



Audi on the road to climate-neutral mobility

- **Accelerated transfer to e-mobility: more than 20 models by 2025**
- **Cooperation with energy providers: Audi is calling for expansion of renewable energies**
- **Holistically sustainable: numerous steps in the supply chain, production, and logistics**

Ingolstadt, August 27, 2021 – Production of Audi’s final new combustion engine model will start in just four years. Beginning in 2026, the premium brand will only release models onto the market that are powered purely by electricity. The manufacturer will phase out production of internal combustion engines by 2033. In order to become a leading provider of net-zero¹ carbon mobility, Audi is also optimizing every link in its value chain and, moreover, committing itself to the expansion of renewable energy. On the “Sustainability” theme day at Audi Media Days prior to the IAA, the company presented, among other things, its vision of a climate-neutral factory and showed how sustainability is implemented in the supply chain.

Audi wants to be a net-zero carbon emissions company by no later than 2050. By 2025, the company plans to offer more than 20 fully electric, battery-driven cars. At the same time, Audi wants to reduce the ecological footprint of its fleet – specifically, by 30 percent as compared with 2015. One central goal is to make production carbon neutral at all sites by 2025. This has already been achieved as an interim target at Audi Hungaria and Audi Brussels. The premium brand is keeping all its processes in sight: the sourcing of raw materials and production itself, but also the utilization phase and recycling or reuse at the end of a car’s life cycle.

Manufacturing: where it all begins

Through the transition to e-mobility, a portion of total carbon emissions is being transferred to the supply chain. Above all, that applies to electric cars’ lithium-ion batteries, which require particularly energy-intensive production. For perspective, that is where almost a quarter of all carbon emissions will be produced per car at Audi. That’s why the company is starting right at this early phase. Intelligent use of resources will save materials and reduce energy consumption. In turn, this will reduce carbon dioxide emissions in upstream production processes and lower levels of the supply chain.

¹ Audi regards net carbon neutrality as a state in which, following the exhaustion of other possible measures aimed at reducing the still remaining CO₂ emissions caused by the products or activities of Audi and/or currently unavoidable CO₂ emissions within the scope of the supply chain, manufacturing and recycling of Audi vehicles, at least quantitative compensation is provided through voluntary and globally conducted compensation projects. Throughout the utilization phase of a vehicle, meaning from when a vehicle is delivered to a customer, CO₂ emissions produced are not taken into account.

The equipment, data and prices specified in this document refer to the model range offered in Germany. Subject to change without notice; errors and omissions excepted.

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For that reason, Audi is taking steps, together with its suppliers, that address this early phase of manufacturing above all. By 2018, the company had already initiated the “CO₂ Program in the Supply Chain” to identify steps to further reduce CO₂ together with its suppliers. “We are convinced that our suppliers play a key role in our success with respect to sustainability,” says Marco Philippi, Head of Procurement Strategy at Audi. Opportunities can be found primarily in closed material cycles, a gradual increase in the use of secondary materials, application of materials from recycling processes known as “recyclates” in plastic components, and using green electricity. These measures will also be in full operation by 2025 and, according to calculations by Audi and its suppliers, have the potential to save an average of 1.2 tons of CO₂ per car. In 2020 alone, Audi was able to save a total of over 335,000 tons of CO₂ in its supply chain. That amounts to a reduction of 35,000 tons of CO₂ released in comparison with 2019.

Green energy, more recyclates, less waste

One example of more sustainability in the supply chain is the switch to renewable energy. By contract, for instance, high-voltage battery cells have to be produced with green electricity. That was the case for Audi’s very first electric model, the Audi e-tron*, and it still applies today. Moreover, Audi is committed to various initiatives and, together with other partners, campaigning for adherence to human rights and environmental protection in its supply chain. That includes membership in the [Global Battery Alliance](#). This worldwide platform was started in 2017 on the initiative of the World Economic Forum. It brings public and private actors together to sustainably organize the battery value chain from a social, environmental technology, and economic perspective.

