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**Nissan's Future of Mobility concept, created in partnership with world-renowned architects Foster + Partners and unveiled earlier this year, was designed to reimagine how cars could be powered, driven, and integrated into the urban fabric.**

In the future, cars will connect with the social infrastructure including road, information and electric power networks, all of which will eventually lead to reduced traffic jams, more efficient car sharing, remote vehicle operation and improved energy management.

To meet the challenges facing European cities, local governments, businesses and residents need to adopt intelligent, holistic solutions.

**David Nelson, Head of Design, Foster + Partners:** As a practice we are committed to this kind of approach. The scale of this challenge is enormous. As it touches every aspect of human existence it therefore requires simultaneous action on energy, jobs, food production, and transportation etc. The task is so complex that all studies appear as vignettes to the bigger picture. The mobility study with Nissan is one of those vignettes. Transport, linked to energy production, storage and the physical effects on our cities, is a big piece of the equation."

Based on current growth figures, it is estimated that by 2050 there will be 2.5 billion vehicles in the world, a 150 per cent increase on the one billion on roads today. With CO<sub>2</sub> emissions currently estimated at 600 million tons worldwide, transport and mobility will have an increasingly prominent role in shaping the future landscape in large cities.

Figures from the Institute for Energy Diversification and Saving (IDAE) suggest that putting 1,000 electric vehicles on a city's streets would reduce greenhouse gas emissions by more than 30,000kg and CO<sub>2</sub> emissions by over 2,000 tons per year.

The 33,000 pure electric Nissan LEAFs driven in Europe that are currently registered with NissanConnect EV services have already prevented the emission of 86 million kg of CO<sub>2</sub> into the atmosphere<sup>[i]</sup>.

**"The Fuel Station of the Future succeeded in bringing together many elements of the urban environment to create a solution that can inspire a generation towards a more sustainable future."**

"The real challenge is in how all the different aspects of how we live can come together and that is a truly enormous equation. That's where computing power and the recent Big Data phenomenon can help us to supersede the limits of the single human brain and marshal parameters of human experience from ever more diverse directions.

"We believe in the potency of the study we carried out in partnership with Nissan. The Fuel Station of the Future succeeded in bringing together many technologies, and many elements of the urban environment to create a solution that connects many touch points, and can inspire a generation towards a more sustainable future."

**Gareth Dunsmore, Director of Electric Vehicles, Nissan Europe:** "The future of mobility is both dependent upon our cities, and the impetus for many of the changes coming. Congestion and poor air quality are just two of the challenges that we face on the road to sustainable megacities.

"This concept is not distant future, and we're seeing demand for these technologies in our cities right now. Less hostile urban environments and a better quality of life is within reach.

"In light of Nissan's clear commitment to creating innovative mobility solutions that reduce the impact on our environment, and make life more comfortable, easier and more fun, we are pleased to present our take on the future of mobility: a 360-degree portrait of where visionary thinking, design and technology could take future vehicles and the societies in which they operate."

The vision set out in Nissan's concept addresses issues ranging from the biggest global challenges – energy supply, urban air quality and climate change – to matters as everyday as parking, road safety and vehicle charging.

### AUTONOMOUS CARS: NISSAN INTELLIGENT DRIVE

The cars in Nissan's Fuel Station of the Future concept can operate autonomously – driving, parking and charging themselves without a driver.

Nissan Intelligent Driving is Nissan's vision for autonomous drive technology. The manufacturer will launch multiple vehicles with autonomous drive technology in the next four years (until 2020) in Europe, the United States, Japan and China.

Intelligent Driving improves a driver's ability to see, think and react. Human error causes 90 per cent of all accidents – so reducing the likelihood of error through technology makes driving safer, more efficient and more fun.

The Nissan Qashqai, made in the UK at Nissan's Sunderland Plant, will receive the first iteration of the technology in 2017: Piloted Drive 1.0. It will allow the car to drive autonomously and safely in a single lane in heavy traffic conditions on highways.

Using an autonomous car won't be like sitting on a conveyor belt to get from A to B. Future iterations of Nissan Intelligent Driving technology will allow a car to 'learn' a driver's style behind the wheel and reflect this when Piloted Drive is selected. In Manual Mode, the driver has control – the AI will only provide assistance when it is needed, such as braking if an imminent impact is detected.

### NISSAN INTELLIGENT INTEGRATION

The car of the future will be able to communicate: not only with its driver, by relaying upcoming traffic conditions, their personal schedule, and other information; but also with pedestrians and other road users. Exterior lights and displays will clearly signal the car's intentions, such as letting a following cyclist know the car is aware of their presence, or flashing an 'after you' message to pedestrians waiting to cross the road.

Cars connected to road, information and power networks could lead to reduced traffic jams, more efficient car sharing, remote vehicle operation and improved energy management.

