

**PRESS KIT**

November 30, 2015

# FRENCH CARMAKER **RENAULT** **PIONEERING ELECTRIC** **VEHICLES IN EUROPE**

Renault helps to counter global warming by making electric transport an attractive and affordable option



Groupe Renault's range of electric vehicles: the Renault Twizy, Renault ZOE, RSM SM3 Z.E., and Renault Kangoo Z.E.

**Renault will be playing a key role in arrangements for the COP21 United Nations climate change summit, to be held in Paris from November 30 to December 11.** The Renault-Nissan Alliance is an official partner to the event, providing a fleet of 200 electric vehicles, driven by volunteer employees from Renault and Nissan to provide transport for conference delegates. This is the largest fleet of all-electric vehicles ever fielded at an international event of such a scope.

**To coincide with this important conference, Renault invites you to discover its strategy on all-electric transport, designed to help counter climate change and improve air quality.**

## SUMMARY

**Committed to ensuring sustainable transport for all, Renault was the first European automaker to have backed the all-electric vehicle.** The all-electric vehicle is the flagship of Renault's environmental strategy. It provides an excellent illustration of Renault's capacity for breakthrough innovation, spearheading progress in the automotive industry and individual transportation practices, through the development of cutting-edge technologies and the pursuit of frugality by design. Renault's electric power expertise, developed in France, shines through both in production vehicles and in motorsport. With the release of the ZOE, the latest model in Renault's full electric vehicle line-up, Renault sells more electric vehicles (Twizy included) than any other carmaker in Europe.

**Renault sees electric power as the most environmentally sound automotive solution, and a viable countermeasure against climate change.** Renault electric vehicles emit zero CO<sub>2</sub> when driving<sup>(1)</sup>, the primary greenhouse gas responsible for global warming. Even when factoring in the CO<sub>2</sub> emissions produced to generate the electricity needed to recharge the vehicle, the carbon balance is much better than for an equivalent internal-combustion vehicle in most countries. Obviously, this advantage increases with the use of renewable energy sources, which are low-carbon forms of energy generation. By virtue of their batteries' green energy<sup>(2)</sup> storage capacity, Renault electric vehicles play a role in accelerating the transition from fossil fuels to renewable energy sources. Beyond developing environment-friendly vehicles, Renault also takes a pioneering stance on reducing its worldwide carbon footprint, across all its operations. This has been shrinking by at least 3% per year per vehicle since 2010. As well as countering climate change, the electric vehicle also improves air quality: by emitting zero atmospheric pollutants through its exhaust, it presents very considerable hope for public health improvements.

**With Renault electric vehicles, environmentally conscious motoring entails no compromise on driving pleasure for the driver, who discovers a new passion for driving.** Drivers enjoy the full benefit of avant-garde technologies, futuristic design, comfort and connectivity, plus the advantages only electric power can offer: a quiet drive with crisp response and smooth acceleration. Everyday convenience comes with charge stations that are available directly at the driver's usual parking location, the peace of mind afforded by Renault services, and the parking and access privileges that many cities grant for electric vehicles today. The thrills of motorsport are translated to the racetrack through all-electric vehicles at Formula E, promoted by Renault.

**Renault offers its electric transport solutions to a broad customer base.** Renault is the only carmaker to offer a full range of four electric vehicles, addressing a broad customer base and a wide usage spectrum. In most of the countries that practise tax incentives for low-pollution vehicles, purchase prices are comparable to those of equivalent diesel vehicles, and running costs are competitive. To extend the scope of electric transport and thereby stimulate scale-up in the electric vehicle market, Renault works with many partners to improve the coverage of public-access charging stations. The range offered by its electric vehicles is also steadily increasing. Groupe Renault also anticipates and supports the emergence of new transport solutions such as car-sharing, with a view to expanding the scope of its all-electric vehicles.

<sup>(1)</sup> Zero atmospheric emissions of CO<sub>2</sub> or pollutants while driving as per the NEDC certification cycle, excluding wear and tear to parts.

<sup>(2)</sup> "Green" energy is produced from renewable sources: water, wind, sun, etc. These are low-carbon forms of energy generation.

# 01

## **RENAULT WAS THE FIRST EUROPEAN AUTOMAKER TO BELIEVE AND INVEST IN THE ALL-ELECTRIC VEHICLE**

Pioneer in electric transport	04
Breakthrough innovation for the benefit of all	05
French electric expertise	06
Number one on the European electric vehicle market	08
The Renault-Nissan Alliance: a front-line force for more environmentally friendly transport	09

# 02

## **RENAULT SEES ELECTRIC POWER AS THE MOST VIABLE AUTOMOTIVE COUNTERMEASURE AGAINST CLIMATE CHANGE**

«Zero CO <sub>2</sub> » while driving <sup>(1)</sup>	10
Toward «Zero CO <sub>2</sub> » including electricity generation	11
Stepping up the energy transition	12
Pioneering commitment to shrink Renault's carbon footprint, with effective reduction of at least 3% per year	14
«Zero pollutants» while driving <sup>(1)</sup> for more breathable air	15

# 03

## **WITH ITS ELECTRIC VEHICLES, RENAULT IS CREATING AN EXCITING NEW DRIVING EXPERIENCE**

Take advantage of technology of the future today	16
Enjoy dynamic, relaxed driving	18
Making everyday life easier	19
Passionate about electric motorsport	20

# 04

## **FOR RENAULT, ELECTRIC VEHICLES ARE FOR THE MANY**

A comprehensive and accessible range	21
An increasingly wide activity radius	23
Meeting new mobility needs	25

## 01

## RENAULT WAS THE FIRST EUROPEAN AUTOMAKER TO BELIEVE AND INVEST IN THE ALL-ELECTRIC VEHICLE

*“ Accounting for around 15% of human-originated CO<sub>2</sub> emissions and 25% of world oil consumption, the automotive industry is part of the climate change problem. Renault has chosen to be part of the solution. Electric vehicles are the only existing, practical and affordable transportation solution to our planet's environmental challenges – and they are available today. ”*

**CARLOS GHOSN**, President and CEO of Groupe Renault

## Pioneer in electric transport

**Renault's commitment to sustainable transport for all dates back more than 115 years and the company has a 20-year record of consistently endeavouring to reduce the environmental impact of its vehicles and business activities.** Renault's environmental strategy seeks to reduce emissions of CO<sub>2</sub>, the primary greenhouse gas responsible for global warming. Renault electric vehicles are the standard-bearers of this endeavour.

