



## **Fit for Purpose -**

Redefining the city car

## **London's Calling -**

Developing a zero emission taxi

## **Q&A with BioMCN -**

Rob Voncken, CEO

## **Launch Control -**

Behind the scenes on the Evora first drives



# Welcome

**Last week saw Lotus and many other vehicle manufacturers participate in the London to Brighton Eco Rally. The rally culminated at City Hall and was welcomed by Boris Johnson, Mayor of London and a strong advocate of environmentally friendly vehicles. London has ambitions to lead the world in the electrification of its road transport, a technology choice that many cities are embracing.**

Electrification is a high-profile option among the array of emerging routes for cleaner vehicles and urban commuter transport is an area where electric vehicles do make sense, although the support of national and city government is a necessity if they are to succeed. Just as important, though, are vehicles with the usability, affordability and desirability to motivate car-buyers to make the change to electric. These were major requirements in the Lotus Engineering city EV concept study featured in this issue, and which brings together our thinking in vehicle architectures, hybrid and electric propulsion and design for this challenging segment.

While the city EV concept may provide a blueprint for future urban vehicles, today, in Britain's capital, the ubiquitous black cab is an icon of London's streets. Although its appearance may be familiar, by the time the Olympics come around in 2012, the work that Lotus Engineering and its consortium partners are doing may mean that under the skin, the black cab taking you to the stadium might be very different. The series hybrid, fuel-cell powered London Taxi project is another step towards cleaner city transport. I'm sure it would get Boris's vote.

Peter Morgan

Marketing Manager – Lotus Engineering



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According to *Reuters*, Toyota said the Lexus was roomier, wider and longer than the Prius hybrid with which it shares a platform



## US: Lexus launching first hybrid-only model

While General Motors has axed its hybrid version of the Chevy Malibu for the 2010 model year, Toyota hopes to sell about 25,000 of its new Prius-based hybrid-only Lexus HS250 model in the United States in its first year.

The sedan is the luxury brand's first model to be offered only with a hybrid powertrain.

"More than 60% of entry luxury sedan buyers said they would consider hybrids, and this is a segment nobody's in right now," US Lexus chief Mark Templin told *Reuters*.

Toyota has sold over 1m Toyota and Lexus hybrid models in the US so far, accounting for over half of its global hybrid sales.

It has taken a 75% share of all hybrid vehicle sales in the US over the past decade.

According to *Reuters*, Toyota said the Lexus was roomier, wider and longer than the Prius hybrid with which it shares a platform.

Its 2.4-litre petrol engine is larger than the 1.8-litre unit in the latest Prius.

**Source:** just-auto.com editorial team



## UK: Rolls-Royce has 1,500 potential Ghost buyers

Rolls-Royce has received around 1,500 serious expressions of interest in its soon to be launched Ghost model – a figure that would more than double the group's annual sales.

The BMW-owned brand would not unveil the new car until September but has generated "overwhelmingly positive" feedback after touring the world with a prototype, chief executive Tom Purves told the *Reuters* Global Luxury Summit in London.

"Over 10,000 people have expressed some sort of interest, but at least 15% have expressed a genuine desire to own the vehicle."

Rolls Royce sold a record 1,200 'Phantom' vehicles in 2008, but Purves said he expected sales to be flat this year as the economic downturn bites.

"We are trading reasonably well, just not on the scale of last year," he said, adding that the luxury end of the car industry was typically late to enter recession and late coming out of it.

Purves also said Rolls-Royce was delivering a profit to its loss-making German parent.

"We expect to continue to make a [profitable] contribution," he said.

He added that in his view the economy had bottomed out.

"We are bumping along the bottom ... I do not see things getting any worse," he said.

**Source:** just-auto.com editorial team

## SOUTH KOREA: LG Chem starts on new Li-Ion cell plant

LG Chem has said it will spend KRW1tn (about US\$800m) on a new factory to produce secondary cells for energy-saving cars.

LG is targeting KRW2tn in sales of rechargeable cells by 2015 and to reach 20% of global sales of batteries for electric and hybrid vehicles, vice Chairman Peter Bahn-suk Kim told the Korea Herald during a ground breaking ceremony.

LG expects the investment will create 3,000 new jobs by 2015.

In January, LG Chem said it would supply GM with lithium-ion batteries for the Chevrolet Volt.

The global demand for secondary cells used for electric and hybrid vehicles is projected to rise to kRW10tn by 2015, when the eco-friendly car market expands to 4.6m vehicles. Currently, the annual output is set at 900,000, according to LG.

**Source:** just-auto.com editorial team

## JAPAN: EVs viable only as compact commuters – Toyota

Electric vehicles are a viable option but only as compact commuters, a senior Toyota official said.

“Even though it is often said that the era of electric vehicles is just about here, fundamental issues surrounding [them] still remain unsolved with the latest lithium-ion battery technology,” Masatami Takimoto, the executive vice president in charge of R&D, told a group of European journalists visiting Japan.

Takimoto noted that Toyota had marketed an all-electric RAV4-EV about a decade ago but its limited cruising range, long charging time and the high price due to the need to use large batteries meant it “unfortunately failed to gain wide support among consumers”. Most of these issues remained, he added.

Toyota showed an ‘e-com’ concept, based on the production petrol iQ, at the Detroit show in January.

“We are developing electric vehicles with an aim for mass production by around 2012,” Takimoto said.

He said battery rental schemes may eventually be one solution to the range question but said that it was “too early” for them to be a practical proposition yet.

“As an idea, battery exchange is interesting. The battery technology is continually evolving. When a battery can be standardised so that it could be used by all [auto] manufacturers then [an exchange system] would be feasible.”

For now, Takimoto reckons plug-in hybrids (PHVs) are the “most practical way to use electrical energy”.

The company will start leasing “a third generation Prius-based PHV with lithium ion battery at the end of this year to a mix of selected customers. About 500 units will be trialled worldwide mainly in Japan, the US and the EU.

Takimoto said the plug-in starts with the latest Toyota Hybrid System and adds enhanced battery capacity and equipment to enable recharging from standard electrical outlets.

“While it operates as an electric vehicle in short-distance driving, it automatically shifts to a conventional hybrid with excellent fuel efficiency in mid- and long-distance driving.

“In addition to minimising the burden of an expensive battery, users are free from concern over remaining battery charge.”

Li-ion is not the holy grail, yet.

“For commercialisation of full-fledged electric vehicles or pure EVs, an innovative battery needs to be developed that far exceeds the performance of the latest lithium-ion batteries. To promote R&D for the next generation battery, we established a battery research division at our Higashi-Fuji Technical Centre last July,” Takimoto said.

Nonetheless, Toyota was also looking at other power sources other than electricity such as synthetic liquid fuels, biofuels and natural gas.

Fuel-cell hybrids remain a focus as they use hydrogen most efficiently.



“Depending on the energy situation in each country, in the future, we plan to distribute the best-suited alternative energy vehicle based on the ‘right car for the right place at the right time’ concept,” Takimoto added.

He said though there was debate over whether fuel-cell or electric vehicles were the better future eco-car candidates, Toyota believed several types of vehicle running on different power sources would co-exist “as no single automotive power source as suitable as oil exists”.

He said the hybrid technology Toyota had a ten-year head start on was the “core technology for every form of future automotive mobility” and the automaker would keep promoting its development.

In answer to a question, he said the combination of a diesel engine and hybrid technology was still too costly due to the added cost of cleaning the diesel exhaust. The payback period for the consumer was still too long, in Toyota’s view.

