

Renault launches its 'Renault eco²' line of vehicles

- Renault introduces its new 'Renault eco²' appellation which is intended to inform customers about its commitment to offering ecological, economical vehicles as part of its contribution to safeguarding the environment. True to Renault's ambitious policy of curbing the impact of its business on the environment, this new appellation guarantees the environmental credentials of the vehicles concerned during each phase of their lifecycle – manufacture, use and end-of-life management. Renault eco² vehicles meet three global environmental standards: they are produced in an ISO-14001-certified plant, their CO₂ emissions do not exceed 140g/km (or are biofuel-compatible) and, in addition to being 95% reusable at the end of their life, at least 5% of the plastics they contain have been recycled.
- .As well as being ecological, Renault eco² vehicles are economical to buy. Because they are affordable to the majority of customers, the progress they represent will lead to significant gains for the environment. Observable examples of Renault's environmental commitment are downsized engines like the TCE 100hp engine, as well as biofuel-driven vehicles such as the E85 bioethanol Mégane and the B30 biodiesel Trafic and Master.
- The eco² line will initially apply to Renault brand vehicles only. However, Renault sees protection of the planet as a global challenge and will later extend the appellation to other regions of the world.
- The Renault eco² line is also seen as a means of highlighting the ongoing gains achieved in environmental matters, with standards becoming more and more stringent with a view to offering a line-up of vehicles that are increasingly ecological and economical.

The Renault eco² line: a range of ecological, economical vehicles

With the framework of Renault Commitment 2009, the company has publicly stated its ambitious environmental objectives. They form part of Renault's drive over the last ten years to curb the environmental effects of its activities at every stage in the life cycle of its vehicles – from manufacture to use and end-of-life product management. They also assert its determination to rise to the great ecological challenges by offering its customers here and now affordable technologies that can be applied to the majority of vehicles. Renault believes that by making its environmentally-friendly vehicles economical to buy and run it will increase the benefit they represent for the environment.

The Renault eco² appellation underpins Renault's environmentally friendly approach by certifying that the vehicles covered comply with important ecological and economical criteria:

- Ecological because the environmental impact of such vehicles is kept to a minimum when they are designed, manufactured and driven on the roads, as well as at the end of their useful life,
- Economical because they are affordable and fuel-efficient.

The new appellation reflects Renault's commitment to proposing a range of vehicles that are easy both on the environment and on customers' finances.

Renault eco²: three verifiable, measurable criteria

Renault sees the Renault eco² appellation as a means for its customers to measure the environmental performance of its vehicles. The line has been thought through based on three criteria that can be either certified (e.g. ISO

14001) or objectively measured, such as carbon emissions and the proportion of recycled plastics that goes into a vehicle's production.

Noise pollution was not included because it is not defined by any globally accepted standard. However, Renault enjoys a true lead in this field, with many of its vehicles emitting 3dB (decibels) less than the EU standard of 74dB – a halving of noise levels.

Vehicles qualify for Renault's eco² appellation if they comply with the three following requirements:

- **They must be manufactured in a production plant that has secured ISO 14001 certification.** The independent International Standards Organisation (ISO) certifies that a facility complies with standard 14001 when it achieves continual improvement in reducing the impact of its activities on the environment. It includes, for example, water and energy consumption, visual and sound impact, and harmful emissions and wastewater discharges. In seven years, Renault has, for example, cut water consumption at its Sandouville plant in France three-fold. In 2006, 39 manufacturing facilities, accounting for more than 90% of Renault's activity worldwide were ISO-14001-certified. Other group sites in Russia and Morocco are currently undergoing certification.
- **Their CO₂ emissions must not exceed 140g/km or they must be able to run on E85 bioethanol or B30 biodiesel.** Renault eco² vehicles emit low levels of CO₂, the main culprit in global warming. It is possible to get below the 140g/km threshold (equivalent to fuel consumption of 5.3 litres/100km for diesels and 5.9 litres/100km for petrol engines) by using either specific technology (e.g. downsizing) or biofuels. The crops used to produce biofuels absorb CO₂ from the atmosphere as they grow (part of the process of photosynthesis). E85 bioethanol can achieve CO₂ gains of up to 70% over the so-called well-to-wheel cycle compared to the same model powered by conventional petrol. The figure is about 20% for B30 biodiesel.
- **At least 5% of the plastics used in their production must be made from recycled materials.** Renault eco² end-of-life vehicles are designed to be 95% reusable by weight. Furthermore, Renault eco² vehicles contain over 5% of recycled plastic. For Clio III the proportion is nearly 10% (20kg) and for New Twingo 9% (15kg). Recycled plastic levels will increase further in the future line-up.