**At the 2009 Frankfurt Motor Show, Carlos Ghosn presented four electric concept cars** and announced a strategy, ambitious and completely unique in the automotive industry, which would involve putting a full range of affordable all-electric vehicles on the market by 2012.

**Renault was true to its word.** The upmarket sedan Fluence Z.E. (today sold as the Renault Samsung Motors SM3 Z.E. in Korea) was launched in 2011, along with the Kangoo Z.E. range of vans, with payload capabilities comparable to those of its internal-combustion counterparts. In 2012, the Twizy would open up a whole new angle on urban transport. A Cargo version followed in 2014, addressing the needs of urban delivery and call-out operators. The compact ZOE sedan, released in late 2012, marked the advent of Renault electric vehicles addressing a broad customer spectrum.

Renault has consistently demonstrated its capacity to innovate and invest in a people-centred automotive future, in which the electric car becomes genuinely affordable instead of remaining an unrealistic ideal.



2009 Frankfurt Motor Show: concept cars heralding Renault's forthcoming electric vehicle range, which were released in 2011 and 2012

## Breakthrough innovation for the benefit of all

**With its electric vehicles, Renault has engaged in disruptive innovation.** As the manufacturer with the automotive industry's most consistent track record for innovation, Renault innovates continuously, notably to improve the energy efficiency of its internal-combustion vehicles. Furthermore, to boost reductions in CO<sub>2</sub> emissions, Renault has chosen disruptive innovation with its development of all-electric vehicles.

**Renault engineers took up the formidable challenge of developing advanced technology, adopting a lean design approach to ensure that it would be affordable to the customer.** Renault develops products and related services affordable across the broadest possible customer base, offering unparalleled added value. It pursues meaningful innovation, to achieve genuine automotive progress and improve people's quality of life. For Renault, innovation is only meaningful if it benefits a maximum slice of the population.

### **Renault's development of electric vehicles marks a breakthrough, and targets wide-scale take-up.**

For the population at large: The benefits of electric vehicles, as regards climate change and public health, will only be tangible if this solution is taken up on a wide scale.

For individual motorists: Renault electric vehicles create a new passion for driving.



## French electric expertise

**High-added-value Renault vehicles, including the electric vehicle range, are designed and made in France.**

Renault's electric vehicles are designed by engineers at the Renault Technocentre in Guyancourt, near Paris. The Kangoo Z.E. models are made at the Renault plant in Maubeuge (northern France), the ZOE is made at the Renault plant in Flins (near Paris) and the R240 electric power unit is made at the Renault plant in Cl  on (western France).

**Development work on the Renault ZOE spawned more than 60 patents.** The ZOE spearheads Renault's zero-emissions technology and innovation capability. This, the very first affordable all-electric car ideal for everyday use, epitomizes Renault's electric excellence, harnessing the most advanced electric power technologies in existence. It features a host of innovations directed at usability, affordability, vehicle range and connectivity.

For example, vehicle range is enhanced by Renault innovations such as these:

- **New-generation regenerative braking has the electric motor acting as a generator to charge the battery during deceleration and braking.** When the driver releases the accelerator pedal, the engine converts the kinetic energy of the vehicle into electrical energy for charging the battery. When the brake pedal is pressed, the new-generation system, developed in partnership with Bosch, distributes braking power between the brake callipers and the engine brake, again enabling the engine to generate energy for charging the battery.
- **The ZOE features the very first volume-production automotive implementation of a heat pump** (frequently found in residential heating systems), to increase vehicle range when the car heating is on. For this innovative automotive application, control algorithms were developed specifically to allow for thermal inertia and power phenomena in a vehicle passenger compartment. In "heat" mode, the system samples the ambient air outside the vehicle, heats it by compression and feeds the heated air into the car. By moderating the energy consumption involved in heating the passenger compartment, it greatly reduces the difference in vehicle range between cold and warm seasons. In addition, the set temperature is reached faster and held more stable than in an internal-combustion vehicle, in which heating is solely dependent on the heat generated by the engine.



Renault Flins plant: assembly line of the ZOE powertrain

**The ZOE's new R240 65 kW power unit, developed and made entirely by Renault, stands as a glowing tribute to Renault's electric expertise.**

It was designed by Renault engineers at the Technocentre and the Cléon plant. Cléon, Renault's flagship facility in the manufacture of high-added-value engines and gearboxes, makes the whole of Renault's all-electric power unit, including the power electronic controller. Production of the ZOE junction box, also developed by the Technocentre design office, dates to 2012, and expertise in windings stems from developments across the Renault-Nissan Alliance.

- With the R240 unit, and its battery featuring optimized electronic control, ZOE drivers enjoy increased range in their everyday journeys, up to 240 km NEDC (an increase of 30 km), which translates to a real-life range of 115 to 170 km. It also recharges an average of 10% faster at domestic charging stations due to improvements on the Cameleon charging system.

**No fewer than 95 patents have been filed covering the highly innovative design of the R240 power unit.** One of the achievements of the Renault engineers on this project involved a 10% reduction in engine size with no penalty on drive performance (power, torque, etc.).

## DID YOU KNOW?

The high performance and compact size of the R240 were instrumental factors behind Renault's development of a derivative version to power the Daimler group's forthcoming all-electric Smart models.

**Renault was selected as electric vehicle expert to act as technical partner in the Formula E championship from the very first season (2014/2015).**

For the second season, which began in September 2015, Renault Sport provided technical expertise exclusively for Formula E, with development of its own electric powertrain. This technological commitment runs side by side with direct racing involvement, through the Renault e.dams team, holder of the manufacturers' championship title.

This dual technical and racing challenge provides Renault with a valuable opportunity for testing out new electric power technologies on the racetrack, with the promise of crossover targeting constant improvements in the performance of its volume-production electric vehicles.