He also said Toyota had no plans to switch from nickel metal hydride (Ni-MH) batteries for its regular hybrids. “It’s proven technology and [our] choice for hybrids for the foreseeable future. The cost and long-term reliability of Ni-MH was stable and ideal while lithium-ion technology was still evolving.

**Source:** just-auto.com editorial team

## GERMANY: 'High-beam assistant' won't dazzle

Mercedes-Benz says the new E-Class is equipped with a new innovation that means it is the first car in the world where the headlamps continuously adjust to the respective traffic situation.

The system, it says, was jointly developed by Daimler and Hella engineers and gives the driver the best possible road illumination without dazzling other road users.

The new 'high-beam assistant', which is available as an option, uses a camera on the windshield to detect oncoming vehicles or vehicles travelling in front, and controls the headlamps so that the light cone ends before the other vehicles.

The range of the low beam can also be increased from 65m to up to 300m and, if the road is clear, the system gently switches to high beam. As soon as the camera detects other road users at a distance of up to 800m, the range of the headlamps is correspondingly adjusted "within milliseconds". The system is available from a speed of 35mph.

Mercedes says the tests prove the system offers enhanced safety. Despite oncoming traffic, groups of pedestrians at the edge of the road were detected at a distance of around 260m which is 150m earlier than with a conventional low beam.

In addition, the system contributes to taking the strain off the driver as he or she no longer needs to operate the dip beam controls and can concentrate on the task of driving.

"The system is based on the interaction of image-producing sensors, powerful software for image processing and state-of-the-art lighting technology," says Steffen Pietzonka, head of lighting marketing at Hella.

"In addition to the maximum possible visibility for the driver, the dazzling of other road-users is ruled out as the headlamp cone always ends at their vehicles."

**Source:** just-auto.com editorial team



## US: TRW capacitive touch sensing replaces buttons and knobs

TRW says it is breaking new ground in the development of capacitive touch sensing technology for interior controls.

The new touch-sensing technology replaces traditional buttons and knobs and allows occupants to control vehicle functions with a fingertip – similar to touch screen technologies used in consumer electronics.

TRW claims there are many potential benefits for the use of capacitive touch sensing, and TRW has already developed its Touchpad technology to include a multifunction control module which can interface with driver information and communication systems.

A key feature is the capability for handwriting recognition that the system recognises as shortcut commands. This combines control functions to help reduce driver distraction and enables fast and intuitive operation of mobile phones and navigation systems.

In addition, touch-sensor controls present significantly thinner surfaces than traditional mechanical controls such as knobs, buttons or sliders, and are lighter in weight, TRW maintains.

They are also flexible and can be spread over more complex, uneven surfaces providing numerous styling and design options. The end result, it says, is a seamless surface that can accommodate increased functionality while eliminating historical packaging, fit and finish challenges.

"With nearly a decade of research and development in capacitive touch sensing, TRW has made great strides and we are very excited for the future of this technology," according to Victor Peltola, Director of Sales for TRW Body Control Systems, North America.

"As interiors evolve to reflect the wider trends in electronics, TRW is at the forefront of technologies that will transform interiors into a more customised and efficient space for occupants."

And capacitive touch fits very well into the trends of personalisation and customisation. Through the use of advanced materials, touch sensor surfaces can be semi-translucent and backlit with customised colours.

The production process also offers more flexibility and makes it easier and less expensive to experiment with new functions and designs, TRW says.

**Source:** just-auto.com editorial team

## New format for Lotus Cup Europe gives new dimension to club racing

The Lotus Cup Europe has started with a new promoter and new format to give a new dimension to club racing.

The first round was at Brands Hatch over the weekend of 1-3 May as a supporting race to the World Cup of Motorsport Formula A1GP International program.

The series is being organised and run by Lotus On Track Racing Drivers Club (LoTRDC) who, with MotorSport Vision Racing, also run the highly successful Elise Trophy race series in the UK.

Mike Kimberley, Chief Executive Officer of Group Lotus plc said: “Lotus cars are perfect for a race series of this type, as the drivers have the ability to race at a rewarding pace and drive the car to and from the event as well. The series, which has been created for Elise, Exige and 2-Eleven cars, means that our pan-European owners and drivers now have even more of an opportunity to exploit their cars and skills on the racetrack.”

Paul Golding, LoTRDC Director and Series Coordinator, commented, “The outstanding success of Elise Trophy from its inception just two years ago has shown there is tremendous enthusiasm out there for Lotus in racing – not just among the competitors but also from the many Lotus owners and fans who follow the series from circuit to circuit. Now with Lotus Cup Europe there is an added dimension, with the opportunity to both race and spectate at some of the greatest circuits in Europe.”

The Lotus Cup Europe Series, now in its sixth year, started in 2004 as a direct response to customer and Lotus Dealer interest in a ‘fun’ but professionally run motorsport series in Europe. During that time it has attracted many competitors from all over Europe, a large number of whom have been new to Lotus cars and racing. Anyone holding a current driving licence and is living in Europe can compete in Lotus Cup Europe. All that is needed is a National Race Licence from the respective European country’s motorsports authority and a Lotus, of course!



The Lotus Cup Europe aims to provide a friendly, safe and financially viable series for those wishing to race a Lotus Exige, Elise or 2-Eleven in Europe.

There are three classes within the Lotus Cup Europe series and all cars run on Yokohama A048 ‘LTS’ and ‘M’ control tyres.

**Production Class:** For series 1 and 2 Elises with a maximum hub power of 151bhp (170bhp fly wheel) and a minimum combined weight of driver and car of 825kg. Also open to standard Series 2 Exige and 111R Toyota engined cars with a maximum hub power of 169bhp.

**2-Eleven Class:** For standard and slightly modified 2-Eleven cars\*.

**Exige Cup Class:** For Exige S2 Cup cars and S2 Exige variants – for Exige variants up to a maximum of 235bhp at the hubs (260bhp at the flywheel) with a minimum weight of 850kg. Includes Lotus Cup 260, Lotus Cup 255, Lotus Cup 240, Lotus Cup 190 and Lotus Exige S.

A typical race meeting will involve a 20 minute practice session, followed by two 20 minute races. At some rounds free practice will be available and there will be an option of a test or track day. The second 20 minute race may be held in a ‘reverse top ten’ format.

### Forthcoming races for 2009

- |                                 |               |
|---------------------------------|---------------|
| 1. Hockenheim (Germany):        | 20–21 June    |
| 2. Donington Park GP (UK):      | 15–16 August  |
| 3. Dijon Prenois (France):      | 4–5 September |
| 4. Spa Francorchamps (Belgium): | 2–4 October   |
| 5. Le Mans (France):            | 24–25 October |

**Source:** Lotus Cars

\*Full Event Regulations and step-by-step instructions on how to enter a race, together with paddock and track procedures can be found at [www.lotuscup europe.com](http://www.lotuscup europe.com).

# LOTUS

# Fit for Purpose - Redefining the city car

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There are an increasing number of urban clean air and congestion zones and tax incentives in Europe

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**Automotive Engineer magazine asked Lotus to design a concept to show how far city car design could go. The result shows how future vehicles could become much more tightly focused on their real purpose.**

Buyers are downsizing their vehicles and engines to save money and fuel. Purchases of city cars are on the rise. But how could you improve on the Smart ForTwo and Toyota iQ? That's the question we asked Russell Carr, head of Lotus Design – and would he also sketch his ideas for *Automotive Engineer* magazine? Carr thought it would only be worthwhile with a proper technical brief.

