

## HumanCar:

# A Futuristic Automobile Innovation



**C**huck Greenwood, CEO, HumanCar Inc is sure that his human-powered car would emerge as the most significant vehicle on the streets across the globe in future. His optimism is well-grounded in an ever-evolving engineering and worldwide focus on alternative sources of energy. In an exclusive interview with Society & Environment editor Seema Sangra, he shares how the whole concept advanced and turned out to be a commercial success. Excerpts from the conversation:

### **How did you conceive the idea of a human-powered car?**

It was 1968. Traffic was at a complete standstill, again, on a busy boulevard in what is now known as the Silicon Valley. Sitting within their cars were many commuters who were overweight and out of shape, breathing unhealthy exhaust fumes. As a young engineer working at my first job at a research and development laboratory for a major corporation, it seemed intuitively that there must be a better way to move people around than this.

Could one create a modest modification that would allow automobiles to interface with a tracked system capable of eliminating the need for drivers or vehicle power for part of the daily commute? It was this inspiration that eventually led to the HumanCar project.

If a “Synchronous Guideway”™ could power and control a car during each leg of the commute, then the vehicle power and weight could be reduced dramatically – so much so that it might be practical to use a mix of human and electric power to propel the vehicle where no guideway

was available. Thus, even without a guideway, the practical use of augmented human power might provide a matrix of benefits including health enhancement, teamwork building skills, and improved traffic flow.

Engineering studies have verified that the lane density (measured by occupants per hour per lane) with an operating Synchronous Guideway is up to ten times greater than that of an equivalent standard-design traffic lane. Similarly, HumanCar, Inc., has verified the practical design for a human/electric hybrid vehicle that provides the benefits listed above, for use with, or without, the availability of an operating Synchronous Guideway.

### **How did the HumanCar actually evolve from the first model to the present one?**

Creative research engineers were expected to suggest projects that might possibly lead to product development at the above-mentioned facility. The search for a useful human power interface for vehicle use began with several test devices that could measure the force available from various muscle groups. It was clear that a bicycle type mechanism, while quite successful as a thigh and calf interface, would not meet the needs of a full-body workout, so early design focused upon a rowing-like motion. The first simple three-wheeled prototype travelled around the area in 1972, and design work began on the remaining components of the entire Guideway concept.

However, this product did not match the goals of the large corporation, so the design and engineering work moved to a rural location in Southern Oregon, USA, in 1975. It would take the next ten years to put together a suitable manufacturing capability and a high-tech consulting engineering business to leverage the

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required skills and machinery to produce serious prototype vehicles.

The 189 MPH (300 KPH) Retro Rod was the next major vehicle design, as it could

represented the culmination of the human power interface design coupled with an ultra-performance envelope chassis design. The FM-4, never intended to be more than a research “skeleton” car, has achieved remarkable acceptance around the world as the first practical four wheel four/passenger full body muscle car.

Finally, in 2000, the engineering and design work on the complete human electric hybrid vehicle began. The Imagine\_PSTM (Power Station) incorporates the essence of the FM-4 while adding the features anticipated at the beginning of the HumanCar project.

### **What are the typical features of the HumanCar?**

We are changing the notion of what features should be considered important. Specifically, the HumanCar® Imagine\_PS Low Mass Vehicle (LMV) introduces a new entrant into the transportation equation. As an exercise-enabled vehicle, it is possible for one, two, three or four people to operate the bi-directional human-power interface. Alternatively, a single operator may operate the vehicle in electric power mode only – or any combination of human and electric power may be employed.

The Imagine\_PS may operate as a plug-in hybrid electric vehicle, as an exercise



rapidly test the limits of the suspension and handling theories developed for the HumanCar project itself. It was and is very successful, turning 1/4-mile drag racing elapsed times in the low ten-second range.

Finally, the FM-4 (Fully Manual - 4 people) was ready to build and test. It



based human electric power station, or in vehicle-to-grid (V2G) mode. Regenerative braking and an advanced power system enhance overall efficiency. Other available features include a human/machine interface (HMI) touchscreen display with GPS and biometric data logging, iPod® integrated sound systems, and Bluetooth® compatible onboard computing/communications devices. The vehicle is especially suited to generate the power required to operate these devices. An all-weather roof shell is available.