## Number one on the European electric vehicle market

**At the end of October 2015, more than one in five electric vehicles sold in Europe was a Renault.**

- Despite intensifying competition, Renault continues to increase its share of the electric vehicles market.
- This year again, Renault leads the European market in the number of electric vehicles sold: it sells more electric vehicles than any other carmaker in Europe since 2013<sup>(3)</sup>.
- Renault sales of electric vehicles in 2015 so far are 50% higher than for the same period in 2014.
- Since its launch, ZOE has sold eight times as many units as did the first hybrid vehicles during the same span of time

**ZOE sales in Europe already top 30,000, and Renault will have sold its 20,000<sup>th</sup> Kangoo Z.E. by the end of the year.**

- Renault holds more than 60% of the French electric vehicles market, the second biggest in Europe. In June, Renault approached the historic threshold of 1,800 registrations in a single month, the equivalent of 2.5 months' sales in 2014<sup>(4)</sup>.
- In Norway, Europe's biggest electric vehicles market, ZOE sales tripled in 2015, following release of the range in 2014.

**The Renault electric vehicles range continues to expand outside Europe.**

- The ZOE, the Twizy and the Kangoo Z.E. are sold in roughly forty countries worldwide, and projects are underway in many others.
- Worldwide, Groupe Renault electric vehicles on the road today number more than 33,000 for the ZOE, close to 20,000 for the Kangoo Z.E., more than 16,000 for the Twizy and around 6,000 for the Fluence/SM3 Z.E.

### DID YOU KNOW?

Someone somewhere in the world opts for an electric vehicle every three minutes. The electric vehicles market continues to show steady growth. In 2015 so far, the overall electric vehicles market has risen by around 50% in Europe, compared to 8% for the motor market as a whole.



The Renault ZOE and Twizy in Italy: eco-tourism in the Umbria region

<sup>(3)</sup> Including Twizy

<sup>(4)</sup> Excluding Twizy



## The Renault-Nissan Alliance: a front-line force for more environmentally friendly transport

**Within the Alliance, Renault and Nissan pool their electric power expertise while offering two different vehicle ranges.**

- The Renault-Nissan Alliance has already invested more than €4 billion in Research & Development on electric vehicles. Some 2,000 people across the partnership are hard at work on development and rollout of innovative electric transport solutions.
- To achieve the economies of scale needed for producing affordable electric vehicles, the Alliance partners share certain electrical subsystems and components, through joint purchasing or manufacturing arrangements.
- The Alliance leads the field in development of an electric vehicle ecosystem that will support wide-scale take-up of electric transport. Renault and Nissan work with some 500 partners worldwide (government agencies, local administrations, electric utility companies, roadway operators, retail chains, etc.) with the aim of stepping up rollout of charging infrastructures accessible to the public.

**The Renault-Nissan Alliance is world number-one in electric vehicles.**

With its six models, the Alliance has already sold more than 275,000 electric vehicles worldwide, more than half of the electric vehicles on the road today. The two partners have largely complementary territories: Renault's biggest markets today are in Europe, whereas Nissan's are the USA and Japan.

**The Renault-Nissan Alliance is the official partner of the COP21 United Nations climate change summit, to be held in Paris from November 30 to December 11, 2015.**

*“ Renault has committed to the organising committee of the COP21 to provide delegates with an electric transport offer that is an essential solution to the fight against global warming in the field of transport. ”*

**CLAIRE MARTIN**, Alliance COP21 leader, Director of Groupe Renault Corporate Social Responsibility

### DID YOU KNOW?

The official report “Climate Action”, prepared by the Climate Action Network (CAN) for the COP21 summit, notes that a virtuous approach for the transport sector will involve massive rollout of electric vehicles, plus lower carbon dependency for electric power generation. CAN is a worldwide network of more than 700 non-governmental organizations in 90 countries, working to encourage governments and citizens to take measures limiting the impact of human activities on the climate.

## 02

## RENAULT SEES ELECTRIC POWER AS THE MOST VIABLE AUTOMOTIVE COUNTERMEASURE AGAINST CLIMATE CHANGE

*“ Thanks to all the Renault electric vehicles on the road today, 115,000 fewer tonnes of CO<sub>2</sub> have been discharged into the atmosphere, and 1.15 million fewer barrels of crude oil have been extracted<sup>(5)</sup>. ”*

JEAN-PHILIPPE HERMINE, Groupe Renault Head of Environment Plan

### «Zero CO<sub>2</sub>» while driving<sup>(1)</sup>

**Electric power is the real breakthrough solution to counter climate change, because electric cars emit no CO<sub>2</sub> (carbon dioxide) while driving<sup>(1)</sup>.**

Renault internal combustion engines are among the very best in terms of energy efficiency and thus in low CO<sub>2</sub> emissions. But CO<sub>2</sub> release is an inescapable outcome of any power unit burning oil-based fuel. Because an electric motor does not burn any fossil fuel, Renault is fully committed to the electric vehicle as the innovative solution capable of meeting today's very considerable environmental challenges.

**Even when factoring in CO<sub>2</sub> emissions produced by generating the electricity needed to charge an electric vehicle, the carbon balance is much better than for an equivalent internal-combustion model in most of the countries where electric vehicles are sold.**

In Europe, the figure averages around 58 grams of CO<sub>2</sub> per km for the Renault ZOE, compared to at least 100 grams for an equivalent internal-combustion model.

The overall carbon footprint of an electric vehicle varies from one country to another, with the degree of carbon dependency of the local power plants: renewable (hydroelectric, wind farms, solar, etc.), nuclear, coal-fired, etc. In France, for example, where power-plant carbon dependency is relatively low, the carbon footprint of the Renault ZOE is 15 grams of CO<sub>2</sub> per km.

<sup>(5)</sup> Comparison between carbon footprint of Renault electric vehicles on the road today worldwide, and of diesel equivalents. Data calculated from figures provided by Comité Professionnel du Pétrole.

<sup>(1)</sup> Zero atmospheric emissions of CO<sub>2</sub> or pollutants while driving as per the NEDC certification cycle, excluding wear and tear to parts.

