

Shift 2009 Cambridge



The New Auto Industry: New Brands and Opportunities

Steven Cousins - Managing Director

Axon Automotive

Lightweight Vehicles
for Low Carbon Futures

Conference by
Cambridge Investment Research Strategy
www.hvm-uk.com

Many factors for success....



- **National Focus / Advantage**
- **Timing / Surprise**
- **Fundamentals / Physics, Economics**

Materials and Brands



CAR = VEHICLE PLATFORM + PRIME MOVER

FUNDAMENTAL CO2 = Mass x Acceleration

**Mass = materials
(brand core competence)**

Acceleration = brand choice

Materials and Brands



CAR = VEHICLE PLATFORM + PRIME MOVER

SHIFT 1 Prime Mover eg EV, PHEV, Small IC

SHIFT 2 Body materials and manufacturing

The latter enables different economics of scale and allows for new entrants and new Brands

New Brand success...is...



- Largest EV producer
- New range of well styled models
- GM's partner for EV in India
- Spearheaded EVs in London/Europe

REVA G-Wiz

EV Market size UK in 20 years



- Pure EVs 10%
- Plug-in Hybrids 30%
- Internal combustion/hybrid 60%

Then surprise may change this eg
Hydrogen or small IC

Axon as a New Brand

Axon

AWARD-WINNING

thescottishsun.co.uk/motors

SCOTTISH Sun

MOTORS

1st picture

BY PHIL LANNING
Motors Editor

THIS is the UK's latest plug-in hybrid electric eco car – and it even has seats made out of recycled jeans and pin-striped suits!

The car, built by Axon Automotive and unveiled at the Milton Keynes Science Festival this week, can run on full electric mode and uses a petrol or bio-ethanol combustion engine for long journeys.

It boasts a CO₂ figure of just 50g/km, achieved by using lightweight materials and its ultra-aerodynamic shape.

The Axon is a multi-purpose vehicle built for two adults, with good luggage space. It has fashion house-designed seating made from old clothes, and door panels made from recycled carbon fibre.

Axon insist that electric-powered vehicles should clarify the emissions used to make the electricity they use.

MD Dr Steve Cousins said: "We have had our emissions calculated to include typical UK power station emissions when driving in electric mode.

"The result gives us just under 50g/km for the mix of electric and petrol used in the Government test. This is just half the level needed for free annual road tax."

It has been funded by the UK Technology Strategy Board, which also backs Scottish firms Allied Vehicles and Axon, who make lithium-ion batteries. The first cars will be on sale in 2011, with full production in 2012.

Mega Drive – See over

AXON

Plug-in Hybrid Drive electric

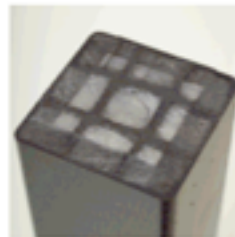
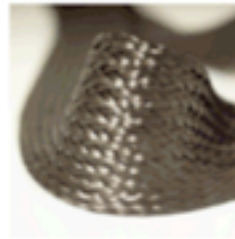
IT'S JEANIUS

Lightweight Vehicles
for Low Carbon Futures

Steel to **Carbon** : that's us too



Steel to **Carbon** : that's us



- Low tooling cost
- Mature market with many models – great competitive advantage
- Half weight, half power. Same P:Wt ratio, half CO2

Steel to **Carbon** : that's us too



- Axon** – 500cc petrol engine
- plug in hybrid
 - 470 kg 130 mpg
 - carbon fibre chassis frame
 - 2 seats plus lots of luggage