Another example of how Audi is bringing more sustainability into the supply chain is secondary materials. Audi returns the aluminum scraps from the press plant to the supplier for processing and then gets it back in the form of newly processed aluminum coils. This means that less primary aluminum is necessary and less carbon is emitted. Introducing the “Aluminum Closed Loop” in Audi’s press plant was able to prevent a total of about 165,000 tons of carbon dioxide emissions in 2020. Now, Neckarsulm, Ingolstadt, and, starting in 2021, Győr are also implementing the Aluminum Closed Loop.

Additionally, as a contribution to resource conservation, we are using recyclates – processed materials derived from a recycling process – in more and more components. That is not only a matter of reducing carbon emissions, but also economical and efficient use of materials. Some 27 components in the Audi Q4 e-tron are made with recyclates. On the exterior, that includes parts like the assembly carrier – a part that some cooling components, headlights, or the bumper casing are attached to and that has to meet particularly high mechanical demands. What’s more, a large proportion of the headlight mounts, wheel arch liners, fender covers, floor trim, and wheel spoilers is made from secondary raw materials.

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Starting with PET: seat covers made from bottles

In the interior, recycled materials are used in the insulation and damping materials. Moreover, many of the visible surfaces contain recycled materials. These include the floor covering and parts of the luggage compartment trim. In the S line interior, Dinamica microfiber material, in combination with artificial leather, functions as upholstery for the sport seats. Polyester fibers make up 45 percent of the Dinamica material. They are obtained from recycled PET bottles, old textiles, or residual fibers.

The carpeting and floor mats in the Audi e-tron GT* are made of Econyl – a material that consists of 100 percent recycled nylon fibers. They come from production waste, fabric and carpet scraps, or old fishing nets. There are up to 45 1.5-liter PET bottles in the seats of an Audi A3. Seat covers made from secondary raw materials were used for the first time in the fourth generation of the Audi A3.

Artificial intelligence in supply chain monitoring

Alongside carbon-reduction initiatives and a gradual increase in secondary materials, the premium brand is also willing to break new ground for a more sustainable supply chain. The Volkswagen Group has outlined its sustainability requirements for partner companies in its “Code of Conduct for Business Partners.” The Group takes well-founded indications of violations of the Code’s requirements extremely seriously and follows up on them systematically. Its defined environmental, social, and compliance guidelines form the basis for collaboration and are an integral part of monitoring. A sustainability rating (“S rating”) for suppliers has been a mandatory criterion for awarding Audi contracts since 2019. Audi uses this procedure to verify whether companies comply with the requirements laid out in the “Code of Conduct for Business Partners.” Audi only works with companies that pass this audit.

Moreover, there are post office boxes and ombudsmen to inform Audi about suspected cases. Artificial intelligence has supplemented supply chain monitoring at Audi since October 2020, complementing these traditional complaint channels with a proactive tool. In a pilot project organized by Audi, Porsche, and Volkswagen in about 150 countries, intelligent algorithms from the Austrian start-up Prewave analyze reports on suppliers from public media available online and social networks. This analysis encompasses suspected sustainability risks such as environmental pollution, human rights violations, and corruption. When they are found, the artificial intelligence sounds the alarm and Audi can respond to it. The main advantage of the AI that Audi uses is the speed at which it recognizes relevant information online and transmits it in packaged form. “We can recognize where potential risks turn up much earlier and actively counteract them, for instance through targeted strategic dialog with supplier companies,” Philippi explains.

Production: conserving resources, reducing emissions

The importance to Audi of sustainably using resources is also evident in production. A central goal of the cross-site “Mission:Zero” environmental program is to make production carbon-neutral at all sites by 2025. Audi Hungaria reached the carbon-neutral goal in the past year; Audi

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Brussels did it in 2018. Moreover, the environmental program also addresses water use, resource efficiency, and biodiversity and has initiated pilot projects in all locations.

“In Brussels, we implemented a whole bundle of measures,” says Achin Diehlmann, Project Manager for the Audi environmental program Mission:Zero. The factory switched to green electricity and installed a large, 107,000 square meter (*1,151,738 square feet*) photovoltaic system. The heat supply for the location comes from renewable energy via coverage through biogas certificates. Emissions that are currently technically unavoidable are compensated through certified carbon credit projects. These three pillars – supported by other measures – are blueprints for decarbonization at other locations as well, depending, of course, on the individual regional possibilities and constraints.