## Toward «Zero CO<sub>2</sub>» including electricity generation

**The environmental benefits of electric transport will continue to rise as electricity generation becomes less carbon-dependent.**

Drivers of Renault electric vehicles can be sure that their cars' carbon footprints will shrink with the increasing development of renewable, i.e. low-carbon, energy sources for generating the electricity that charges their cars. Worldwide, 56% of new power plants use renewable energy sources. In Europe, the figure is 72%. Drivers of internal-combustion vehicles, on the other hand, will see no change in their cars' carbon footprints (or, indeed, an increase with vehicle wear).

**The well-to-wheel CO<sub>2</sub> balance of a Renault ZOE in Europe is expected to shrink more than two-fold by 2030, from 58 to 24.5 grams of CO<sub>2</sub> per km, under a scenario consistent with a 2°C limit on global temperature increase by 2030. Such a scenario assumes growth in low-carbon energy production, including electricity generated from renewable sources.**

### DID YOU KNOW?

Renault's commitment to the development of renewable energies also extends to the use of photovoltaic panels at its production facilities. The solar power generated is injected into the local electricity grid to reduce the carbon intensity of its energy production.

Solar panels at Groupe Renault production plants cover a total surface area of 136 hectares, the equivalent of 190 football fields, and generate 88 Megawatts, which if generated conventionally would involve the emission of 14,200 tonnes of CO<sub>2</sub> per year. The panels are located over personnel car parks and vehicle storage areas at sites in France (Douai, Maubeuge, Flins, Batilly, Sandouville and Cléon), Spain (Valladolid and Palencia) and South Korea (Busan), where the Renault Samsung Motors installation is the world's largest solar power plant at an industrial facility, generating electricity equivalent to the consumption of 6,000 homes.



A Renault ZOE in the Hebrides, in Scotland

## Stepping up the energy transition

**Renault sets up a virtuous circle within which electric transport itself helps to boost the energy transition.** The CO<sub>2</sub> balance of electric vehicles (including generation of the electricity needed for charging them) decreases as the energy transition proceeds, and Renault electric vehicles themselves step up the replacement of fossil by renewable energies.

**Renault electric vehicles contribute to the energy transition in the automotive industry by reducing the use of fossil energies for vehicle needs.**

According to the International Energy Agency, with seven million electric vehicles on the road worldwide, we would save 400,000 barrels of crude oil per day between now and 2020.

**They also can contribute to global energy transition efforts at a territorial scale.**

Renault co-develops technical solutions for generating electricity from renewable sources, the aim being to offset the intermittent nature of renewable energy sources (solar, wind, etc.); development of green electricity<sup>(2)</sup> production is currently held back by the inherent fluctuations. Through its work on electric vehicles, and on their batteries above all, Renault and its partners are developing solutions capable of flexibly synchronizing electricity production to electricity demand.

The wide-scale roll-out of such solutions would make a substantial contribution to reducing the carbon footprint not only of electric vehicles, but in all sectors consuming electricity.

### Smart charging for Renault electric vehicles, to increase the proportion of green electricity<sup>(2)</sup> that they use

Renault is experimenting with smart-charge solutions enabling its electric vehicles to charge during timeslots when electricity is cheaper and less carbon-dependent. This typically means during peak sunlight exposure of photovoltaic panels, or peak wind exposure for wind farms.

Under a pilot project run in Germany with The Mobility House, eleven Renault ZOE customers are using smart-charge systems in their homes. And similar systems have been tested with other partners in Ireland, the Netherlands and Germany.



Charging at home

<sup>(2)</sup> "Green" energy is produced from renewable sources: water, wind, sun, etc. These are low-carbon forms of energy generation.



## A second life for the batteries of Renault electric vehicles that no longer meet the needs of automotive applications: they can be used to store power and inject it back into the grid

In France, Renault is examining the feasibility of stationary applications for batteries from its electric vehicles. Several pilot projects are underway.

In Europe in 2015, Renault, along with its partner Nissan and Bouygues Energies & Services, launched the ELSA project (for Energy Local Storage Advanced system) co-funded by the European Commission.

The aim is to develop and then commercialize systems for storing electricity in vehicle batteries at the second-life stage. Six sites will be equipped with this kind of storage system in 2016, in the UK, France, Germany, Italy and Spain. The projects cover a wide range of applications, including power for office buildings, neighbourhoods and industrial sites.

### **For example, Renault electric vehicles batteries store electricity for:**

#### **electric power grids**

- Renault, Bouygues Energies & Services and ERDF have developed a system with three batteries from the Kangoo Z.E. in a distribution unit at Issy-les-Moulineaux (France). It has been in operation since September 2015, improving the quality of the local grid and the integration of electricity generated locally by solar panels.
- In Germany, where the renewable energies movement is well under way, The Mobility House is currently testing batteries from Renault electric vehicles with a view to developing large-capacity storage systems for balancing output from the grid.

#### **office buildings**

- Renault is working with Bouygues Energies & Services on an experimental system at the Bouygues Construction headquarters in Saint-Quentin-en-Yvelines (France), on the Eco2Charge cooperative programme funded by the French Energy Agency and launched by the two partners in 2012. The installation, which includes six Kangoo Z.E. batteries, stores the electricity generated by 25,000 square metres of solar panels at the site.

#### **fast-charge stations for electric vehicles**

- In the UK, Future Transport Systems, a consulting and R&D firm, has developed a system that uses Fluence Z.E. batteries to store electricity. One of the system's first applications is to provide power for electric vehicle charging stations.
- In Belgium and Germany, Renault and the Allego utility company will be setting up several charging stations equipped with storage systems using batteries from Renault electric vehicles, under the European Fast-E programme on rollout of fast-charge stations.
- These solutions store electricity when available and supply it when a vehicle comes in to charge its batteries. Because they enable operators to set up fast-charge stations at locations where the grid would not otherwise be powerful enough to accommodate them, they improve the coverage of electric transport capability.

## Pioneering commitment to shrink Renault's carbon footprint, with effective reduction of at least 3% per year

**In 2009, Renault became the first automaker in the world to publicly commit to a precise reduction in its worldwide carbon footprint**, as a measure for countering global warming. This commitment was expressed as a key indicator in its strategic plan, Drive the Change. For twenty years now, Renault has been running an active company-wide environment policy. Its electric transport strategy is one of the keystones of this global commitment.

