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Real life tests of the 2024 ECOBEST Challenge reveal surprises and new leaders in electric mobility

With the aim of informing, guiding and advising European car users about the true efficiency and use of the latest pure electric cars, the AUTOBEST international independent organization has performed in June 2024 a new edition of its ECOBEST Challenge. 13 new cars from 13 different manufacturers were evaluated under true real life, real traffic, similar and reproducible conditions and went through 7 different kinds of tests which results are of the highest interest for users of electric vehicles.

The tests performed this year show great improvements compared to last year in some areas such as fast DC charging times, but none in the key area of the energy efficiency, which should urgently become a main focus for electric vehicle manufacturers. If in general electric mobility makes good progress at a much higher pace than most expected, this progress is not homogeneous, as shows the fact that 6 different cars from 6 different brands (Volvo twice, Kia, Audi, Opel, Honda and Mini) took victory out of the 7 categories of the ECOBEST Challenge's tests and indexes.

Another surprise is the fact that, while it has been a leader and the benchmark for electric mobility for several years, Tesla does not dominate any category in 2024.

By alphabetical order, here are the 13 cars the AUTOBEST jurors tested in the 2024 ECOBEST Challenge: **Audi** Q4 Sportback e-tron, **BMW** i5 Touring, **BYD** Dolphin, **Fiat** 600e, **Honda** e: Ny1, **Hyundai** Kona, **Kia** EV9, **Lancia** Ypsilon, **Mini** Cooper SE, **Opel** Corsa, **Tesla** Model Y, **Volkswagen** ID.7 and **Volvo** EX30

"The tests performed at the 2024 ECOBEST Challenge once again clearly show that the future of the electric car does not consist in bigger and bigger batteries but, on one hand in improving the energy efficiency, meaning in increasing the distance that can be covered with every single kWh. And, on the other hand, in providing users with faster and faster charging times. While we could see great progress in charging times, we were disappointed by a rather stagnating energy efficiency" said Dan Vardie, Founder

and Chairman of AUTOBEST and creator of the ECOBEST Challenge.

Based on the data provided by AUTOBEST, users can decide if they feel at ease with the switch from a traditional to an electric vehicle and/or evaluate if the one they would envisage to buy might fulfill their true needs. The unique, real-life methodology developed and refined by AUTOBEST has been certified by the independent Bureau Veritas organization.

Key figures, findings, interpretation and technical background in brief

- **TREMENDOUS IMPROVEMENT IN DC FAST CHARGING:** The best outstanding result of this edition is the quick DC fast charging time for all the 13 cars in test- between 7 min and 18 min to charge for 100 km. Kia EV 9 ranked no 1 with 7 min for 100km! This overall performance is showing how much all the EV producers progressed in this car users sensitive approach.
- **AMBIVALENT RESULTS WITH AC CHARGING TIMES:** Less impressive, the AC charging capabilities of tested cars are going from 59 min - the best of this edition, VOLVO EX 30 - for 100 km range to 2h:27 min for the same 100 km. Interesting enough, the last one in rankings for AC charging is KIA EV 9 which is the best in DC Fast Charging.
- **MANUFACTURERS PUBLISHED RANG CLOSER TO REAL LIFE (EcoC1 test):** At this edition ECOBEST Challenge, none of the 13 models in test surpassed the homologated range under the WLTP cycle. With an EcoC 1 index of 98,95%, Audi Q4 Sportback 45 e-tron is the closest real range to the WLTP at this edition and one of the best in the history of ECOBEST Challenge. 6 of the remaining EV's are between 80 % - 90% and the remaining 6 are between 73% and 79.8 %. At this edition there is no car in test below 73%.
- **BETTER CHARGE BEFORE THE BATTERY TELLS IT'S EMPTY:** As ECOBEST Challenge pioneered from the beginning of our competition, there is life in the battery after the cluster indicator is zero km/ 0%. 12 of the 13 cars demonstrated a strategic reserve of electricity between 2 and 24 kilometers. - VOLVO EX 30 is the winner of this measurement, but it is far the record of 45 km measured in last year edition. Furthermore, only one car stopped once the battery indicator showed zero on the cluster.
- **STILL WORK TO DO TO IMPROVE ENERGY EFFICIENCY (EcoC 2 test):** With the ECOBEST Challenge, AUTOBEST uses two proprietary indexes. EcoC 1 representing the ratio between the real driving range and the WLTP range. EcoC2 states the actual energy efficiency of EVs, revealing how many kilometers of real driving range a specific car can provide from 1 kWh of battery. The EcoC 2 is the most important expression of the energy efficiency of an EV. With 6,84 km/ kWh, the new Opel Corsa is the leader in efficiency of this year's tests. As a reminder the record was established in 2021 with a remarkable 8.07 km/ kWh by Dacia Spring.