A month later, I had the chance to sit in on a brainstorming session for an initial concept for *Automotive Engineer* with Carr, Lotus Engineering's technical director Simon Wood and vehicle architect Richard Rackham. They would then have just two weeks to come up with some sketches and basic layout ideas – 10% of a normal project's concept phase.

I was surprised by how radical some of the thinking was – and how down-to-earth the answers could be. Early on we agreed that the vehicle should be able to carry up to four people or two people with luggage, and that the seating position should be high to improve visibility.

People like to buy cars that cover all possible eventualities – that's why the C-segment is so popular. For 99% of the time it may just take you to work or the supermarket, but nonetheless you feel compelled to buy spare space for those rare, crowded family excursions or surplus power for the motorway driving you do once a month.

Wood started by suggesting that the car should focus on meeting the requirements only of the average European journey, rather than all eventualities: "People don't travel far," he said. "More than half of all journeys in the UK are less than 11km. City journeys are shorter, but take longer. A range of a little more than 22km would meet most of our requirements. You'd want good acceleration from 0 to 65km/h but a top speed of 105km/h is probably adequate."



For that sort of range and performance, an electric vehicle makes perfect sense. There are an increasing number of urban clean air and congestion zones and tax incentives in Europe. London is also considering allowing electric cars to use bus lanes. It all helps to create a market.

But a vehicle with a range of just 25km? How acceptable is that really? Carr had been driving an electric vehicle a few weeks earlier and found himself worrying about the battery, even switching off the lights at junctions in a bid to save energy. Rackham argued that we do need people to be more conscious of the energy they consume, not just in cars, but all the time: "Range awareness is what should come out of all this," he said.

GM's answer is to add a gasoline engine, just in case. Lotus suggests that the reason we're in this mess is because we're carrying around tonnes of metal and cubic metres of space that we don't need. A city car designed for tighter parameters and a simple charging infrastructure if you break your journey or a service that can deliver an additional battery should suffice. Many households have more than one car in any case.

"An electric vehicle also frees up some space to preserve other types of cars," said Wood. "When cars came along, it allowed people to enjoy horses more for recreational use."

"Even so, a fundamental part of the platform should be the ability to add greater battery capacity," said Rackham. "You'd need it in any case for winter when consumption increases. You could lease another battery that slides into the car."

At the moment the notion of standard replacement batteries poses problems; the technology is young and awkward still. Wood made the point that torch batteries started off with some quite elaborate designs too, but soon evolved into standard sizes. He expects the same to happen in vehicles too, albeit with planar, not cylindrical, cells.

Wood then calculated that, given that power consumption of 200W/km is typical in a small car, a 10kW battery

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Because the car must be small, safe and manoeuvrable, all agree that rear-wheel drive is best

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would give a range of 50km – just enough to reassure people. That would weigh around 100kg. It's clear that you would not want to carry the winter battery when you didn't need to. Recharging that with a standard 13A plug that delivers 3kW would take three-and-a-half hours. Kitchen circuits have 32A and could speed this up but, besides the size of such plugs being cumbersome for elderly drivers, most electrical substations are designed on the assumption that domestic baseloads are around 2.5kW and 10A, said Wood.

Put a street of cars on to charge at 32A and the lights go out in your neighbourhood.

Controlled charging is what's needed. In the UK, a signal from the BBC switches on many houses' night storage heating at half-second

intervals to avoid blowing the system. Some sort of GPS-based approach could do the same with vehicles.

Rackham likes the idea of taking energy from the car to manage the electricity in his home, to avoid buying energy from the grid at peak-time prices. "I'd love to be able to have a wind generator that stores energy in the car battery and which could also run the house," he said. "There's massive potential in a more holistic approach."

The detailed business of plugging in the car came under scrutiny too. In Japan, thieves have targeted the thick cables for their valuable copper content. The solution, Lotus reckons, could be to park the front wheels on a device with a cantilever that automatically locates a connector with the car's socket. Solar cells on the roof could provide free additional charge.

Because the car must be small, safe and manoeuvrable, all agree that rear-wheel drive is best. The steering angle at the front will be greater as a result. The drivetrain would be simple: a single motor with around 30kW, a reduction gear and a button for forward and reverse. Rackham suggested a motor with an in-built epicyclic transmission to which the driveshaft could attach: "The five-to-one reduction we'd need would be big for a single gear, but not for an epicyclic. The output would be in line with the motor's axis so you could have a hollow motor and put the shaft through it with the joints at the wheels."

The consensus is that the platform should have a sandwich floor that holds the batteries, inverter and power electronics and keeps the centre of gravity low. The wheels go at the extremities. "It needs to be lightweight, so an extruded aluminium spaceframe with a flat sheet underbody would suit," said Wood. "It shouldn't be complex."

Carr pointed out the need for a substantial structure across the front to hold the steering wheel and doors. Another behind the front seats could provide rollover protection. These will also protect against front and side impacts. "The body would be pressed aluminium or composite, depending on volumes," said Carr. "A utility version could have tough moulded plastic for its pick-up area."

Wood's keen to have sliding doors to get the car into tighter parking spaces. That's been tried before with limited success, but buyers might be more receptive in a more radical vehicle concept.

A diecast magnesium or aluminium unit with a pressing on the exterior gets the thumbs-up. Metallic parts are also specified for around the door to ensure the dimensional accuracy for the sealing and a quality feel. There is some creative tension when it comes to the wheels. The engineers want them to be 12 inches and narrow, arguing that most cars today are "over-tyred". The designer wants a cool-looking car. With a cuboid, that's not easy.

"The car's going to be shorter and taller than normal," said Carr. "It needs personality but, with those proportions, you've got to be careful it doesn't become cartoon-like. The trick will be to make it look a little bit low and sporty. I have ideas to do something quite different inside, if we can move some of the boxes for HVAC and infotainment electronics under the floor."

He suggests that by 2015 it might be realistic to have a docking station for the driver's BlackBerry or iPod; other in-car entertainment

# Fit for Purpose - Redefining the city car

“ To give the car a tiny turning circle of 6.5m – the iQ’s is 7.8m – Lotus has given the car a very large steering backlock of 55° ”

would be superfluous. Linking it into the car using Bluetooth would dispense with a lot of weighty instrumentation and wiring.

The session produced a lot of ambitious ideas for the engineers and designers to explore. But with just a couple of weeks to come up with some concrete ideas, the real challenge was in the give-and-take between the two sides and integrating all the knowledge around automotive engineering and electrical systems into one package.

In the end there are some very interesting ideas. Rackham and Mark Soukal, the package engineer who brought it together, achieved a lot. There are two blocks of four batteries, each with capacity of 10kWh. The first block provides the basic 50km range, the second is bought or leased for winter use or extra range.

The batteries are air-cooled, not water-cooled. The air comes in the front of the vehicle through the composite crash structure, through the air-conditioning condenser, and then along a tunnel in the floor section between the batteries. This cools the cells and assists the water-cooled e-motor in the summer. “In the winter, the air flow is blocked,” says Rackham. “Instead warm air from the motor’s radiator is pumped the other way up the tunnel to keep the batteries at an efficient operating temperature. Other heat generated is also allowed to pass through the floor to the interior.”

The wishbone suspension is simple. “We wanted to make this thing a bit nippy and fun to get people into it,” says Rackham. “It may not be a double wishbone with a damper; it could be a strut type. We didn’t look into this too much but we’d definitely use the same suspension components on all four corners.”

To give the car a tiny turning circle of 6.5m – the iQ’s is 7.8m – Lotus has given the car a very large steering backlock of 55°.