Through group-wide mobilization, Renault achieved a 10% reduction in its carbon footprint per vehicle over the three years from 2010 to 2013. From 2010 to 2014, the reduction averages at 3.3% per vehicle per year, amounting to the equivalent of 10.1 million tonnes of CO<sub>2</sub> over this period. Renault undertakes to keep up this rate over the next two years.

- The vehicle usage phase, which accounts for 85% of greenhouse gas emissions within the overall carbon footprint, comes under very close attention. **Renault has been a front-runner in the drive to cut down CO<sub>2</sub> emissions for many years in Europe**, offering internal-combustion vehicles with ever-lower fuel consumption figures, and developing a full range of all-electric vehicles.
- Extraction of the raw materials used for making vehicles accounts for about 11% of Renault's carbon footprint. Renault is stepping up the use of recycled materials in its vehicles, and adopts a circular-economy approach to improve availability under optimized quality and cost conditions. **Renault is among the leaders in the field in the use of plastics from recycled sources, the proportion of which in vehicle manufacture averaged 13% in 2014 and is steadily increasing.**
- As well as shrinking the carbon footprints of its vehicles, Renault also works to reduce the carbon footprint of its operations, which account for 4% of its overall carbon footprint. Renault plants are constantly reducing their energy consumptions, and increasingly turning to renewable energies. **The Tangiers plant, for example, emits 85% less greenhouse gas than a conventional automotive manufacturing facility**, using systems such as the biomass boiler that provides heat for the paint shop, for example. Freight operations are optimized to minimize the number of trucks. And the drive to cut down greenhouse gas emissions also extends to office locations, with extensive use of low-consumption IT systems and group work utilities to minimize employee journeys.

### DID YOU KNOW?

Groupe Renault recently published these commitments on the NAZCA platform (Non-State Actor Zone for Climate Action). Commitments to expanding electric transport options will follow shortly.

## «Zero pollutants» while driving<sup>(1)</sup> for more breathable air

Atmospheric pollution, including that caused by road traffic, has a direct and immediate impact on public health.

**Renault electric vehicles emit no exhaust pollutants (particulates, nitrogen oxides, etc.), have a key role to play in improving air quality, with the attendant benefits to public health.**

A 20% proportion of electric vehicles in city centres would bring a reduction of up to 30% in the concentration of particulates responsible for respiratory and cardiovascular pathologies, and of up to 45% in the concentration of nitrogen dioxide, a potent respiratory irritant<sup>(6)</sup>. The reduction in atmospheric pollution levels afforded by electric vehicles becomes especially important under peak pedestrian exposure conditions, when nitrogen dioxide and particulate levels rise alarmingly as a result of meteorological conditions unfavourable to pollutant dispersion.



Renault Twizy in New York as part of a PR campaign

<sup>(1)</sup> Zero atmospheric emissions of CO<sub>2</sub> or pollutants while driving as per the NEDC certification cycle, excluding wear and tear to parts.

<sup>(6)</sup> Figures obtained by modelling of local conditions in Rome and Hong Kong, by the Renault-Nissan Alliance, Aria Technologies and Arianet

## 03

## WITH ITS ELECTRIC VEHICLES, RENAULT IS CREATING AN EXCITING NEW DRIVING EXPERIENCE

*“ With their elegant, futuristic design and their relaxing and connected on-board experience, Renault electric vehicles also benefit from the unique appeal of electric driving. ”*

ERIC FEUNTEUN, Director of Groupe Renault Electric Vehicles Programme

## Take advantage of the technology of the future today

**Drivers of Renault electric vehicles report satisfaction rates of almost 100%, higher than the satisfaction rates of customers with internal combustion engine (ICE) vehicles.** 98% of ZOE and Twizy owners and 95% of Kangoo Z.E. owners are pleased with their choice.

**Renault's electric vehicles transport you to a new automotive era.** It begins with design. The Twizy is innovative and fun, the Fluence/SM3 Z.E. is elegant and the Kangoo Z.E. is modern and practical.

**As for ZOE: it embodies Renault's electric vehicle design par excellence.**

## Its futuristic, visionary design has received awards

The Renault ZOE won the Red Dot Product Design Award 2013, one of the most prestigious international awards for design. The Renault ZOE is a compact, all-electric sedan with sleek, fluid lines. Its front end has a cheeky, engaging personality of its own. Its blue-tinted logo, headlamps and dark-tinted windows point to its electric identity. Inspired by nature's pure lines, the passenger compartment offers comfort and relaxation, with soft-touch materials. The ZOE also received an award for its exterior design at the 2013 Automotive Brand Contest.

## It is connected to its user, even when they are not at the wheel

On their smartphone or computer, drivers can view information such as the level of charge, the estimated remaining battery life and the time remaining for a full charge if the vehicle is being charged. Drivers can also receive alerts notifying them of the start and finish of charging. The driver can communicate remotely with their ZOE: start or programme the pre-conditioning of the interior temperature, recharging and optimising their charging schedule based on cost and electricity CO<sub>2</sub>/km.



## With on-board multimedia services, occupants do more than just move: they travel

The Renault R-Link integrated and connected multimedia system is fitted in 100% of ZOE versions. R-Link brings together all multimedia features in one place: navigation, radio, telephone and Bluetooth® audio streaming, music and mobile device synchronisation, connected services, etc. R-Link is at the drivers' fingertips via the 7-inch touch screen, or through intuitive voice recognition.

In the ZOE, Renault R-Link offers features dedicated to electric driving. TomTom® Z.E. LIVE navigation displays the activity radius around your vehicle, guides you to a charge point if the chosen destination is not compatible with the remaining driving range, and offers you the most energy-efficient route. On the Renault R-Link screen, the driver can, for example, view the history of their energy consumption in real time, as well as the energy flow between the battery and the electricity consumption features of their vehicle, such as the engine, air conditioning and heating. At the end of their journey, the driver can view their eco-driving performance by selecting the "eco<sup>2</sup> driving" feature and receive personalised recommendations.

R-Link is also connected to the outside world and the Internet through integrated EDGE connectivity. Its connected services, incorporating TomTom® LIVE and Coyote series alerts, provide the driver with real-time traffic condition updates in order to reduce journey time.



