Press Information

Volkswagen

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Volkswagen at the 38th Vienna Motor Symposium: Large-scale move to electric power, coasting 2.0 and natural gas propulsion

- → **New Golf provides examples of diverse electric-powered systems: from the micro hybrid system to 100% battery-powered electric drive**
- → **Fuel-efficient coasting mode 2.0: the new Golf TSI BlueMotion[1] with DSG gearbox 'coasts' with engine shut off**
- → **The new e-Golf[2] provides 15 kW more power, 20 Nm more torque and 110 km more range**
- → **Sustainably using alternative fuel: the innovative 1.0 CNG turbo[3] for natural gas propulsion**

Wolfsburg/ Vienna – Electric power, natural gas propulsion and a new coasting function for internal combustion engines – at the 38th Vienna Motor Symposium starting today, Volkswagen is presenting solutions for the CO_2-neutral, sustainable mobility of the future. In the case of electric power, the spectrum ranges from the new, affordable micro hybrid system all the way to further optimised battery-powered propulsion. For the first time, Volkswagen is presenting a coasting function for internal combustion engines with a 'Coasting - Engine off' function that shuts off the engine completely. The company is going on the offensive on the natural gas front as well – with a new, compact three-cylinder engine for the Polo.

1,0 TGI engine with 66 kW/ 90 PS

"Partially and fully electric drive systems form a key pillar of our drive system strategy," explains Friedrich Eichler, Head of Volkswagen Powertrain Development, who is giving a talk at the Vienna Motor Symposium. "Our range of technology, especially that available for the Golf, now covers all customer preferences. The new 'Coasting - Engine off' micro hybrid system represents a low-cost level of electric-powered motoring on a 12-volt basis."

In the new Golf TSI BlueMotion, which launches this summer, the system works in tandem with a model DQ200 DSG gearbox. In a speed range of up to 130 km/h it offers the driver hybrid-style characteristics: lift off the

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throttle, and the Golf can coast with the engine completely deactivated. The system reduces fuel consumption in practical use by up to 0.4 litres/100 km and compared to the current coasting function with the engine running by 0.2 litres/100 km.

This new Volkswagen system adds a compact lithium-ion battery to the 12-volt vehicle electrics, with the battery supplying the electric consumer units with power when coasting. A so-called Q-diode regulates the current flow between the lithium-ion and lead-acid batteries. At the end of the coasting phase the Golf TSI BlueMotion's engine, a highly efficient 1.5 TSI Evo[1], is started in one of several different ways, depending on driving speed and situation: using the starter, using the clutches of the DSG gearbox or – particularly ingeniously – in combined fashion using starter and clutch.

Volkswagen e-Golf high-voltage battery

In the middle of the electric power range is the plug-in hybrid concept of the Golf GTE[4] and at its top end the 100% battery-powered drive system, such as Volkswagen is offering in the new e-Golf. In this latest upgrade the new e-Golf's electric motor delivers 100 kW of power and 290 Nm of torque, 15 kW and 20 Nm respectively more than before. The e-Golf now accelerates from 0 to 100 km/h in just 9.6 seconds and its top speed has gone up by 10 km/h to 150 km/h. Through improvements to the chemistry of its cells and to their structure, the capacity of the lithium-ion battery system has also been increased from 24.2 to 35.8 kWh. This results in a big increase in range – in the NEDC cycle from 190 km previously to now up to 300 km.

Volkswagen is taking on the next big step in the switch to electric power using the all-electric architecture. The first model using this completely new drive system and connectivity architecture will be launched in 2020. The BUDD-e[5], I.D.[6] and I.D. BUZZ[7] concept cars that the brand has already unveiled give a look ahead to the great potential of the new architecture.

"The all-electric architecture combines local zero-emission driving with superb long-distance mobility," says Friedrich Eichler, Head of Volkswagen Powertrain Development. "It forms the basis for our new generation of electric vehicles that we will be offering globally in high volume. Its drive system and the system's intelligent management provide for great efficiency and simultaneously convey to the passengers a new, highly comfortable driving experience, including with regard to automated driving."

A second technology with which Volkswagen is shaping the transition to the sustainable mobility of the future is propulsion using compressed natural gas (CNG). Dr Wolfgang Demmelbauer-Ebner, Head of Volkswagen Petrol Engine Development, outlines the subject in his symposium speech as follows: "Due to its chemical composition, natural gas as a fuel already reduces CO_2 emissions if it comes from fossil sources. If, however, it is produced in a sustainable way, for instance as biomethane from agricultural waste, then looked at from well-to-wheel it facilitates a form of mobility that produces appreciably less CO_2. We use the term e-gas to describe synthetically produced CNG that is made out of water and CO_2 from renewable power generation's excess current. e-gas is ideal for making renewable power usable for the transport sector and for storing it. It is in practical terms a partner in the switch to renewable forms of energy."

Volkswagen has been represented in the marketplace with CNG engines since way back in 2002. A special feature of the new three-cylinder turbocharged engine with a cubic capacity of 1.0 litre and high torque of 66 kW (90 PS) that is being shown at the Vienna Motor Symposium is its bivalent concept: it can be run on petrol or CNG. In gas-powered mode it works in a particularly low-emission manner – and that applies both to CO_2 and NO_x particulate emissions. The compact 1.0 TGI is a new engine specification for the small car class in the Volkswagen Group.

A key factor in its low emissions is the optimum conversion of the methane in the exhaust gas. In order to bring the catalytic converter quickly up to operating temperature and keep it there, Volkswagen has developed a lambda split process. During warm running and under low load two cylinders are fired using a rich mixture and one using a lean mixture. An important component of the technology here is the so-called lambda probe with no dew-point end. Thanks to electric heating, it is able to take up its regulating function within no more than ten seconds of a cold start, even if the exhaust gas and exhaust system still contain certain amounts of condensation.

The activities promoting CNG drive systems go well beyond technical solutions. In addition to the Group's extensive and attractive range of models, Volkswagen is also conducting an intensive dialogue with other market participants and political players. In collaboration with energy providers, the gas industry, other OEMs and federal government ministries, we are driving forward activities that continue to make CNG known and attractive as a fuel.

Volkswagen is thus pursuing every path leading to CO_2-neutral mobility. In addition to systematic optimisation of the existing powertrains, alternative forms of drive system are being introduced into the portfolio. The scaling

possibilities of electric-powered drive systems open up further areas of potential, as the example of the Golf shows. Looked at overall, the fuels' CO_2 relevance is a key factor. In this regard, CNG in the form of e-gas is playing an increasingly important role.

[1] Golf TSI BlueMotion: The vehicle has not yet gone on sale and therefore Directive 1999/94 EC does not apply.
[2] e-Golf (100 kW/136 PS) Electrical consumption in kWh/100 km: combined 12.7, CO_2 emissions combined in g/km: 0, efficiency class: A+
[3] 1.0 CNG turbo (66 kW/90 PS): Vehicle with this engine have not yet gone on sale and therefore Directive 1999/94 EC does not apply.
[4] Golf GTE - Fuel consumption in l/100 km: combined 1.8 - 1.6; Electrical energy consumption in kWh/100 km: combined 12 - 11.4;CO_2 emissions combined in g/km: 40 - 36; efficiency class: A+
[5] BUDD-e: The vehicle has not yet gone on sale and therefore Directive 1999/94 EC does not apply.
[6] I.D.: The vehicle has not yet gone on sale and therefore Directive 1999/94 EC does not apply.
[7] I.D.BUZZ: The vehicle has not yet gone on sale and therefore Directive 1999/94 EC does not apply.