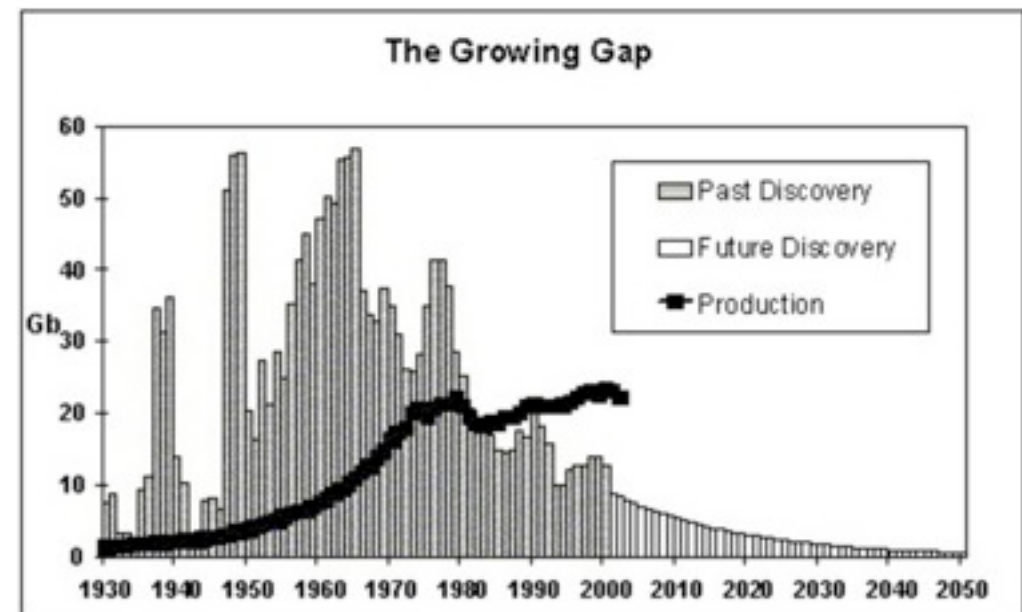


- Prius 1/x** – 500cc petrol engine
- plug in hybrid
 - 420 kg
 - carbon fibre chassis frame
 - 4 seats little luggage
 - 150 mpg

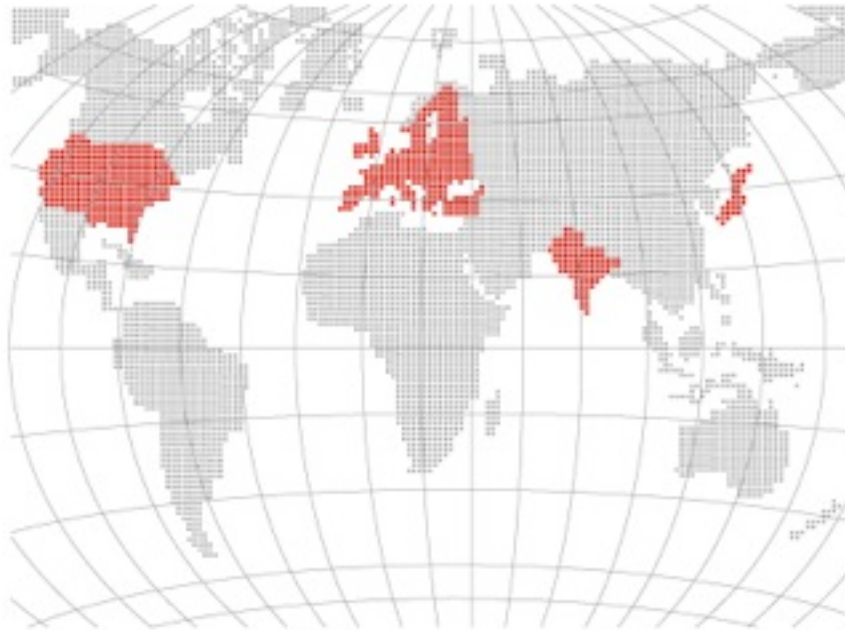
Steel to **Carbon** : Oil strategy

- Aircraft Industry now Carbon fibre led
- Tokyo University projection/simulation 100% of car production carbon by 2020
- A 2020 strategy for Japan given the prospect of 'peak oil'