This vehicle is 100% sustainable and non-conventional; it reformats our perception of what a vehicle can do for us, and it makes us very healthy at the

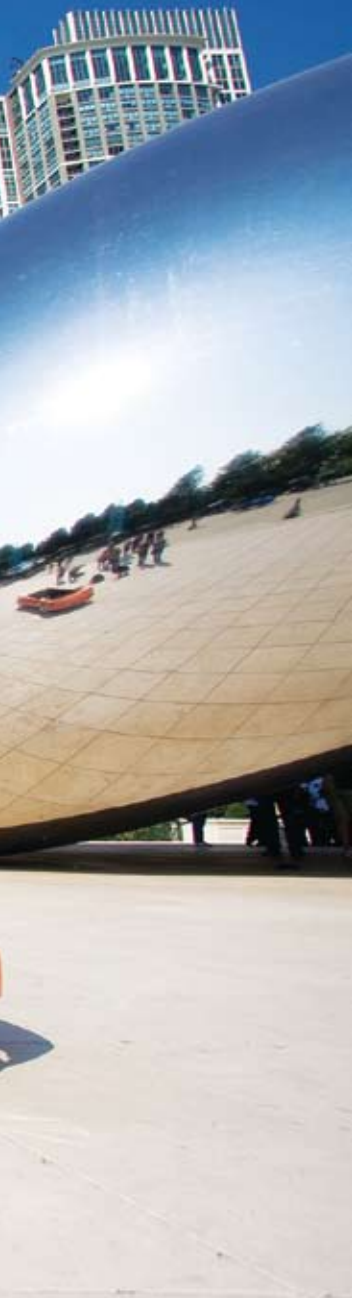
same time. Thus, a new feature is born: one of social responsibility.

**Do you think the HumanCar would ever become a commercial success story?**

Yes. Commercial scale production requires manufacturing partnerships worldwide, with distribution channels via existing up-market automobile networks. We are self-funded, own our facility and over 100 pre-orders exist for the Imagine\_PS. We are essentially profitable right now. Our scalable manufacturing facility is ready to be cloned worldwide for an immediate supply of units. Our 200-year business plan focuses on the production of

geographically appropriate models and guideway systems. The fact that we have gained the respect of engineering professionals world-wide through our introduction of a new market definition (LMV), and the recognition we have earned at WIRED's NextFest 2008 in Chicago USA is already a measure of our commercial success.

We have achieved brand recognition with our target consumer base on every corner of the earth at a small fraction of the research and development budgets of typical auto makers. Profitability in the new economic reality will require this kind of focus and agility with resources. HumanCar recognizes that alternative commodities such as health, family



unity, environmental responsibility and economic independence will emerge as more important criteria for measuring success.

**Why would people buy your car that fails to address significant customer concerns such as safety, speed, manoeuvring etc.?**

People would not buy a car that fails to address safety, speed and manoeuvrability. Some people do purchase vehicles that do not incorporate style, efficiency and usefulness. But why not offer all of those elements and more? The patented Body Steering™ outperforms the typical steering wheel system

that is really just a remnant of sailing ship technology. This advance must be experienced to be fully appreciated. Operator control of high-speed motorcycles and high-performance jet aircraft does not, for example, utilize steering wheels.

Safety is provided by a patented sophisticated and robust structural system that compares favourably to other alternative transportation concepts such as motorcycles, bicycles, micro cars, golf carts, and the many derivative designs similar to these vehicles. Controlled energy absorption areas integrated into the body shell offer additional protection.

No one is exempt from the laws of physics, so there is always an inherent risk when combining vehicles of very different mass and kinetic energy characteristics on the same road. These facts serve to emphasize the need for an ultimate specification requirement: open standards for a Synchronous Guideway platform, where impact risk is effectively eliminated.

**Is the HumanCar suitable for use by the elderly and disabled persons?**

Some of the first visitors to come and visit the lab and get a first-hand look at the FM-4 in operation were a group of elderly persons from a care facility some distance away. A number of people over sixty (one in their eighties) tried the FM-4 and loved the way it allowed them to get a light workout and perhaps most importantly to stretch their muscles while engaging in social interaction. The FM-4 never fails to excite its occupants with a feeling of teamwork and social bonding. It is patented as a teamwork and strength-training apparatus. Several paraplegics have contributed ideas towards making the interface suitable for their needs. Individual adaptations are necessary, as there are many variations in abilities amongst the physically challenged. Universal access is a goal of HumanCar, Inc.