“It might be too extreme,” says Rackham. “We’d do some simulations and mules to check out the manoeuvrability of the suggested wheelbase, rack and steering angle.”

In the end, the engineers opted for a conventional motor with driveshafts in an attempt to keep the materials down. Having two pancake motors in the hubs would have been expensive.

## Package deal

These drawings are the result of just under two weeks’ work. A typical concept phase at Lotus lasts between three and six months. In that time, the engineers would devise a package for the stylists to put some lines around.

They would then build a seating buck to check the CAD assumptions on the internal package. This would then feed back into the

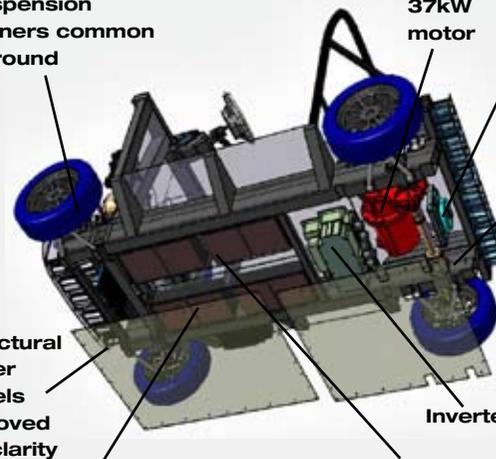
mechanical package, improving the ergonomics and fine-tuning the styling.

After three months and several loops, the car should look good, function correctly and be built to cost. This isn’t the finished item, but shows massive advances in a short space of time. The electric platform is new for Lotus.

**Occasional seating capacity, three 95th plus one 50th percentile behind driver**



**Suspension corners common all round**



**Structural under panels removed for clarity**

**Air cooled batteries according to usage and climate**

**Battery packs loaded from below, base capacity 10kWh. Optional additional 10kWh also shown for extended range or extreme climates**

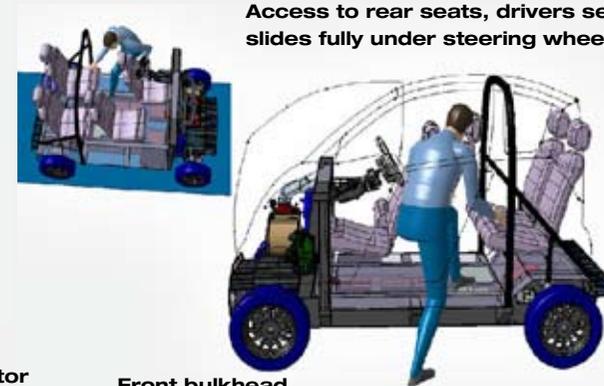
**37kW motor**

**Motor cooling radiator**

**Simple bonded aluminium lower structure can be stretched for other variants**

**Inverter**

**Access to rear seats, drivers seat slides fully under steering wheel**

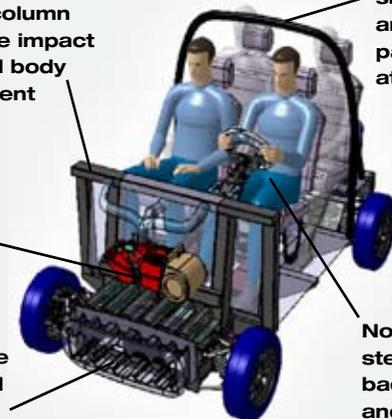


**Structural hoop for seat belt attachment, roof crush, side impact and body panel attachment**

**Front bulkhead structure for column mounting, side impact protection and body panel attachment**

**Blower and distribution unit with heating element**

**Composite low speed energy absorbers front and rear**



**Non assisted steering, 55° backlock and 1870mm wheelbase gives 6.5m turning circle**

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The lower structure is dominant. It's a thick platform with two rails that run front to back. It looks like a car from decades ago, but they are joined with sheer panels under the seats and under the batteries. The result is a 150mm-thick rollerskate from which the car derives all of its integrity, stiffness and crashworthiness.

"The simple bonded aluminium lower structure can be stretched for other versions of the vehicle," says Rackham. "It's simple and scaleable for volumes up to 100,000 units."

The bulkhead structure in front of the occupants holds the steering column and offers somewhere for the door hardware. It also provides side-impact protection. Lotus used the hoops on the Lotus Evora and found that with them the upper body creates a lot of additional stiffness.

"I could imagine this and the roll hoop folding flat on the platform," says Rackham. "It could then ship flat-packed for body styles to be fitted locally. Obviously, all the upper panels will be lightweight, because we need to keep the mass as low as possible, so that it feels much more planted."

The crash structure comprises sacrificial composite energy absorbers that can be replaced cheaply. The material suits cars with short overhangs because the composite has no residual crush length. It just turns to dust. An aluminium can compresses to around a sixth of its length and then becomes solid. The car was to be a one- or two-seater capable of squeezing a couple more people in, if necessary. "Well, three people fit," says Rackham. The front passenger sits further forward than the driver, so you can just squeeze another 95th percentile behind him. A 50th percentile can fit behind the driver."

The engineers conducted CAD studies to assess access to the rear seats. The front seat's travel is longer than usual. The seat slides completely forwards to touch the steering wheel to let you climb into the back. "There is legislation that requires the seat to be at the halfway point on its runner for the crash test," says Rackham. "We'd make sure this extended runner travel would only be accessible when the door is open. The sandwich floor gives us the chance to sink the runner into the floor. A groove would be the only thing visible."

The red car shows the door sliding forwards, the blue moving rearwards. "We'd decide on the better option after looking at a seating buck study," says Rackham. "If it slid forward, it would need to move out at the bottom to clear a front wheel with some lock on



it. It would increase the clearance for you to get your foot out at the bottom of the door, however."

The door appears to have a kind of articulated hinge, similar to the system developed by Dura. It allows conventional doors to open like sliding doors. The door is lightweight to make it easier to handle with just enough inertia to shut it. "It certainly wouldn't be a van door," says Rackham. "It would be common across all variants and we'd invest in a magnesium diecasting for its inner."

The styling ideas worked out well. City cars tend to be very tall, very slabby and quite narrow, creating an interesting visual challenge. Designer Jon Statham's concept, the red car, is mature, definitely not toy-town.

He came up with a series of visual devices to alter the car's appearance. The side window links to the front and rear lights to create a graphic that's longer than the car's side. Similarly, the windscreen extends into the solar panels on the roof.

"The body side would be almost flat," says Statham. "So I've introduced some section changes, light and shape to break it up.

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The car is also surrounded with soft rubber trim, protecting it from low-impact knocks in cities where they engage in 'tactile parking'

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Some high-tech detailing would give this car credibility. The LED lights and solar panels are part of this idea."

The car is also surrounded with soft rubber trim, protecting it from low-impact knocks in cities where they engage in 'tactile parking'. The strip along the sill is the sandwich floor, but by turning it into a black panel it cuts down the visual height.

"The interior gave us a chance to rethink things," says Statham. "Current car seats are quite bulky. I had in mind the Herman Miller office chair – a thin-walled, composite structure that supports mesh panels. When you slide the seat forward, the steering wheel would show through its back, and provide a little extra space for people to get in."

The rear seats fold down to create extra space for storing luggage and shopping.

The instrument panel is a simple, one-piece moulding with airbags at the top. A common vent runs across it and there's a useful tray and a cup-holder. There's also a head-up display to link the satnav and the speed, quite useful in a city.