A [current project](#) at the Neckarsulm location shows how recycling can work. There, 3D-printed assembly aids are produced in a recycling loop. To that end, accumulated plastic waste is sorted out of production, shredded, and then processed into filament. With the help of 3-D printers, these plastic threads are turned into tools for production, precisely customized to employees’ needs.

Valuable water and habitats close to nature

To use water consciously and sparingly, Audi is looking to efficient processes, closed water loops, and amplified use of rainwater. AUDI AG Board Member for Production and Logistics Peter Kössler says, “We want to massively reduce our freshwater consumption and cut our water consumption per vehicle produced in half by 2035. To do that, we’re already using recycled water, which is used repeatedly and reprocessed within the loop, wherever possible. Our vision is to have closed water cycles at all of our production locations.”

Audi México has been wastewater-free since 2018. At the Neckarsulm site, a closed water cycle is being set up between the factory and the neighboring municipal wastewater treatment plant operated by AZV Unteres Sulmtal. A service water supply center has been in use at the Ingolstadt site since 2019. Together with the previous treatment system, roughly half of the wastewater generated can be fed into a circuit where it is treated and processed for reuse.

“In many regions of the world, habitats for plants and insects are becoming scarcer and scarcer. That’s why we want to contribute to preserving biodiversity at our locations,” says Peter Kössler. The natural open spaces at the Audi facility in Münchsmünster constitute a lighthouse project for action with respect to biodiversity. Thanks to targeted ecological design, the complex near Ingolstadt offers a particularly valuable habitat for numerous species of plants and animals. At the production facilities in Münchsmünster near Ingolstadt, Audi has transformed 17 hectares of land into natural habitats for animals and plants.

So far, more than 110 species of plants have developed there and around 90 species of wild bees have settled in.

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The goal: carbon-neutral manufacturing and delivery to customers

The effects of these steps and concepts are visible: production of the Audi e-tron GT*, Audi e-tron*, Audi e-tron Sportback*, and Q4 e-tron series and their delivery to customers are already carbon neutral. All unavoidable carbon emitted in the course of production and logistics is offset with carbon credits. They are certified by either the non-profit organization [The Gold Standard](#) or [Verified Carbon Standard](#).

Consequently, all electric cars for the European and US markets have been delivered to customers as carbon-neutral products since 1/1/2021. That is certified by [TÜV Nord](#).

The utilization phase: green electricity is crucial

A car's utilization phase comprises the entire time in which the product is used by the customer, including fuel or electricity provision. This is the phase when most of the emissions that a car produces over the course of its life cycle arise. For electric cars, the electricity used to charge them is a major factor, however charging points with green electricity are still not available everywhere. For that reason, Audi is cooperating with energy providers, among others, and developing its own charging concepts. "We want to offer our customers a holistic electric driving experience. In addition to attractive models, we need to be able to offer widespread green electricity," says Board of Management for Technical Development at AUDI AG Oliver Hoffmann. For example, Audi customers can already use the green power solutions offered by Volkswagen subsidiary [Elli](#) (Electric Life) to charge their cars at home today. For charging on the road, the [IONITY](#) charging network and many other charging point operator companies rely on green power.

"We're working hard to make carbon-neutral mobility possible. The expansion of renewable energy sources at an industrial scale is the next, logical step," says Hoffmann. To cover the charging processes that do not yet use green electricity, new wind and solar parks that will altogether generate around five terawatt hours of additional green electricity are planned for various European countries with several partners by 2025. This corresponds to an installed capacity of about 250 new wind turbines.

The objective is to increase the share of electricity our partners generate from renewable sources in conjunction with an additional increase in the share of electric cars on the road. "That means that our entire e-tron fleet in Europe will be climate neutral in the future," says Oliver Hoffmann. The first project, a solar park in the German state of Mecklenburg-Vorpommern, is being developed in collaboration with the German utility company RWE. The plant will come on stream in 2022 and is designed for a total capacity of 170 million kilowatt hours. Encompassing nearly 420,000 solar panels, it will be one of the largest independent solar parks in Germany. Further projects are to quickly follow.

