Introducing the HUMO ™

Humo ™ – for people, for the planet

The **Humo™** (**Hu**man **Mo**tor) is **a car powered by human force.**

It offers the following benefits compared to contemporary human-powered vehicles (e.g. bicycles or tricycles):

Efficiency:

- The unique arrangement of the drive-levers enables operation of drive pedals for nearly 100% of driving time – as opposed to 60% for bicycles - and permits use of significantly longer crank-levers than the 150/175 mm levers possible with contemporary bicycles. Even levers 2, 3 or 4 times longer than the longest bicycle crank are possible
- The seated driver position permits use of **the body's strongest muscles** (gluteus maximus)
- There is good potential for stream-lining
- Humos can be used on rails (esp. in **Humoways TM**)

Comfort and safety:

- Humos have 4-wheel stability, impact-absorbing bumpers, and low centre of gravity
- Humos offer good primary visibility from upright driver's seat
- Humos offer good secondary visibility – they can be seen easily by drivers of other vehicles
- Humos give all-weather protection and insulation for quiet and warmth
- multi-person vehicles can be added to the range
- there is no need to dismount from a Humo when stationary

- an electric motor, with rechargeable battery and regenerative charging, can easily be fitted

PRODUCT-ADVANTAGES OVER BICYCLES

Bicycles offer upright, recumbent or semi-recumbent driver positions, which typically allow exertion of force on the drive pedals for only 60% of driving time. By contrast, the Humo offers the same driving position as a car, while also enabling exertion of force by the body's strongest muscles for nearly 100% of driving time.

Recumbent bicycles have reduced primary and secondary visibility – see above.
Bicycles are inherently unstable; recumbent bicycles even less stable than upright bicycles

On a bicycle, the length of the crank-levers is limited. With a Humo, this does not apply.

Further advantages over present human-powered vehicles
The driver can operate pedals while stationary to keep warm and/or boost a battery.
Humos can include desirable features normally found in cars, such as radios, CD players, central locking, 'sat-nav.', air-movement systems etc.
Secure storage can be provided for shopping, briefcase, laptop, toolkit, guitar, violin etc

PRODUCT-ADVANTAGES OVER CARS

Much lower purchase price
No fuel costs or explosive fuel
Low weight, so reduced impact in accidents
Very low maintenance and insurance costs

Low or nil parking and tax costs, possible folding for indoor storage
Greater safety in poor conditions (especially when travelling in Humoways)
Very light, so damage to road and rail surfaces is minimal
The Humo driver's health benefits from the exercise

Efficiency Comparisons:

1. cars - at least **80%** of the loaded weight is the car itself; so 80% of the energy used – whether electricity or liquid fuel – is used on moving the vehicle itself – not the human contents;
   All costs of fuel, infra-structure etc. have to allow for **100%** of the weight;

2. trains - 'Pendelino' type: over **98%** of the weight of a full train is the train itself: i.e. 2% of the weight is the human contents;
   London commuter train – **93%** of the weight of a full train is the train itself: i.e. 7% of the weight is the human contents;
   All costs of fuel, infra-structure etc. have to allow for **100%** of the weight;

3. Humo – assuming weight of Humo is 25 kg;
   Driver @ 8 stone (50kg) + Humo @ 25 kg: Humo is **33 %** of loaded weight
   Driver @ 10 stone (65kg) + Humo @ 25 kg: Humo is **27 %** of loaded weight etc.

Environmental Advantages:

Very low environmental burden in manufacture
Negligible environmental burden in use
No harmful fumes or carbon emissions in use

Project-status so far (Spring 2016)

Prototypes*:* Three prototypes have been built, one static, two wheeled.

Prototype #1 (static). This prototype demonstrated significant efficiency benefits of the Humo principle over a conventional bicycle drive system, through use of a rope-brake dynamometer, using standard 150mm drive-levers.

Prototype #2. The second prototype incorporated the drive system into a safe, comfortable and reliable 4-wheeled vehicle with selectable 450mm and 750mm drive levers. It gave a comfortable cruising speed of 12-15mph and a top speed of 17 - 20mph for people of reasonable fitness - speeds comparable to urban motor traffic.

Its comparative slowness was attributable partly to its weight (80kg), its lack of streamlining, and to limitations in the drive-system (see next paragraph). Total weight was equivalent to that of a 15kg bicycle carrying both a rider and a 65 kg passenger. This was because a conventional steel go-kart kit intended for petrol-engine use formed the chassis.

Prototype #3 – built 2013/14
This third prototype was planned with better gearing, much lighter construction, and 'fared-in' streamlined superstructure. Unfortunately, in actual building, the advantages of low weight were overlooked and the vehicle weighed 115 kg., even more than Prototype #2. Anticipating a build-weight of about 25 kg, I had specified a lever-length of only 260 mm. The measured speed-was 7 mph.

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