Design detail of the ZOE



Renault R-Link multimedia system

## Enjoy dynamic, relaxed driving



A driver at the wheel of his ZOE

**Energetic on the road, ZOE is also a soothing cocoon.**

- The all-electric compact sedan is stylish, agile and fun to drive, with a chassis tailored to the requirements of electric driving, and attention to detail in its steering, tyres and shock absorbers. In a fraction of a second, the electric engine delivers a maximum torque of 220 Nm, enabling fast starts and accelerations from low revs. Acceleration from 0 to 50 km/h (the most common range in urban use) takes only four seconds. Acceleration is smooth, perfectly linear, without hesitation. For the driver, it is like having the best automatic transmission on the market.

- Being electric, ZOE provides a calmer and more relaxing drive, thanks to the absence of engine noise and vibration. The sound measured in the ZOE's passenger compartment at between 40 and 75 km/h is 60-65 dB, two to three times less than an ICE vehicle of equivalent power. The ZOE also offers several comfort features. The driver can enjoy a passenger compartment set at the ideal temperature (22°C), the air they breathe is cleaner, while the air conditioning system maintains a good level of moisture in the air, to avoid drying out skin: we've thought of everything to make driving more pleasant.
- Drive the ZOE with complete peace of mind. It received five stars all in passive safety tests carried out by the Euro NCAP independent organisation.

**With the Twizy, Renault has invented a fun urban mobility concept for one to two people, available in the "Twizy 45" version accessible from age 14 without a licence, and the "Twizy Cargo", with a storage compartment instead of rear passenger seat.** With its ultra-compact dimensions (2.34 m long, 1.24 m wide) and 3.4 m turning circle, with a Twizy you can park in the tightest of spaces. On a typical urban journey, it offers a 25% time-saving, including parking. A pleasure to drive, it takes just six seconds to accelerate from 0 to 45 km/h, the same acceleration as a 125 cc scooter over 50 m. Comfort and safety are the Twizy's other strong points. Its passenger compartment protects the driver against impacts. Its very low centre of gravity and chassis with its four-disc brakes grip the road. In the event of an impact, the driver is secured frontally and laterally by a four-point seat belt, and protected by the Twizy's innovative tubular structure and front airbag as standard.

**Thanks to the battery's central location under the floor, the Renault Kangoo Z.E. offers the same dimensions and load capacities as its ICE version.** With a length of 4.21 m, it has a load volume ranging from three to 3.5 m<sup>3</sup> and a payload of 650 kg. Its asymmetric rear hinged doors and sliding side door provide easy access to the loading area. Versatile, the Kangoo Z.E. is also available in a "Maxi" two or five-seater version. Professionals who spend a lot of time in their vehicles are the first to appreciate the benefits of electric driving, such as fast starts and accelerations from low revs, the perfectly linear driving and lack of vibration.

**Fluence Z.E., now sold in South Korea as the SM3 Z.E. and the Renault Samsung Motors brand, is the version of the Fluence/SM3 ICE model.** This three-box sedan is dedicated to individual customers or fleets, seeking a premium vehicle with elegant styling, equipped with a comfortable passenger compartment and a host of useful technologies.

## Making everyday life easier

**In their everyday life, users of Renault electric vehicles have access to their own “service station”, since they can recharge their car directly wherever they park most frequently.**

When purchasing their electric vehicle, the driver identifies their “base point”, whether this is a parking space at home, at their workplace, or on the street near their home.

The primary recharge, in most cases at home, represents around 95% of recharges by electric vehicle users.

The battery life acquired by primary recharge mode is more than enough to cover day-to-day journeys.

In Europe, 87% of these journeys are less than 60 km.

**Renault offers competitive pricing and easy to implement solutions so that everyone has a primary charge point. Individuals can therefore be easily equipped with a home-based private charge point** – including in flats – and businesses can offer charge points to their employees.

Depending on the country, Renault complements or supplements states subsidies, making the cost of installation low, or even negligible, for the customer. In France, for example, Renault contributes €500 to the cost of the charge point, the total cost in 80% of cases. It also offers a turnkey management of the works and of the administrative procedures through its installer partners.

In some countries, installation of private charge points is fully subsidised by the government. In the UK, for example, electric vehicle owners can even have charge points fitted free of charge in more than one home.

Renault provides dedicated charging stations for its employees’ electric vehicles, by providing around 1,000 charge points at 26 of its sites in France. These include 340 at the Technocentre engineering centre near Paris.

**Users of Renault electric vehicles drive with complete peace of mind, thanks to the battery hire contract that comes with the purchase of the car in almost all countries where it is sold.**

This contract guarantees a battery that is always healthy, with charge capacity of at least 75% of its original capacity, regardless of the age or mileage of the vehicle. If the vehicle range no longer meets the needs of the driver, and the diagnosis by the Renault network confirms that the battery’s capacity is insufficient, the battery is replaced free of charge. In addition, Renault roadside assistance covers the vehicle even if you run out of charge, 24/7.

**When driving a Renault electric vehicle in the city, the driver has the upper hand.**

In the Paris region, for example, electric vehicles can be parked and recharged at 900 Autolib’ stations, an offering of around 5,000 charge points. Simply subscribe for a modest price of €15 per year. The driver can reserve their space in advance, eliminating time wasted searching for a parking space, especially in Paris. The cost of charging and parking is one euro per hour. In addition, on-street parking, wherever it is, is free for electric vehicles in Paris and in many other cities in France (Bordeaux and Nice), Norway and Denmark, and in Madrid, Monaco, etc. Electric vehicles benefit from congestion charge exemption in London and Milan and can drive in dedicated lanes in Oslo.

## Passionate about electric motorsport

**A key player in motorsport and electric vehicle pioneer, Renault is promoting the emergence of a new, more accessible and environmentally friendly form of auto racing: Formula E.**

Held in major cities across the world, this competition represents a global showcase for all-electric mobility to the wider public.

- Since the competition's first season (2014/2015), Renault has acted as technical partner of championship and clinched the manufacturers' title as part of the e.dams Renault team.
- At the opening of the 2015/2016 season, Renault is stepping up its involvement by developing its own engine and transmission assembly. With this technological support, the e.dams Renault team is determined to play leading roles and is aiming to win the double Teams/Drivers title in this second season.