Audi charging hub: power in 2nd life storage

With the Audi charging hub, the company with the four rings has developed a charging solution that will primarily cover peak demand as a supplement to the basic coverage that is on the

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market. The concept calls for high-power charging (HPC) stations that can be reserved in advance to provide a high level of planning security. A lounge area connected directly to it will provide an attractive, premium place to pass the time. “Charging an electric Audi model only takes a little longer than a coffee break,” explains Audi charging hub overall project manager Ralph Hollmig. “With our lounge, it will be particularly entertaining or it can be used, for instance, for business appointments.”

Cubes are the foundation of the Audi charging hub. These flexible container Cubes house charging pillars as well as used lithium-ion batteries for energy storage. The use of 2nd life modules from disassembled development vehicles doesn’t just give the battery cells a new, sustainable purpose – it also provides a great benefit in their suitability as ancillary storage for direct current. This makes complex infrastructure with high-voltage lines and expensive transformers unnecessary.

Flexible and sustainable concept: 2.45 Mwh storage

Starting from 11 kW of power per Cube via a standard 400 volt high-voltage connection, the Audi charging hub can already be operated. This not only makes it easier to select possible locations, but it also reduces the planning time required and economizes both costs and resources. The hub can be quickly transported, installed and adapted to the particular location – largely independently of local network capacities. At the pilot location, a total power input of 200kW is enough to be able to continuously fill three storage modules with a total capacity of 2.45 Mwh and charge them overnight – supported by additional photovoltaic modules on the roof. With the ancillary storage, about 70 quick charges with up to 300 kW of power are possible daily – and that is without a power connection in the megawatt range that would otherwise be necessary. The first Audi charging hub will go into operation in Nuremberg in the fall.

The 2nd life philosophy says that components should only be recycled when they are broken. If they still work, but are not necessarily up to the demands of their original purpose anymore, then it is more ecological and conserves more resources to find an alternative – for instance as energy storage – than to recycle them prematurely. In the future, the battery storage units could also free up the network as ancillary storage in generators or big industrial consumers. Together with utility company EnBW, Audi has already built the first storage unit of that kind in Heilbronn to test the process.

Pilot recycling system for batteries in Salzgitter

Only when batteries can no longer fulfill their 2nd use applications are they dismantled in accordance with modern recycling concepts into their individual raw materials in order to be used again in new batteries. Among others, the Volkswagen Group’s pilot recycling facility for lithium-ion batteries in Salzgitter, Germany serves that purpose. What is particular about the facility in Salzgitter is that only batteries that are no longer otherwise useful are recycled there.

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As an initial diagnosis, analysis software tests the health of the battery and checks whether it still has enough power for reprocessing – for instance into mobile energy storage units like flexible fast-charging stations or charging robots. Audi Brussels developed the software. Other recycling facilities are planned to follow the pilot project. The goal is to establish a closed material loop for batteries.

Looking beyond the horizon: Audi is fostering sustainable innovations

Innovative technologies are the key to a sustainable future. Rüdiger Recknagel, Director of the Audi Environmental Foundation, says that “environmental protection is a job for all of society. The Foundation is an instigator and a driver for innovative technologies in environmental protection. We want to inspire each individual to be part of environmental protection and give them concrete ideas so that they can make their own contribution.” The Foundation wants to sensitize and inspire people of every age with respect to environmental protection and, in doing so, make a social contribution to a livable future. The focal points of its engagement include supporting what are called Greenovation Projects by applying new technologies to gentle treatment of natural resources.

For example, the Foundation, together with TU Berlin and other partners, is developing filters for street drainage. They prevent the tire wear particles and other environmentally harmful substances from being washed into sewers and bodies of water along with rainwater.

Innovative units like Audi’s Berlin-based Denkwerkstatt are also working on bringing more sustainability into everyday life and the economy. The Denkwerkstatt develops new business models, tests them, brings them to maturity, and acts as an incubator. That way, good ideas can be implemented quickly. One example of that is the [ecomove app](#). It helps users understand and reduce their personal mobility-induced carbon footprint and offset unavoidable emissions. For example, the app automatically recognizes which means of transportation users are currently using and calculates a personal mobility score based on that. To improve this score, ecomove playfully motivates users to make their mobility more sustainable. Rewards in the form of trophies are used to encourage users to make positive changes in their behavior. In addition, users can offset remaining emissions through the app.