Timing

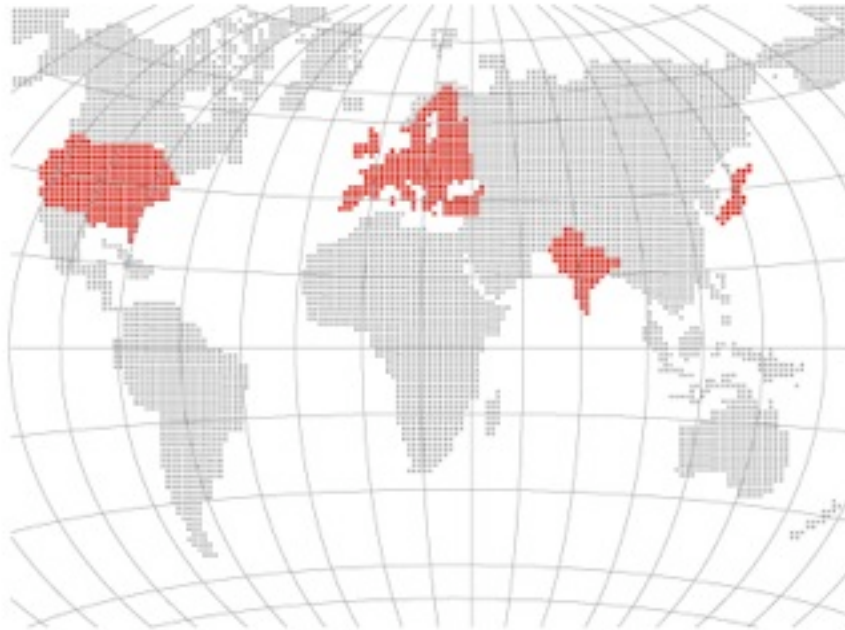


Geographical Advantage



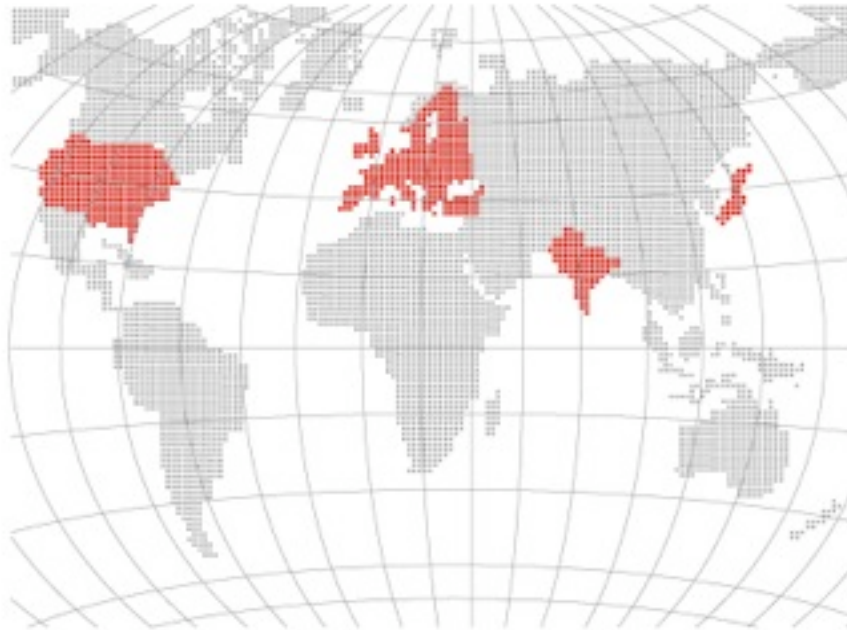
- **Electricity abundant**
- France Nuclear
- Denmark Wind
- USA Coal
- **Therefore Electric Vehicles make sense**

Geographical Advantage



- **UK strengths**
- IC engines
- Composites
- Design engineering
- **Electricity deficit**
- UK rebuild existing supply

Geographical Advantage



■ India strengths

- CNG infrastructure
- Compact car mfr
- R&D facilities

■ Electricity deficit

- increasing supply

Why Axon will succeed



Steve Cousins, Managing Director

10 years Cranfield University Honda centre
£100M Foresight Vehicle Programme

John Hall, Strategy Director & Chairman

Director of Strategy Jaguar-Land Rover
Director 3 Range Rover designs, BMW

David Payne, Director Automation

BAE systems, Vision Controls SME

Kevin Lindsey, Director Engineering

Lotus, MG Rover, Gibbs Aquada

Lightweight Vehicles
for Low Carbon Futures



Future UK Car Manufacturing



UK assembles high volume cars

Has no domestically Owned and Head Quartered Manufacturers

8 new UK O&HQ Manufacturers, vol 50,000 target 2015, 450,000 2020. This is a new Sector.

Future UK Car Manufacturing



New Brands are enabled by new manufacturing techniques

They enable new customer relations and the SHIFT to new fuels – EV, Plug-in EV, small IC and H2