# Fit for Purpose - Redefining the city car

“

It's clear that we need some fresh thinking too when it comes to legislation for electric and city cars

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“The screens could be reconfigurable LCD displays, styled by the occupant to be either a traditional layout or more high-tech and trendy with the HVAC and music controlled from the side pod,” says Statham. “The paddle on the other side is for gear selection: forward, reverse and neutral.”

The blue car, is an attempt at adding visual excitement to a car with proportions that aren't very dynamic. The strong graphic breaks up the side and deceives the eye as to the door's shape. There are also changes in the texture and a chamfered surface below the door aperture. “The texture is like a golf ball, but the dimples' diameters change to emphasise the panel's contours,” says designer Barney Hatt. “You wouldn't necessarily be scared of scuffing the bumper, it could even emphasise the car's graphic quality.”

It's clear that we need some fresh thinking too when it comes to legislation for electric and city cars. Current regulations are based around cars with an internal combustion engine that can travel 500 miles on a tank of fuel, carrying five people, with a completely different duty cycle to city cars' lower speeds. A lot of electric cars are designed instead around quadricycle laws – that really is dangerous and the loophole should be closed.

It's possible that in the future only cars of a certain footprint will be allowed into cities. There are signs we're moving in that direction already. If urban areas were populated only with small, light cars moving at low average speeds, safety regulations could then focus more sharply on specific duty cycles.

Similarly, Lotus's concept has foundation braking only on the front axle – the rear braking is purely regenerative and does most of the work. There are many more areas of the vehicle that need to be readdressed for the sake of efficiency.

It's important to stress that this isn't a Lotus city car – it's a concept they could develop for anybody in their usual behind-the-scenes manner. The aim was just to illustrate to readers how far we could take city car design. Of course it's also a chance for them to show off the speed at which they work and to promote their “versatile vehicle architecture” philosophy.

We all see a lot of concept cars at motor shows, but most suggest that technology can allow us to drive just as we always have. Perhaps that's why most fail to capture the public's attention.

What I like about this concept is that, like the Tata Nano, it asks us to think differently about personal mobility. This nameless little car may be restrictive but I want one.

**Source:** Tristan Honeywill  
For more information,  
go to [www.ae-plus.com](http://www.ae-plus.com)

Automotive  
**ENGINEER**

## Dimensions

|                       | Concept | Toyota iQ | Smart ForTwo |
|-----------------------|---------|-----------|--------------|
| <b>Wheelbase</b>      | 1,870mm | 2,000mm   | 1,867mm      |
| <b>Length</b>         | 2,600mm | 2,985mm   | 2,695mm      |
| <b>Width</b>          | 1,600mm | 1,680mm   | 1,559mm      |
| <b>Height</b>         | 1,700mm | 1,500mm   | 1,542mm      |
| <b>Turning circle</b> | 6.50m   | 7.80m     | 8.75m        |



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# London's Calling - Developing a zero emission taxi

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When required, the fuel-cell operates on the most efficient part of its cycle to charge the battery pack

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**The London Taxi is an iconic vehicle, used all over the world from Bahrain to Beijing and Riyadh to Cape Town with over 21,000 currently in operation in London alone. A fleet of diesel vehicles this size that operates for many hours of the day inevitably makes a substantial contribution to traffic emissions, not just of CO<sub>2</sub> but also NOx, hydrocarbons and particulates. Changing to a zero-emission taxi would have a marked effect on the pollution levels in London.**

With the goal of developing a zero-emissions taxi, a partnership of companies – Intelligent Energy, Lotus Engineering, TRW Conekt and London Taxis International (LTI Vehicles) – put forward a proposal to develop a hydrogen fuel-cell taxi and approached the British Government through the Technology Strategy Board for funding to support this research. The project was successful in winning funding and commenced in 2008 to develop a fuel-cell series hybrid zero-emissions taxi based on the LTI TX4 'black cab'.

A taxi's operating cycle of stop/start in city traffic makes it ideally suitable for an electric drive system with the ability to recover energy through regenerative braking. But unlike other public vehicles, such as buses, or service vehicles, such as post office delivery vans, the taxi's duty cycle can be extremely varied, depending on the demands of the passengers. A large proportion of London taxis spend the day just operating in the centre of London, but if requested, they will go further afield, no driver turning down the opportunity to pick up a lucrative lengthy fair. Therefore the daily mileage and operating cycle of a taxi can be extremely varied. A taxi needs a range of 150 miles, the normal distance covered in a shift, but also the ability to be refuelled quickly, minimising the time the vehicle is off the road.

For these reasons, a battery-electric propulsion system alone is limited. The size, weight and cost of the battery packs, even using the latest lithium ion technologies, are significant for the range required, and the recharging time would also limit the practicality in taxi applications. A series hybrid configuration using the hydrogen-powered fuel-cell being developed by Intelligent Energy, acting as a range extender, is the solution being developed in this collaboration. The hydrogen-powered fuel-cell acts as the range extender to an electric drive with a smaller battery pack and creates a total powertrain with zero tailpipe emissions. With an appropriate distribution network in place, the fuel-cell could be replenished with hydrogen quickly in service, unlike charging the battery of a pure electric vehicle.



With LTI Vehicles as the supplier of the base vehicle and TRW Conekt conducting the safety analysis and supplying some of the systems, Lotus Engineering's role in this project is as the technology and vehicle integrator while also building, developing and testing the demonstrators. It encompasses a variety of activities to ensure all the systems in the new propulsion system are robustly installed in the vehicle and that the systems work seamlessly together to operate the vehicle efficiently and reliably.

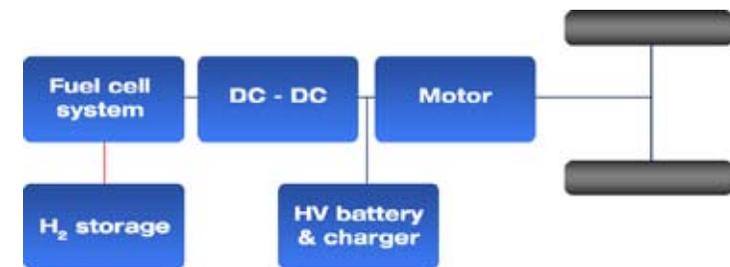
To achieve acceptance and be able to operate in London, the vehicle must have comparable performance with the standard vehicle, but also be able to meet all the requirements of the Public Carriage Office: turning circle, passenger access, carrying capabilities etc. Also it was a requirement that the external appearance of the instantly recognised London Taxi must not be altered.

The configuration of the propulsion system for this vehicle is Intelligent Energy's fuel-cell system with high pressure hydrogen storage, connected via a DC-DC converter and high voltage battery pack to an electric motor, which powers the rear-wheels through a single speed transmission.

In the normal operation mode of the vehicle, the average power is provided by the fuel-cell while the peaks are provided by the battery. The fuel-cell operates on the most efficient part of its cycle to drive the vehicle or charge the battery pack. The charging can occur while the vehicle is in motion or stationary waiting at a taxi rank.

The system is sized for operating speeds up to the vehicles normal cruising speed of 60mph. To achieve the target maximum speed of 75mph, the system combines the power output from the fuel-cell with the battery. Computer-aided vehicle simulation work has been conducted to size the propulsion components and this has determined the amount of hydrogen storage required to enable the vehicle to achieve its target range.