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The Audi Group, with its brands Audi, Ducati and Lamborghini, is one of the most successful manufacturers of automobiles and motorcycles in the premium segment. It is present in more than 100 markets worldwide and produces at 19 locations in 12 countries. 100 percent subsidiaries of AUDI AG include Audi Sport GmbH (Neckarsulm, Germany), Automobili Lamborghini S.p.A. (Sant'Agata Bolognese, Italy), and Ducati Motor Holding S.p.A. (Bologna/Italy).

In 2020, the Audi Group delivered to customers about 1.693 million automobiles of the Audi brand, 7,430 sports cars of the Lamborghini brand and 48,042 motorcycles of the Ducati brand. In the 2020 fiscal year, AUDI AG achieved total revenue of €50.0 billion and an operating profit before special items of €2.7 billion. At present, 87,000 people work for the company all over the world, 60,000 of them in Germany. With new models, innovative mobility offerings and other attractive services, Audi is becoming a provider of sustainable, individual premium mobility.



Fuel consumption of the models named above

Information on fuel/electricity consumption and CO₂ emissions in ranges depending on the tires and alloy wheel rims used and on the equipment and accessories of the car.

Audi e-tron

Combined electric power consumption in kWh/100 km (62.1 mi): 26.1–21.7 (WLTP);
24.3–21.4 (NEDC); combined CO₂ emissions in g/km (g/mi): 0 (0)

Audi e-tron GT quattro

Combined electric power consumption in kWh/100 km (62.1 mi): 21.8–19.9 (WLTP);
19.6 – 18.8 (NEDC); combined CO₂ emissions in g/km (g/mi): 0 (0)

Audi RS e-tron GT

Combined electric power consumption in kWh/100 km (62.1 mi): 22.5–20.6 (WLTP);
20.2 – 19.3 (NEDC); combined CO₂ emissions in g/km (g/mi): 0 (0)

Audi e-tron Sportback

Combined electric power consumption in kWh/100 km (62.1 mi): 25.9–21.0 (WLTP);
24.0–20.9 (NEDC); combined CO₂ emissions in g/km (g/mi): 0 (0)

The indicated consumption and emissions values were determined according to the legally specified measuring methods. Since September 1, 2017, type approval for certain new vehicles has been performed in accordance with the Worldwide Harmonized Light Vehicles Test Procedure (WLTP), a more realistic test procedure for measuring fuel consumption and CO₂ emissions. Since September 1, 2018, the WLTP has gradually replaced the New European Driving Cycle (NEDC). Due to the realistic test conditions, the fuel consumption and CO₂ emission values measured are in many cases higher than the values measured according to the NEDC. Vehicle taxation could change accordingly as of September 1, 2018. Additional information about the differences between WLTP and NEDC is available at www.audi.de/wltp.

At the moment, it is still mandatory to communicate the NEDC values. In the case of new vehicles for which type approval was performed using WLTP, the NEDC values are derived from the WLTP values. WLTP values can be provided voluntarily until their use becomes mandatory. If NEDC values are indicated as a range, they do not refer to one, specific vehicle and are not an integral element of the offer. They are provided only for the purpose of comparison between the various vehicle types. Additional equipment and accessories (attachment parts, tire size, etc.) can change relevant vehicle parameters, such as weight, rolling resistance and aerodynamics and, like weather and traffic conditions as well as individual driving style, influence a vehicle's electrical consumption, CO₂ emissions and performance figures.

Further information on official fuel consumption figures and the official specific CO₂ emissions of new passenger cars can be found in the "Guide on the fuel economy, CO₂ emissions and power consumption of all new passenger car models," which is available free of charge at all sales dealerships and from DAT Deutsche Automobil Treuhand GmbH, Hellmuth-Hirth-Str. 1, 73760 Ostfildern-Scharnhausen, Germany (www.dat.de).