Single-seater Spark-Renault SRT 01E from the Renault e.dams Formula E team, and the Renault ZOE

**After a resounding victory in 2014, the Renault ZOE repeated its outstanding performance at the 2015 edition of the Monte-Carlo ZENN Rally (Zero Emission No Noise).** In this competition, Renault entered four ZOE EVs, and one was entered independently alongside competing brands. Over seven and a half hours of racing, each team travelled almost 130 miles.

Four ZOE's took the top four spots overall. And that's not all: the five ZOE's also earned the top five spots for consumption, and four of them the top four spots for regularity.



# 04

## FOR RENAULT, ELECTRIC VEHICLES ARE FOR THE MANY

### A comprehensive and accessible range

**The only carmaker to market a complete range of four electric vehicles, Renault covers a maximum range of uses.**

There is an electric model to cater for every need, from the compact ZOE sedan, to the Kangoo Z.E. utility vehicle, not forgetting the Twizy and the premium Fluence/SM3 Z.E. sedan.

**As a full-line carmaker that seeks to offer electric mobility to as many people as possible, Renault offers a range of vehicles aimed at a broad audience.**

For Renault, electric vehicle should be a mass-production vehicle to maximise its beneficial effects on the environment and enable everyone to enjoy a new driving experience.



ZOE parked in town

**The purchase price and running costs of Renault electric models are competitive on European markets where incentives are in force to encourage the purchase of electric vehicles.**

**In the UK, the most popular version of Renault ZOE costs £15,045**, after deduction of the government incentive of £5,000, which places it just below the price of the equivalent diesel-powered Clio. The ZOE starting price is £13,445, after deduction of the government incentive.

**In France, ZOE prices start at €15,600**, after deduction of the €6,300 bonus, for the Life version, which is very well equipped (satnav, climate control, cruise control, etc.).

**Compared to an equivalent diesel vehicle, customers can achieve real savings in running costs. Take the example of ZOE in France:**

- A full recharge of the battery only costs around two euros (22 kW battery, depending on the kilowatt per hour price).
- The battery hire cost – starting at €49 per month – is comparable with the fuel costs of an ICE vehicle.
  - The battery is guaranteed for the full duration of the hire agreement: the customer has the assurance of having access to a battery in perfect working condition at any time, with sufficient charge capacity.
  - It benefits from free-of-charge, 24/7 breakdown assistance, even if you run out of charge
  - When the vehicle is resold, the battery's loss in value does not affect the customer, since they only resell the vehicle.
- Maintenance costs are very low.
  - No more oil changes: an electric engine does not require lubrication.
  - Less wear and tear, less damage to the traction chain: having no gearbox or clutch, the mechanical technical constraints associated with these disappear.
  - Brake pads, discs and drums that last longer: there is less pressure on the mechanical brakes, as electric cars' power supply systems recover a large part of the kinetic energy during regenerative braking.
- The ZOE guarantee provides for a two-year guarantee/unlimited mileage on the chassis and five years, or 100,000 km, on the electric traction chain. It can be supplemented with extended warranties and maintenance contracts specifically adapted to the electric vehicle.
- Insuring an electric vehicle costs on average 10% less than an equivalent ICE vehicle.
- Vehicle registration papers are on average 30% less expensive compared to an ICE vehicle, and sometimes even free in some regions, since the ZOE's taxable horse power is only one HP.

## An increasingly wide activity radius

The increased deployment of publicly accessible charge points has a major role to play in widening the electric vehicle market, even if the primary recharge is mainly done at home or at places identified by the driver as their usual base points.

*“The proliferation of publicly accessible charge points is reassuring for motorists who may be hesitant to make the switch to electric, and extends the use of these vehicles to journeys longer than the usual daily trips.”*

THOMAS ORSINI, Groupe Renault Business Development Director for Electric Vehicles

Renault is involved in various projects for the installation of publicly accessible charge points, alongside public authorities and other electric mobility stakeholders such as energy companies.

### Along major highways

Coverage across European road networks is growing, to connect cities and countries with each other, thanks to the rapid chargers being gradually installed along motorway corridors and major routes. These charging stations, with a capacity of between 43 and 50 kW, recharge the ZOE's battery to 80% in 30 minutes to one hour (assuming the vehicle arrives at the charge point with zero battery life). There were already nearly 1,000 in late 2015, and there will be approximately 2,000 by late 2016, in around 15 European countries.

Renault is supporting this deployment through its participation in the TEN-T (Trans-European Transport Network) funding projects of the European commission, including the «Corri-Door» pilot project in France. The latter had already enabled the installation of around 140 new rapid chargers in late 2015. There will be 200 in France by mid-2016, equivalent to one charging station installed approximately every 80 km in both directions of traffic on the routes covered.

### On the street and in public car parks

Road networks are also being strengthened, thanks to various projects and initiatives that are increasing the number of charge points at on-street parking spaces, in public car parks, shopping centres and airport car parks etc.

Renault has partnered with E. Leclerc supermarkets in France, which already offers nearly 500 charge points in its car parks.

Renault's outlets are also potential locations for recharging electric vehicles. Nearly 400 Renault dealerships in France are making 900 22 kW charging stations available to the public in their car parks. The Renault network offers one hour's recharging to any user of electric vehicles, whether or not they are a customer of the brand.

**In terms of publicly accessible charging infrastructure available to the public, the trend is positive.** Through all the projects – whether completed, in progress or planned – there has been an increase in the number of public charging stations of 30 to 60% since 2013, and is expected to accelerate in the coming years. To date, there are over 100,000 charge points worldwide, 60,000 of which are in Europe. In France, the number of charging stations will triple between 2015 and 2017, from 12,000 to approximately 40,000.



Charging station accessible to the public

**To extend the activity radius of its electric vehicles further, Renault is working on increasing their driving range.**

Unveiled at the 2015 Geneva Motor Show, the ZOE's R240 engine, accompanied with a battery with optimised electronic ignition, offers enhanced efficiency and improved charge performance. It brings the ZOE's actual driving range to between 115 and 170 km, and makes recharging faster by 10% on average at domestic charging stations.