Other 7 cars are at the more than 6 km/ kWh, 4 are between 5- 6 km/kWh and only one was below 5 km/kWh.

- **DISCLOSED: THE REAL EFFICIENCY OF THE CHARGING PROCESS (EcoC 3 test):** AUTOBEST uses the EcoC 3 index -this year Honda e: Ny1 is the best- as the ratio between the real energy charged into the battery and the official net capacity, a clear expression of the charging process's efficiency.
- **THE REAL ENERGY EFFICIENCY SHALL BE MEASURED WITH CHARGING + DRIVING (EcoC 4 index):** To give an even better real-life perspective, the EcoC 4 - introduced last year, which measures the car's actual efficiency, taking into consideration the energy filled in the battery (and not the net battery capacity) and the real range - winner is Mini Cooper SE.
- **AUTOBEST STRENGTHENS ITS ECOBEST CHALLENGE STRUCTURE:** AUTOBEST is promoting Alessio Viola, the Italian representative in the AUTOBEST Jury as Vice president of the Jury , in charge with the ECOBEST Challenge project. Also, David Anderson, the Norwegian Jury member and Joan Dalmau, the Spaniard in the Jury, become board members of ECOBEST Challenge.
- **RELIABLE TESTS THANKS TO A CERTIFIED METHODOLOGY:** The 2024 edition of ECOBEST Challenge received for the second time the Bureau Veritas certification – a global recognition of the genuine, comprehensive, and innovative methodology employed in testing electric vehicles (EVs) in real traffic conditions and assessing their real-life green credentials in an unbiased manner.
- **A DEDICATED, EXCLUSIVE APP COLLECTS ALL DATA:** For the third year, the ECOBEST Challenge is using an app specially designed to measure the key data through a direct connection to a Xiaomi mobile terminal in the car. With this, AUTOBEST is harnessing a wide range of data & graphs from the testing sessions and the charging process with both AC and DC (HPC). We also record the batteries' temperatures during different stages of the test and charging. These datas are available on request.
- **VINFAST AS the main Partner OF THE ECOBEST CHALLENGE:** For the 4-th year, ECOBEST Challenge is conducted in partnership with VINFAST, the emerging Vietnamese EV producer and a part of the VINGROUP, the largest industrial conglomerate of Vietnam. No model from Vinfast is involved in the ECOBEST Challenge, and tests are performed in absolute transparency.
- **PRECIOUS TECHNICAL PARTNERS SUPPORT THE ECOBEST CHALLENGE:** AUTOBEST counted on the logistical and technical support of the Italian car publication Quattroruote, the support of Xiaomi for mobile devices, and e-gap to offer remote charging once the batteries were depleted at the end of the test. The app to measure the cars' data is PKC - Power check Control, developed by the Italian company Power Cruise Control.