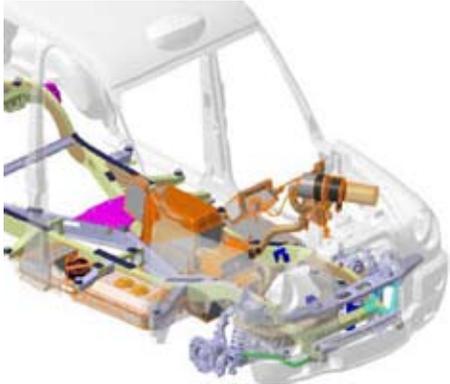
The fuel-cell system is a development of two Intelligent Energy single stack evaporatively cooled modules which together provide an output of 30kW. A single air delivery subsystem reduces system losses and is mounted remotely from the main fuel-cell power module to aid



# London's Calling - Developing a zero emission taxi

“ The new powertrain located at the rear of the vehicle has resulted in the development of a new rear suspension and brakes for the vehicle ”

packaging. A bespoke liquid/liquid plate heat exchanger is used to enable the heat generated to be used in conjunction with waste heat from other electrical components to heat the vehicle cabin. This is then coupled to a conventional radiator located at the front of the vehicle in order to remove excess heat. The stacks are housed within the fuel-cell power module, which is positioned in a modified vehicle transmission tunnel.



Careful packaging has been necessary to maintain the current forward luggage storage compartment and preserve the existing passenger space, providing capacity for five occupants and wheelchair use. The fuel-cell module and heat exchanger are chassis-mounted and installed from underneath the vehicle.

Packaged into the front of the vehicle is the hydrogen storage tank. At this stage a 350bar system has been chosen, with a tank capacity of 3.7kg. This pressure rating is compatible with the existing UK hydrogen refuelling facilities and the size of the tank should be sufficient to drive over 200 miles. The installation design has protection for a 700bar tank, which could be used with higher pressure refuelling stations and would give the vehicle a greater range.

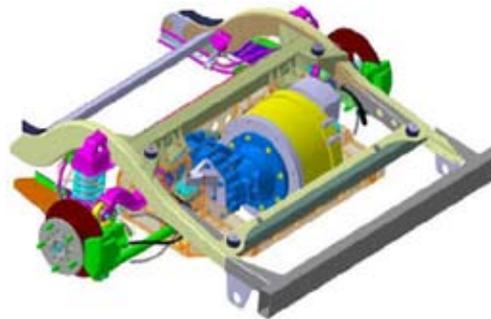
The 400V, 14kWh battery pack is constructed from lithium polymer cells with a battery management system to monitor the charge and discharge and control the balancing of the cells. Its modular construction allows it to be packaged into the chassis beneath the passenger compartment without raising the floor or causing any reduction in ground clearance.

The drive system is a DC brushless electric motor, with a peak capacity of 100kW and a continuous rating of 50kW. This drives

**proActive**

the rear wheels through a single speed transmission. Front wheel drive was considered but rejected because of the wheel angle dictated by the turning circle requirements. Direct-drive hub motors just on the rear were also considered but, without the multiplication factor that gearing gives, hub motors currently on the market: this could not provide the required torque to enable the taxi to meet its performance targets.

The electric motor and gearbox are housed under the rear floor of the taxi, where the live rear axle is normally located and are mounted on their own subframe. The new powertrain located at the rear of the vehicle has resulted in the development of a new rear suspension and brakes for the vehicle.



A fully independent trailing arm and lateral link system has been designed to fit in the package space available without major modifications to the vehicle structure.

The vehicles will use the latest TRW Slip Control Boost braking system which balances the regenerative and friction braking to maximise the energy recovery during braking.

Apart from minor revisions to the centre console in the driver's compartment, the interior of the taxi remains unchanged from the standard vehicle. Two in-car displays will be incorporated into the vehicle, one to give the driver information about the electrical systems and a more pictorial display in the passenger compartment informing them of the way the vehicle is operating and displaying the energy it is using.

Controls strategy for the vehicle including power management and battery management is an important area where Lotus Engineering is applying the expertise it has developed over the variety of previous hybrid and electric vehicle projects it has undertaken. For this project the vehicle control methodology is to incorporate a complex Matlab Simulink model with numerous detailed sub-system models. The

high-level model consists of mode selection and transition control, identifying basic vehicle operation modes and conditions. The sub-systems include the braking module, DC-DC fuel-cell converter, fuel-cell controller, high-voltage battery management system, inverter drive unit and ancillaries.

The energy management strategy includes methods of sharing the power from the high-voltage battery pack and fuel-cell, possible power splitting solutions and regenerative braking. Comprehensive diagnostics, including a graphical user interface, incorporated into the controls strategy will form an important debugging tool during the development phases. However prior to the test and development on vehicles phase, rigorous test bench hardware-in-the-loop development of the control strategy is being undertaken, consisting of battery and fuel-cell simulation, incorporating the DC-DC, inverter driver unit and motor sub-systems in a standalone mode and as part of the main system.

Currently the project is completing the design stage, the controls strategy has been designed and parts are being purchased ready for the build this summer. Vehicles will be up and running for rigorous testing and development later in 2009 and through into 2010. Planning has already commenced on phase two of the project which is to build a fleet of these zero-emissions taxis for the 2012 London Olympics, it will be a fantastic demonstration of British engineering with the world watching.

**Source:** Neil Parsons – Lotus Engineering



**Lotus Engineering**

# Q&A with BioMCN - Rob Voncken, CEO

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Both national and European policies encourage the use of renewable fuel in petrol and diesel

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## **Dutch-based industrial firm BioMCN is about to commission the largest second generation biofuel manufacturing plant in the world.**

It sees very positive prospects ahead in transportation applications for the bio-methanol it produces from glycerine – itself a by-product of biodiesel manufacture. Automotive applications are being readied, especially in the substitution of bio-methanol for bio-ethanol in gasoline blends. And the vision for more efficient energy utilisation and lower CO<sub>2</sub> emissions does not end there, as BioMCN CEO Rob Voncken explains to *just-auto* editor Dave Leggett.

### **DL: What's taking your time at the moment?**

**RV:** This project began at the end of 2006 and we are now close to starting industrial scale production for bio-methanol at our plant – we plan to start at the end of June. We are therefore in the midst of all the work ahead of commissioning production and of course the sales work that comes with having a product to sell in the market.

### **DL: Can you briefly describe the nature of your company and its activities?**

**RV:** We are the first company in the world to produce high-quality bio-methanol from renewable resources on an industrial scale and, after completion of the new plant, the largest second-generation biofuels producer in the world.

Both national and European policies encourage the use of renewable fuel in petrol and diesel. According to the targets set in the EU Renewable Energy Directive (RED), 5.75% of the energy value of transportation fuels must consist of biofuel by 2010 and 10% by 2020. That creates the opportunity for us.

March 2008 saw the successful start-up of the pilot plant, producing 20,000 tonnes of bio-methanol per year. The new plant – ten times bigger – enables BioMCN to purify and evaporate crude glycerine, thus making it possible to produce bio-syngas for making bio-methanol. The next step is to fully convert both existing production lines from natural gas to biogas. The transition will be performed in stages over the coming years, in steps of 200,000 tonnes capacity at a time. The first large unit is scheduled to be operational by the middle of 2009.

The site can accommodate another three such units, adding up eventually to a capacity of 800,000 tonnes a year of bio-methanol.



We have developed a process which enables us to convert crude glycerine – a by-product of biodiesel – into methanol. By converting glycerine into methanol, its full energy potential can be utilised, thus enabling further reductions in CO<sub>2</sub> emissions.