**A vehicle's actual driving range depends on factors including driving style, speed, road profile and temperature.**

Actual driving ranges of Groupe Renault electric vehicles:

- ZOE R240 from 115 to 170 km (240 km NEDC) and ZOE Q210 from 100 to 150 km (210 km NEDC)
- Fluence/SM3 Z.E. from 90 to 135 km (200 km NEDC)
- Kangoo Z.E. from 80 to 125 km (170 km NEDC)
- Twizy from 50 to 80 km (100 km NEDC)

**The activity radius of a Renault electric vehicle can be checked at any time: the driver can view and manage their vehicle's driving range, and identify available charge points.**

The instrument panel screen allows the driver to check, at any time, parameters related to their driving and their vehicle's driving range. They can improve driving range through the preconditioning available on all Renault electric vehicles. They can optimise their vehicle's temperature while it is being recharged, which avoids having to set the heating or air conditioning to maximum when starting, which wastes energy. By choosing the ECO mode, available on the ZOE and the Kangoo Z.E., the driver can limit the performance of the engine and the heat pump slightly (heating/air conditioning), to gain 8-10% driving range.

In the ZOE, the Renault R-Link connected services offer features dedicated to electric driving, including the displaying activity radius and identifying charge points available on the journey.

**Drivers can find GIREVE maps on Renault's websites which indicate the publicly accessible charge points available in Europe. They have been designed to guarantee optimum usability and readability from a computer, phone or tablet.**

These maps enable drivers to locate charge points and provide information on the types of outlets, power and charging modes available. They are also designed to display, in real-time, the status of the charging station: "available" or "unavailable". This feature is currently being rolled out and already implemented in some cities. The GIREVE company (*Groupement pour l'Itinérance des Recharges Électriques de Véhicules*), was set up by Renault, Caisse des Dépôts, Compagnie Nationale du Rhône, EDF and ERDF.



## Meeting new mobility needs

**Renault is anticipating and supporting the emergence of new mobility needs to develop possibilities for using their all-electric vehicles.**

Due to car congestion in cities, and for financial reasons, more and more people are giving up car ownership in favour of car-pooling.

### **Renault encourages car-sharing of its electric vehicles.**

- **The Renault and Bolloré groups set up a joint venture in September 2014, Bluealliance, which enables them to jointly run car-sharing services in Europe.** Car-sharing networks in Lyon (Blueely) and Bordeaux (Bluecub) have been offering their customers access to around 100 Twizys since spring 2015, opening up possibilities for further use of the Bluecar. The two groups are also cooperating in manufacturing; Renault's plant in Dieppe has been assembling the Bolloré Bluecar since June 2015.
- **In July 2015, RCI Banque (Groupe Renault) created its subsidiary RCI Mobility, designed to develop company car-sharing services and any other car-based mobility services.** It enables companies to offer their employees mobility solutions that are simple, user-friendly and flexible; to meet their professional needs as well as their personal needs. The majority of cars it offers are electric. Fleets are already being used to meet the needs of Crédit Agricole, at its Montigny campus, and at Le Village start-up incubator. RCI Mobility's activity will be expanded for the benefit the Renault-Nissan Alliance, in France and abroad.
- Car-share Twizys are also offered in locations such as Malaysia, Italy (Naples, for example), Monaco and Marseilles. Meanwhile, the ZOE was recently integrated into the largest public electric car-sharing service in Palermo in southern Italy. The all-electric sedan is already available in other cities in Italy, in the UK, in Germany, the Netherlands, Denmark, France, Malaysia etc.



Io Guido car-sharing in Palermo



## **Renault is extending use of its electric vehicles to professional and institutional clients.**

- **Renault is increasing deliveries of fleets of the Kangoo Z.E., the ZOE and the Twizy. For example:**

Renault and the Royal Court of Jordan have signed an agreement for the delivery of a fleet of 150 ZOE's before the end of 2015, the largest order of ZOE's since its launch.

In April 2015, Renault delivered a fleet of 45 electric vehicles (23 ZOE's and 22 Kangoo's Z.E.) to Jas Hennessy & Co, which now has one of the largest electric fleets of any private company in France. Designed for employee travel between sites, these vehicles replace 80% of a fleet that until now consisted solely of ICE vehicles.

In September 2014, the Renault-Nissan Alliance signed an agreement with Orange, for the delivery of a fleet of 200 electric vehicles. This adds to the existing fleet of around 30 Twizys, to meet the travel needs of the company's employees in France.

- On delivery of the 5,000th Kangoo Z.E. in late 2014, Renault and La Poste decided to extend their cooperation by signing a new partnership. In addition to their commercial relationship, the two groups share a common goal: to develop sustainable mobility solutions for all. This collaboration focuses on forward studies and pilot projects that can La Poste can try out in its service offering.

## **DID YOU KNOW?**

Renault adopts a “try & learn” approach to designing, testing and developing products and services best suited to new modes of mobility, surrounding itself with partners in each field.

Between 2012 and 2014, Renault launched tests that enabled it to better understand the needs of car-sharing users and operators, and to develop pre-equipment technical solutions for the car-sharing of their vehicles as standard. As part of this, the “Twizy Way” Twizy car-sharing projects responded to consumer needs in the St-Quentin-en Yvelines area, and to professional needs for travel between sites for the Atomic Energy Commission in Grenoble, among others.

Renault is also investing in exploring “last mile” logistics solutions: the “Twizy Delivery Concept” project is in testing phase. Launched one year ago in partnership with the Star's Service delivery company, the City of Paris, and co-funded by the French Environment and Energy Management Agency (ADEME), this urban, electric and flexible logistics experiment looks at the use of Twizy prototypes equipped with a trailer to deliver home shopping right out of the supermarket checkout.

© Photo credits:

November 2015 – All rights reserved.

Pages 1 et 17 : Renault Marketing 3D-Commerce – Page 5 : Olivier Martin-Gambier – Page 6 : Antoine La Rocca – Page 8 : Giovanni Tagini – Page 11 : Malcom Hay – Pages 12 et 24 : Laurent Villaron / Publicis Events France – Page 15 : Isa Wipfl – Page 18 : Eric Matheron / Publicis Events France Page 20 : Bernard Asset – Page 21 : Ralph Richter / Publicis Events France – Page 25 : Zeno Colantoni