At the time of its launch, the appellation will initially only apply to the Renault brand on European markets before being extended to markets in other parts of the world at a later date. Furthermore, Renault will strive to steadily raise standards by incorporating new achievements in environmental progress so that it constantly offers a line-up of ecological vehicles of the highest level.

Downsizing is ecological and economical

Downsizing conventional petrol and diesel engines continues to stand out as one of the most cost-effective ways of curbing fuel consumption and, thereby, greenhouse gas emissions. This is a field in which Renault excels and combines three benefits. It essentially involves reducing the cubic capacity of an engine without detracting from its performance thanks to the use of appropriate technology, e.g. the addition of a turbocharger or a switch to direct fuel injection.

In other words, a 1.9-litre diesel engine with an output of 93hp has now been replaced by a more fuel-efficient, 1.5-litre turbocharged powerplant delivering 105hp. In 1993 a 93hp 1.9-litre Renault 19 DT could make the 748km journey from Paris to Montpellier in the south of France with an average fuel consumption of 6.5 litres/100km and 172g/km of CO₂. Today, a 105hp Mégane 1.5 dCi can drive the 1,100km from Paris to Venice with average fuel consumption of 4.5 litres/100km and CO₂ emissions of 120g/km. Thanks to this sort of technological progress – combined with the mass production of a line-up with low emission levels – Renault has emerged as one of Europe's three most CO₂ efficient carmakers.

The latest addition to Renault's petrol engine line-up, the TCE 100, is a perfect example of the expertise it has acquired in this field. Although it delivers the 100hp of a 1.4 litre engine and torque (145Nm) worthy of a 1.6, the 1.2 litre engine that drives the Clio by Rip Curl boasts combined cycle fuel consumption of just 5.9 litres/100km and CO₂ emissions of 139g/km. Meanwhile, the combination of small-size with a low inertia turbocharger ensures that this engine is particularly responsive from low revs. Meanwhile, the turbocharger and its overpower function can supply short bursts of extra power in 2nd, 3rd, and 4th gears above 4,500rpm.

Renault has given its diesel-engined vehicles the benefit of the same expertise. Powered by a 105hp 1.5 dCi equipped with particulate filter, Mégane emits just 120g/km of CO₂, which put it at the top of the CO₂ performance standings in its segment in Europe in 2005. This benchmark engine has also incorporated many leading edge technical innovations, including a multi-blade variable geometry turbocharger, piezoelectric multi-injection and a particulate filter with exhaust post-injection, etc.

The new downsized engines that Renault develops enable it to balance ecological requirements like reduced pollutant and CO₂ emissions with economical requirements such as low fuel consumption and affordability. Downsizing is fully in phase with the philosophy behind the Renault eco² appellation.

An affordable line-up of vehicles powered by biofuels

Renault also considers biofuels as one of the most effective ways of controlling CO₂ emissions in the medium term. Biofuels are ecologically efficient because they are derived from vegetable matter – a renewable, diversified energy source – and also economically efficient because they require limited development costs and vehicles are affordable for most customers. Furthermore they reduce energy dependency on fossil fuels.

The availability of a Mégane that can run on E85 bioethanol alongside its B30-biodiesel-powered light commercial vehicles reasserts Renault's commitment to biofuels. Indeed, Renault is one of the few automakers in Europe to offer its customers a biofuel double bill.

In June 2007, Renault is due to launch a Mégane powered by a 105hp 1.6-litre 16V engine that runs on E85 bioethanol. It will be Renault's first ethanol-fuelled vehicle in Europe. For such engines to run on both conventional fuels and biofuels, existing powerplants from the Renault line-up have been modified to enable them to adapt automatically to different fuel types. These changes

principally concern the fuel tank, the injection system and the combustion chambers. To develop the ethanol-compatible Mégane, Renault drew on expertise acquired in Brazil where it has been commercializing flex-fuel Clio and Mégane models that burn E100 since 2004.