Production of biodiesel is growing in response to demand for transport fuels with a lower carbon footprint. The main feedstocks for biodiesel production are vegetable oils or fats and methanol, with glycerine as a by-product. And we take that as input into our process.

### **DL: So how does the production process actually work?**

**RV:** The crude glycerine from biodiesel plants is transported by ship, train or truck to the BioMCN plant, where it is stored in tanks. The crude glycerine is then purified, evaporated and cracked to obtain syngas (synthesis gas), which is used to synthesise the bio-methanol. Next, the bio-methanol is purified by distillation and is stored. Tankers delivering the raw glycerine can collect a return load of methanol, thus optimising the logistics in the chain.

The syngas used in the process can also be obtained from other forms of biomass such as wood or algae. In order to ensure sustainability, we use renewable feedstock exclusively derived from organic waste materials and crops other than those used for food consumption. Further to this we are also investigating the feasibility to use our own and other companies' CO<sub>2</sub> emissions as feedstock for sustainable methanol.

Our process closes the cycle by converting the by-product crude glycerine into methanol feedstock. This allows biodiesel production to become even more sustainable, while avoiding potential problems with the disposal of surplus glycerine.

### **DL: And where do the automotive applications come in?**

**RV:** The main opportunity is to replace ethanol in the blending of ethanol and gasoline – currently to produce blends such as E85. Similar to ethanol, bio-methanol is also suitable for direct blending.

# Q&A with BioMCN -

Rob Voncken, CEO



Ethanol production, as we all know, brings disadvantages in terms of incursion into the food chain. Our bio-methanol is a second generation biofuel and we can reduce CO<sub>2</sub> generation by as much as 70% in our production process versus liquid fossil fuel. On top of that, there are further tailpipe CO<sub>2</sub> reductions derived from bio-methanol in use by vehicles.

We also have a Bio-MTBE application. MTBE – an oxygenate created by a reaction between isobutylene and methanol – is mainly used to raise octane levels in gasoline. Thanks to higher oxygen levels, gasoline burns more completely, thus reducing tailpipe emissions.

Bio-DME is another application that we are studying. DME is used as a substitute propellant for chlorofluorocarbons (CFCs) in spray cans, whereas in Asia it is also blended with LPG (for heating). Thanks to its low self-ignition temperature and high cetane number, DME is also a suitable diesel engine fuel for use in heavy-duty vehicles such as trucks and buses.

DME cannot be blended with fossil fuel-based diesel and its volumetric energy content is lower – approximately half that of diesel. However, diesel engines can be easily retrofitted to run on DME – this is similar to retrofitting a petrol car to run on LPG. DME could be, in principle, a replacement for biodiesel. That's a longer term proposition though.

The fuel component opportunity, to replace ethanol with methanol, is the major one that we are targeting right now. That is an existing market that we can tap into with our bio-methanol product. It could be used immediately in flex-fuel cars.

**DL: How does methanol compare with ethanol on CO<sub>2</sub> emissions?**

**RV:** The tailpipe emissions of CO<sub>2</sub> per kilometre are lower for methanol than for ethanol. There's a higher energy efficiency for methanol which means you can increase the horsepower of a car.

Methanol produces a more than 10% CO<sub>2</sub> emission reduction versus a petrol car and it's more than 5% better than ethanol.

If we look at energy consumption per kilometre, a normal petrol car comes out at approximately 3-4% higher than for methanol.

A disadvantage of alcohols – both ethanol and methanol – is the fact that their energy content per litre is much lower than for petrol, so you need to fill up your car twice as often.

“ If we look at energy consumption per kilometre, a normal petrol car comes out at approximately 3-4% higher than for methanol ”

Because methanol produces more horsepower when burning, 25% more than petrol, the opportunity is to utilise that power gain – alongside other technologies, such as turbochargers – to get an engine size reduction for the same power output and in that way decrease CO<sub>2</sub> emissions even further. When you combine technologies like that, you can potentially get a fantastic value proposition.

**DL: Could bio-methanol be used in aviation engines?**

**RV:** The interesting thing about methanol is that because it is so versatile, you can produce kerosene from it. So, yes, that's a possible application.

There are lots of potential applications. Methanol is also a raw material used in the manufacture of a lot of plastics, such as polyesters. A lot of parts in a car are made from plastics, so that's another potential area where bio-methanol could help reduce CO<sub>2</sub> generation further.

**DL: Would it be cheaper to make plastics from methanol rather than oil?**

**RV:** No, not with energy prices where they are now. But in the long-term, as prices of fossil fuels rise, then the economics change and it may well be the case that using more methanol makes sense on simple cost grounds. At the moment there is interest from some customers who are specifically interested in plastics prepared with a bio-product as raw material and therefore prepared to pay a premium for that.

**DL: Is bio-methanol expensive to manufacture, compared with fossil fuels?**

**RV:** Yes, at this stage, compared with fossil fuels, our production costs are more expensive. Much, of course, depends on where fossil fuel prices are – and we have seen much volatility over the past year. But we are very competitive against bio-ethanol.

**DL: In terms of the timescale, how do you see the future for bio-methanol in cars? Do you have projections for penetration rates, for example?**

**RV:** That's a difficult one. You can see, even with a very strong ethanol lobby, just how slow the actual penetration of ethanol in the market is. When you have a separate product called methanol, it is going to be very difficult to get separate distribution via the oil companies.

# Q&A with BioMCN - Rob Voncken, CEO

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Our plant is a large scale plant – the largest second-generation biofuel producing facility in the world

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Lotus Exige tri-fuel can run on any mixture of petrol, bio-ethanol or methanol

What we are trying to aim at is perhaps replacing E85 with 'A85' – A for alcohol – and a situation in which it is left to the blenders to blend in different alcohols.

Our plant is a large-scale plant – the largest second-generation biofuel producing facility in the world – but our share is going to be small. Methanol enables lots of options and we are working on several projects that need years of refinement before going to the market. The potential is there, but I can't give you numbers.

It is also dependent upon the oil companies and how willing they are to change their existing infrastructure.

Closed circuits could be interesting – for instance with bus companies or courier companies, where they come to us to set something up.

**DL: Ethanol and methanol can easily be mixed up then, in an 'A85' blend?**

**RV:** Yes, they can easily be mixed.

**DL: Are you working closely with the oil companies?**

**RV:** They are our customers for the bio-methanol. We already have good relationships with them and we are building these further. Much depends on the companies, how they are branding their products, their distribution systems and so on. Different companies are interested in different products that we can offer.

**DL: Looking to the very long term, how realistic do you think talk of a sustainable synthetic methanol cycle – involving the use of things like CO<sub>2</sub> recycling from factories – is?**

**RV:** We are working on this. The interesting thing is that synthesis gas – that we produce to make methanol – is a mixture of CO<sub>2</sub>, CO and hydrogen, H<sub>2</sub>. The bottom line is that CO<sub>2</sub> is a feedstock to produce methanol. The potential is there to use CO<sub>2</sub> from other sources as a feedstock in the future. We are working on projects in this area with partners.

Adding CO<sub>2</sub> in the process can easily be done, so long as you have the right combination of the synthesis gas components. You need hydrogen, which could be produced, for example, by utilising the spare capacity of windmills to store energy at times of low electricity demand and high winds.

These kinds of concepts are possible and being evaluated. The most important thing is to have a hydrogen source. Hydrogen can be produced by electrolysis on water.

Another possibility is to produce bio-methanol using the fermentation process. In this concept, bacteria transfer CO<sub>2</sub> and water into methanol and oxygen.