**What changes are you contemplating for the future versions of the HumanCar?**

The public is very adept and sending us feedback about what they would like, for example, the ability to convert the rear seats to a cargo area, and the integration

of child-seating is desirable to many. An important concept of the HumanCar is the chassis itself, which is designed to adapt with evolving technology. As batteries, controls and motors gain efficiency, they may be simply upgraded rather than replacing the entire vehicle. We can use many different power systems and that is a real beauty of the design - it's universal.

Integration of sophisticated proximity braking systems, and multi-stage airbags are going to be a reality for production units in the near future. The introduction of gasbag technology into the structural body itself is being considered as well. Versions that employ more traditional operator inputs are also in development.

The FM4 has operated with thousands of people over many years and we have yet to change any of its geometry or dynamics; the engineering fundamentals are sound. The Imagine\_PS™ is equally robust, and future versions will have ever-advancing power systems. The Imagine\_PS™ may be operated with any power source. It is an automobile platform that adapts to changing technology, just as advanced computers are upgradeable through software and hardware swaps: the key is "plug and play".

**Will it be possible to drive the HumanCar on highways in future?**

Yes. Higher performance versions under development will be able to travel on the highway. Availability of this design will be market-driven in each country. We believe that highways of the future will have integrated systems

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to monitor safety and power and will be built around common standards, such as the 1.2m track width interface for which HumanCar products are currently designed.

### **What are your plans to popul-arize the Human Car?**

Our specific plan is to launch the new Imagine\_PS with international press coverage showing the vehicle driving up to a stage where several socially conscious bands are ready to play music. This entire set is powered by the onboard power system from the Imagine\_PS™. The visual information density of this performance is multi-lingual and beautifully powerful at the same time.

We have been fortunate to have an international grassroots appeal through word of mouth association between communities, demonstrating that the populist appeal is worldwide. With comm-unications opportunities like You-Tube, it takes about one week to communicate new ideas with millions of people. Entirely new concepts like the Imagine\_PS, and the FM-4, are able to take advantage of this new and exciting opportunity - one that has never happened before.

### **Do you have any plans to promote the HumanCar in developing countries?**

Yes. It's our goal to provide an alternative in every single sector of human mobility. Almost every home on the planet could use an inexpensive and uninterrupted power system. A power system that also serves as a car is a major step forward. We are grateful to have this rare opportunity in civilization to create profound change, make healthy people and save the environment that we all share and cherish. So we will focus on developing countries once we consolidate our position in terms of production and distribution networks. ❖

## PATHBREAKING GREEN ACTIVIST



Shafqat Hussain

Pakistani economist turned conservationist Shafqat Hussain launched Project Snow Leopard (PSL) in 1999 to survey and provide innovative solutions for the conservation of this rare cat in Baltistan. This non-profit conservation programme combines ecotourism and low-cost insurance, protecting herders against attacks by the leopards on their livestock. The plan is helping local people realize that one cat alive in the surrounding bush is worth more to them than several killed for the fur trade.

Hussain, aged 41, describes the snow leopard as 'a marvel of nature's perfection' and explains that, sitting at the top of the food chain, this animal plays a key role in maintaining the mountain ecosystem. With a total population estimated at between 4,000 and 7,000 scattered across the Himalayas, including fewer than 150 in Baltistan, the snow leopard is listed as "endangered" on the IUCN Red List of Threatened Animals.

Hussain's broader vision is to demonstrate that humane villagers and feline predators can live side by side. By involving local people, he is gradually convincing the villagers that man and beast can profitably coexist. He sees it as "sadly ironic" that in many places there is more concern for endangered biodiversity than for human beings. "No matter how charismatic an animal is, its survival should not come at the cost of poor human farmers," he says. But he adds that he is "only one of many who are trying to make a difference for snow leopards and herders", pointing out that his project would not survive without local colleagues who run the scheme when he is in London and at Yale University writing his Ph.D. thesis on the relationship between human societies and the natural environment in the mountains of northern Pakistan. ❖