At the end of 2006 Renault introduced 90hp and 115hp versions of the 2.0 dCi Trafic and 100hp and 120hp versions of the 2.5 dCi Master, both of which run on B30 biodiesel. Aimed chiefly at companies running their own fleets, these vehicles can function with equal ease on conventional diesel fuel or on blends of diesel with 30% biodiesel (B30). The first passenger cars to use biodiesel will appear in 2008. New Twingo, which was unveiled at the recent Geneva Motor Show, will be available with a B30-compatible 65hp 1.5 dCi powerplant.

Meanwhile, Renault has been working for many years on second-generation fuels. These are obtained using the so-called Fischer Tropsch process from natural gas (Gas To Liquid), coal (Coal To Liquid) or biomass (Biomass To Liquid). Since March 2006, Renault has pooled its research efforts with those of DaimlerChrysler, Volkswagen, Royal Dutch Shell and Sasol Chevron within the framework of the Alliance for Synthetic Fuels in Europe (ASFE).

In 2006, as part of the Renault Commitment 2009 plan, Renault announced its intention to work on a broad selection of alternative technologies, including electric vehicles, hybrids and fuel cells. Such research work into environment-related technology is nothing new at Renault. As early as 1997 Renault unveiled Fever, the first research vehicle powered by a hydrogen fuel cell. More recently the Ellypse concept car incarnated Renault's concern with designing cars as part of a sustainable development outlook.

High resolution photographs and illustrations relating to the Renault eco² appellation can be downloaded from www.media.renault.com > Media Library > Innovations > Environment

Appendices: biofuel and well-to-wheel

• Biofuels

Bioethanol is made by fermenting and distilling biomass – plant matter like wheat and beetroot in Europe, sugar cane in Brazil and corn in the USA. Bioethanol can then be mixed with petrol in varying proportions: 5% inclusion is E5, 10% is E10 and 85% is E85. Flex-fuel vehicles like Clio 1.6 16V Hi-Flex can burn neat bioethanol

Biodiesel is an alkyl ester derived from vegetable oil. It is produced from oleaginous crops and plants (mainly rapeseed and sunflower in Europe, but also soya and palm oil in other parts of the world). Through a process known as transesterification, vegetable oil reacts with methanol to produce biodiesel that can then be mixed with straight diesel. When mixed with diesel at inclusion of 30%, biodiesel is called B30

Synthetic biodiesel (second-generation biofuel) is produced by the Fischer Tropsch process from natural gas (Gas To Liquid), coal (Coal To Liquid) or biomass (Biomass To Liquid). Renault is working on second-generation biofuels as part of the Alliance for Synthetic Fuels in Europe (ASFE) with DaimlerChrysler, Volkswagen, Royal Dutch Shell and Sasol Chevron.

The well-to-wheel approach

To understand the advantages of biofuels over fossil fuels when it comes to reducing CO₂ emissions, it is important to take a global, or well-to-wheel, overview. Well-to-wheel analysis rates the efficiency of a fuel by calculating its aggregate CO₂ emissions from when it is produced to when it is burnt in a vehicle.

Fossil fuels are responsible for CO₂ emissions during production (drilling and refinery), when they are shipped and when a vehicle burns them. Biofuels originate from the biomass - i.e. plants – that is grown to produce them. The CO₂ absorbed by these plants as they grow (photosynthesis) is subtracted from the biofuel's total CO₂ emissions (including production, transport and use in the vehicle).

Because biofuels can be made from locally available biological matter, there is much less need to transport them to distribution facilities by road and sea, which in turn limits CO₂ emissions.

The overall performance of biofuels is far more beneficial for the environment than that of fossil fuels. Total CO₂ emissions produced by the biofuel chain are much lower than for conventional fossil fuels. Some biofuels can, depending on the material used to produce them, lead to reductions in CO₂ emissions of 70% compared to a petrol engine. The equivalent saving for a biodiesel engine over a conventional diesel powerplant is approximately 20%.