All of these things are in development and bio-methanol is potentially very important for the long-term future. People are looking at carbon capture and storage, but we believe we can potentially use that CO<sub>2</sub>.

However, it will take some years to be developed further.



## Rob Voncken

Rob Voncken (45) is the CEO of BioMCN. Before joining BioMCN he fulfilled several positions at DSM in the areas of business development, marketing and sales and general management and he was responsible for the management, of several outsourcing, divestment and acquisition projects.



**DL: What do you see as the big challenges ahead for your business?**

**RV:** The biggest challenge right now is to get bio-methanol fully introduced as a value proposition and accepted as an alternative to petrol or ethanol by the oil companies.

In the long-term, everyone has to look at how we make bio-methanol happen, so support for second-generation biofuels is important. If there was no EU Renewable Energy Directive, we would not be selling biofuels because fossil fuels are still cheaper.

And to further develop the technologies to further reduce CO<sub>2</sub> emissions, bio-methanol is a fantastic starting point.

And of course, we have to get this company profitable so that we can reinvest and develop further.

**DL: How was the company BioMCN formed?**

**RV:** It's a privately held company and was formed at the end of 2006 through the acquisition of the plant in the Netherlands, marrying that to the technology plan and some early-stage investors.

**DL: What gives you the greatest satisfaction in your job personally?**

**RV:** There are lots of challenges involved with an industrial start-up like this. But the most rewarding thing is the fact that we can make a contribution to a better environment by reducing greenhouse gas emissions. That is the really big challenge and we are extremely proud of the contribution we will be making.

**Source:** Dave Leggett, just-auto.com

Photos courtesy of Pitt Fotografie

# Launch Control -

## Behind the scenes on the Evora first drives

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It is not an exact science to launch a new product, nor is it formulaic

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**A product launch is always a challenging activity, whether it is a new insurance policy, cosmetic product or, of course, a new car. A launch which positively engages and reaches the key audiences of the press, dealers and, of course, the end user, is vital for the success of the product. Marketing experts have said that two-thirds of all products fail within the first two years. While the reasons for the failure could be many, such as the wrong product for the market, competitor retrenchment or price, part of the mix, and the subject of this article, is launch strategy and execution.**

It is not an exact science to launch a new product, nor is it formulaic, but what we have learned at Lotus is to completely understand your niche.

Lotus does not have huge marketing budgets to launch new products but still delivers a disproportionate share of media coverage around the world. Part of this share of shout, of course, is due to the fabulous products that the media do enjoy writing about, but part of this is how Lotus has pretty much perfected the niche vehicle launch model.

The key part of a launch of a niche vehicle is not to do a 'big car launch' for a vehicle that will only sell in the small thousands of units per year. So here is a quick description of a launch for a niche vehicle, a general format that has worked for Lotus in the past and has worked over the past month while launching the all new Lotus Evora.

First of all, the most relevant media need to be identified to assist in communicating the key product message: perhaps a selection of freelance journalists who together have plenty of global



## Launch Control - Behind the scenes on the Evora first drives

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All new car press launches are not regular occasions at Lotus, with the Evora being the first all new car for some 13 years

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outlets to take the story, or a magazine that has a global reach via the internet or publishing partners around the world. Of course the nationally important magazines around the world must not be forgotten – they are the opinion-formers after all!

Secondly, as the niche vehicle will be sold in limited numbers, there is little point having an extensive press car fleet, so to be able to get the media through the handful of cars, the launch will normally take between two and four weeks – when each day somewhere in the region of eight to ten journalists get to drive the car on a preferred selection of roads and environments. By keeping the daily numbers relatively low, the journalist is put into a unique position where he or she has extensive access to the car, to the people who created it and to be able to remain for as long as they wish in the car during the day. This is very important as there is nothing worse than hurrying along a member of the press, especially when the vital photographs are to be taken; the magazine will want to take the most stunning photographs of the car – this helps them to sell magazines and differentiate themselves from the others on the newsstands. In addition, by keeping daily numbers low, specific requests can be catered for, perhaps special interviews, different locations for pictures, and, of course, there is more intimate time to communicate the all important product messages!

During the drive activity, the length of the drive is vitally important: too long, and the journalist will worry more about getting to the destination or taking the all important photographs than assessing the capabilities of the car; too short and the full product experience would not be gained. Some brand launches are centred around a 400km drive in a day, so it is best to choose shorter than longer when it comes to the drive route – certain parts can always be revisited!

Finally, as some of these members of the press are coming from all over the world, why not take the opportunity to introduce them to the rest of the organisation, whether it is other products, key executive staff, or even a complete 'brand immersion' to take in the history, the achievements and, of course, the future (within reason of course!). These additional opportunities are best suited to a headquarters or facility-hosted event, as if there is the capability to do it, then wouldn't it be a shame not to show the long-travelled journalist just a little more?

All, new car press launches are not regular occasions at Lotus, with the Evora being the first all new car for some 13 years. This made the

# Launch Control -

## Behind the scenes on the Evora first drives

# Contact Us



recent Evora launch all the more important and exciting for all involved. Taking place at a luxurious baronial mansion on the shore of Loch Lomond, a maximum of eight journalists per day came to Scotland to experience the worlds only mid-engined 2+2 currently in production.

For the journalists that were travelling from further afield, they were given the full immersion into Lotus prior to the visit to Scotland with a trip to the Hethel headquarters, where they experienced the full range of exciting niche products, while also observing the Evora production line for the first time, and speaking to some of the key personnel involved in the development.

There were two drive routes, both delivering breathtaking views while offering long sweeping corners and narrow tight bends illuminating the true character and flawless ride and handling of the Evora. The journalists were also offered a navigator for their route – perhaps a project engineer or even an executive – thereby empowering the media event to all areas of the business, and creating a mutual professional rapport.

Having a high number of technical experts on hand, reliving their experiences of the programme, is one of the most critical aspects of the launch. It is every bit as important for the technical excellence of the car to be covered as it is to cover the strategic importance of the car to the business. This suits Lotus perfectly as we have an extremely high number of technically focused, forward-thinking, enthusiastic engineers who work across many areas of the many projects Lotus Cars or Lotus Engineering is involved in.

These engineers, working on some of the most technologically advanced projects in the automotive industry, know exactly what it

takes to complete a whole vehicle project in a short period of time (27 months in the case of Evora), while ensuring the car is mechanically progressive and positions itself at the cutting edge of technologies.

After comprehensively experiencing the Evora on some of the finest 'Lotus roads' in the world, the evening reception gave the journalists more of an opportunity to quiz the key development personnel on how they have made this vehicle such a roaring success! These discussions predictably continued long into the night in fantastic surroundings on the shore of Loch Lomond.

The event was great fun, not only for the journalists but also for the staff involved – launches are not easy things to execute but for the non-press and sales areas of the business, to be involved demonstrates the effort and the work that goes into these activities.

So was the launch successful, Yes; and the proof of a carefully chosen location was imprinted by Tim Pollard at *Car Magazine* who said:

"It's proving quite addictive on these remote Scottish roads criss-crossing Glen Coe and Loch Fyne. The landscape is jaw-dropping, with mountains rising either side of the road and that inescapably Scottish palette of fern, rock and scree for as far as the eye can see. It's a spell-binding backdrop to our road test. Lotus really has struck a rare seam of creativity with the Evora. What they have created is a brilliant new 2+2. Hethel: we applaud you."

Was the launch success due to the launch itself? Clearly not directly – the Evora is a cracking car - but it all helps, when it comes to a niche vehicle launch.

**Source:** Lotus Engineering

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