Preliminary considerations on the ECOBEST Challenge

The 'ECOBEST Challenge 2024, electrified by VINFAST' and supported by **Quattroruote**, is the first European independent real traffic test of mainstream EVs to reveal the real green credentials. It remains the only test of this kind with a transparent, neutral and balanced approach. The results come from a consistent methodology of testing performed identically on all 13 cars. This methodology is inspired by the practical needs and driving behavior of most European motorists, coming from the habits in their daily commuting.

CRITERIA OF SELECTION FOR THE 13 TESTED CARS: This edition the tested models are: **Audi Q4 Sportback e-tron, BMW i5 Touring, BYD Dolphin, Fiat 600e, Honda e: Ny1, Hyundai Kona, Kia EV9, Lancia Ypsilon, Mini Cooper SE, Opel Corsa, Tesla Model Y, Volkswagen ID.7 and Volvo EX30.** Only the new, popular EV's -below 65.000 Euro, standard entry level price, with no tax and no incentives- on the European markets are selected. The detailed specs of each car tested is in the annex with all the measurements data.

It is not designed pro or con to any models or brands and is neither a typical motoring media comparative test nor a record-breaking range test or – by contrast – a rally speed test to check how agile EVs are. The ECOBEST Challenge states the results from the measurements and offers a ranking based on our own proprietary indexes and measurements.

The test results are available to European car users as a basis for their decision-making process.

The 2024 edition received for the second time the Bureau Veritas certification – a global recognition of the genuine, comprehensive, consistent and innovative methodology employed in testing electric vehicles (EVs) in real traffic conditions and assessing their real-life green credentials in an unbiased manner.

ECOBEST Challenge was created by Dan Vardie, the Founder & Chairman of AUTOBEST organization and is a project of AUTOBEST.

Major findings

As a consequence of this unbiased approach, the real range results show that WLTP is a bit more optimistic in comparison to driving in real traffic. **None of the tested models did achieve their homologated WLTP figure. However, all the cars reached more than 73% of the minimum WLTP reference used in all the indexes. AUDI Q4 Sportback e-tron is the best with an outstanding EcoC 1 of 98.95%**

Introduced three years ago, AUTOBEST key index named **EcoC 2**, is representing the quintessential idea of EV energy efficiency. In this reduced time frame, EcoC2 already achieved an important recognition among the EV consumers and the industry. It is simply **how many kilometers of actual range one kWh of the battery can offer for a specific model.**

*"Compared with the previous editions, we discovered a lower average EcoC 2 index for all the cars tested this year. The most efficient car, Opel Corsa, managed 6,84 km/kWh, a lower result compared with last year's no 1. Based on this evolution, we emphasize the need for all EV producers worldwide to continue to focus on how the energy is spent on the car's propulsion. AUTOBEST was the first independent organization who emphasized the paramount importance of energy efficiency on board of cars. We also predicted that achieving 10km/ kWh should be possible in the next couple of years. But the results of this year EcoC 2, show that the industry is not progressing in energy efficiency. To be competitive, EV's should grow dramatically on the energy efficiency, and this is a key imperative for all the EV makers around the globe. " stated **Dan Vardie**. The lowest EcoC 2 at the test was only 4,52 km/ kWh in line with the lowest EcoC 2 indexes from previous years.*

The ECOBEST Challenge is one of the only independent tests in Europe measuring what happens after the battery reserve indicator/ available km reaches zero. All the cars have been driven to a total depletion of the battery and a final stop. AUTOBEST is happy to deliver good news to all motorists: except for one car, **there is still life in the battery once it indicates zero on the cluster. 12 cars proved between 2 and 24 kilometers of driving remained for the best at this criteria in the Challenge- which is the VOLVO EX 30.**

This year only one car 'died' immediately after the battery cluster indicated zero. Compared with last year, this year test shows a less diverse range with smaller figures, indicating an imperative need for consumers to inform themselves on this key information.

Although it is very important to know how `much life you still have in your apparently empty battery`, AUTOBEST recommends keeping this as a strategic reserve of the battery and better never entering the situation to use it.