Intelligent Integration could also decide which vehicles should be charged first and to what level of charge, based on factors such as projected distance travelled by each car and when it will be needed.

Nissan aspires to a zero-fatalities goal. Intelligent Driving and Intelligent Integration technology will enhance the safety performance of a human driver, bringing this aspiration closer to reality.

### SECOND LIFE BATTERY STORAGE SOLUTIONS

Nissan and power management specialists Eaton Electrical have been working together since December 2015 to develop a product designed to make use of Nissan's lithium-ion batteries in the home.

Designed to be the most affordable and reliable energy storage system in the market today, the xStorage unit will provide a sustainable 'second life' for batteries from Nissan electric vehicles.

Customers will benefit from savings on their monthly energy bills and can earn money back from their supplier through smart energy storage.

The entire solution (including installation and additional equipment) will cost €4,000 (excl. VAT).

Developed in collaboration with Eaton and designed by Nissan Design Europe in London, the xStorage unit will see used batteries from Nissan EVs deployed in homes to provide on-demand power, lowering energy costs and protecting against grid disruption as demand rises.

### VEHICLE-TO-GRID (V2G) CHARGING

Automotive industry leader Nissan and multinational power company Enel has confirmed plans to launch a major vehicle-to-grid (V2G) trial – the first ever carried out in the UK. The trial will work by installing and connecting one hundred V2G units at locations agreed by private and fleet owners of the Nissan LEAF and e-NV200 electric van.

By giving Nissan electric vehicle owners the ability to plug their vehicles into the V2G system, owners will have the flexibility and power to sell stored energy from their vehicle battery back to the National Grid.

This announcement heralds an exciting era for energy management in the UK. Not only will Nissan electric vehicle owners be able to play an active role in grid stability, providing an alternate source of income, but it will revolutionise how energy is supplied to the grid.

Once scaled up, the V2G technology can become a game-changer for owners of Nissan EV in the UK as they become fully fledged and active participants in the UK energy market.

Until now, vehicle charging has been a one-way operation. Charge from the grid is taken into a battery, and depleted as the car is driven. Vehicle-to-grid charging would make possible two-way charging – in which vehicles act as mobile energy hubs.

Using this equipment, a Nissan LEAF or e-NV200 owner can connect to charge at low-demand, and cheap tariff periods, with an option to then use the electricity stored in the vehicle's battery at home when costs are higher, or even feed back to the grid with a net financial benefit. Electricity generated by solar panels or wind turbines can be used to charge a vehicle, to power the home or business, or to feed back to the grid.

Nissan announced in March of this year, that its new regional office in France will house the largest grid-integrated electric vehicle (EV) system and second life battery storage unit ever installed in a building, anywhere in the world.

### GREEN SPACES AND BUILDINGS

The design team from leading architects Foster + Partners imagined a future city not confined to vehicles – the Future of Mobility concept also investigates the potential of applying new thinking and technology to the physical, built world.

New energy-efficient and connected homes that not only store energy efficiently, but create it too feature prominently in the video, and much of this technology is already available – for instance, photovoltaic panels that capture solar energy are already commonplace in the urban environment.

And, green spaces such as gardens, parks and woodlands provide clear advantages to urban populations and an important habitat for wildlife. These benefits include improved physical and emotional wellbeing, but also better air quality and reduced impact of heatwaves by reducing urban temperatures.

Electric vehicles such as the Nissan LEAF and e-NV200 contribute to improving air quality by emitting zero carbon dioxide or other harmful particulates.

Zero emission technology and multi modal transport solutions mean more of our cities could be turned over to residential housing to fill the ever expanding need for accommodation.

What's more, with the introduction of Piloted Drive technologies and fewer idle cars on the road, less of the roadside will be given over to parking, and cities can begin reclaiming green spaces; creating urban parks and community centres.

**David Nelson, Foster + Partners, continues:** "High urban density leads to improved quality of life when housing, work and leisure facilities are all close by. High density does not automatically mean overcrowding or economic hardship, if a holistic approach can be developed.

"'Clean' industries, such as microelectronics, and new service-sector offices and studios are completely compatible with residential areas. Many of these technologies are present in our cities today."

And it is community that sits at the very heart of this commitment to the adoption of zero emission technologies. With fewer emissions, comes a cleaner city, better air quality, greener spaces and more freedom to enjoy the built environment.

**The Nissan Futures Programme marks the first open-source initiative of its kind.**

**Nissan welcomes individuals, businesses, industries, academics and policy-makers to join the debate on the Future of Europe's cities and its next-gen mobility solutions.**

[i] Totals based on Nissan's Global Data Center (GDC) as of 14.04.2016 (UTC). The distance and the amount of CO<sub>2</sub> are gathered only from Nissan LEAF vehicles registered with CarWings, approximately 51% of total sales.

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