Another interesting result of the ECOBEST Challenge is **the energy needed to fully charge cars with totally depleted batteries- index EcoC 3. All the vehicles required more energy than the capacity of the batteries, between 2,5% and 20,1%.** The best in this criteria is **Honda e:Ny1** which is keeping the maximum of energy received from the charger.

The additional consumption when recharging has been investigated and it has several causes. Some energy is lost when transformed from AC (grid) to DC (battery). Some energy powers all the car systems used for charging, mainly the inverter but also the software, the socket, and everything related to the process. Energy is used to cool the battery during the process (this energy increases with fast charging, especially in hot climatic conditions). The state of the batteries and the charger type may also generate some losses.

In our continuous improvement, AUTOBEST has added the **EcoC 4** index, a key parameter for evaluating the true efficiency of electric cars. It measures how many kilometers the car runs on a single kWh considering not the nominal net capacity of the battery, but the total amount of energy supplied by the charger to fill it. Above all the explanations we mentioned, the driver pays for energy, and these supplementary kWh 's are 'escaping' the trip computer. The best **EcoC4** index is achieved by **Mini Cooper SE**, and the value is 5,82 km/ real kWh charged. Because of the energy loss when charging, the no 1 in EcoC2, Opel Corsa is coming as no3 in the rankings of EcoC 4.

We measured the AC and DC Fast Charging processes with great accuracy, using 22 kW AC stations and 350 kW DC stations which delivered to all the cars in test the maximum capacity to recharge. We also measured the time needed for the charging process.

"Probably the best news this edition of ECOBEST Challenge can deliver is the fact that the DC fast charging time remarkably improved to all the 13 cars. Practically, 100 km can be charged in between 7 min and 18 minutes! The average is better than last year measurements and is clearly showing to all the EV car users that time for fast recharging is reducing rapidly." said **Dan Vardie**

Last year we had the record of just 4 min for Hyundai Ioniq 6, less than the 7 min of **KIA EV9**, the best time of this year. But it is also important to highlight the fact that last year the longest time for fast charging 100 km was 25 min, clearly more than this year. Each car's maximum charging capacity determines this time.

Two important notes: for the AC, we charged the batteries from 0 to 100%, and for DC, the charging process was 20% - 80%, the most common recommended cycle for such charging. The timings for charging 100 kilometers is an average of the entire charging process and has to be understood as such. As we noticed, charging rates are not linear during the DC fast-charging. AUTOBEST has all the charging graphs, which are a part of the data available on request.

"This year ECOBEST Challenge is proving that there is no one single car able to win in all the rankings. This is the challenge of the industry to perform better in several key areas monitored by our AUTOBEST comprehensive Challenge. And here is important the interest and willingness of all the EV car users in Europe to learn which of these key measurements are more important than the others. At AUTOBEST we are monitoring closely these observations and try to adapt our results of ECOBEST Challenge. This is the reason why this year we are communicating rankings around our proprietary indexes and measurements." added **Dan Vardie**

To get precise and complete data in the ECOBEST Challenge 2024, AUTOBEST, in close cooperation with Quattroruote and its Centro Prove, used Power check Control (PKC) to analyze and certify an electric car. Since it is connected in real-time with the car via a Bluetooth Onboard Diagnostic II (OBDII) dongle, PKC accesses many parameters about the actual battery status: the SoC (State of Charge), the SoH (State of Health), the temperature, the car's speed, weather conditions, the power used or regenerated by the car, the power during the charging phase and other relevant factors. EV drivers may get this expertise in daily life using Power Cruise Control. PCC suggests the right charging points along the route and precisely calculates how much kWh you need to charge. And to use it in the best way, this software gives constant feedback to the driver via an intuitive interface called the Heaven-Hell indicator.

Please see the Annex tables with all the relevant data to discover all results.

AUTOBEST STRENGTHENS ITS ECOBEST CHALLENGE STRUCTURE

AUTOBEST is promoting **Alessio Viola**, the Italian representative in the AUTOBEST Jury as Vice president of the Jury, in charge with the ECOBEST Challenge project. Also, **David Anderson**, the Norwegian Jury member and **Joan Dalmau**, the Spaniard in the Jury, become board members of ECOBEST Challenge.

***Alessio Viola**, chief editor of Quattroruote and Vice president of AUTOBEST Jury, said: "I'm grateful to AUTOBEST and its Founder Dan Vardie for this personal acknowledgement, which honors me and, above all, honors Quattroruote's great tradition in testing. A long history that is about to span seventy years and which is particularly interesting in such a complex moment for automotive. My commitment will be to make the ECOBEST Challenge even more complete, to make it an increasingly refined and powerful tool in the analysis of electric cars. For motorists, but also for carmaker: one century later, they are again pioneering, and ECOBEST Challenge could be for them a sort of advisor. Ev cars, after all, may undergo some adjustments in timing, but they will certainly maintain a central role in the mobility of the future".*

How the ECOBEST Challenge electrified by VINFAST was organized

It took place in Vairano, where the proving ground of Quattroruote is based, near Milano. The professional motoring journalists of AUTOBEST drove 14 electric vehicles available in Europe (all with more than 350 kilometers of homologated WLTP range and a price list under €65,000 before taxes) to answer the most common question people ask when looking for an electric car.

The test started and finished at Vairano ASC, where we also recharged the cars. All the vehicles tested were regular production models with one person on board, climate system and infotainment equipment active and the tyre pressure recommended by the brand. All the cars were driven in 'Normal' mode and using Brake mode in the city environment when available.

Using a mixed trip, all the vehicles travelled a series of three circuits with different lengths including motorways (55%), conventional roads (25%) and urban environments (20%).

All the drivers changed cars every 30 kilometers to avoid any individual effect of the driving style in the results. All vehicles drove in convoy behind a leader, establishing the average speed and respecting the speed limits at all times.

After reaching the indication of 0% battery and/or 0 Km range appearing on the cluster, cars continued to run in the Vairano ASC until their complete stop.

For the fourth consecutive year, the 'ECOBEST Challenge 2024' was organized in partnership with **VINFAST**, the emerging Vietnamese manufacturer that will launch new EVs on the European markets in the end of this year and first half of next year. "I use this opportunity to thank the great support of VINFAST in organising our EV test. Although VINFAST has no cars in the test, the involvement is a part of its commitment to electromobility, giving the European consumer a fair chance to benefit from this process. These are values we share entirely at AUTOBEST," added **Dan Vardie**.

AUTOBEST also thanks the leading title **Quattroruote**, widely considered the Italian car bible, for the full logistical and technical support.

The cooperation with **Xiaomi** and **e-gap** is also highly appreciated.

Disclaimer.

As the organizer of the ECOBEST Challenge, AUTOBEST stands behind all the results and figures resulting from an unbiased test conducted precisely in the same manner for all the cars- as certified by Bureau Veritas. AUTOBEST is confident that all the results are much closer to reality than the WLTP homologated figures. Therefore, AUTOBEST is inviting all European motorists to use all the info provided to decide based on their needs. The aim of the ECOBEST Challenge is not to rank the 13 cars but to offer an average reference that can lead to a more realistic option for each and every European consumer. There are no worse or good vehicles and ranges. Everyone should make a personal choice based on the individual mobility needs. AUTOBEST believes there is no car able to satisfy all the consumers' possible needs. The ECOBEST Challenge provides an average obtained under certain conditions of landscape, temperature, cycle of testing etc. AUTOBEST is not claiming it reaches the absolute ideal average, but we believe we are very close and we provide data that allow the fairest possible comparison between the tested cars. .

For more info, please visit www.autobest.org and www.ecobestchallenge.org
Or send your enquires to pr@autobest.org