Bidirectional charging: Audi A2 e-tron as a mobile energy storage system

Ingolstadt, November 12, 2026 – The high-voltage battery of an electric car can not only provide the energy for driving, but can also be used specifically as a power source beyond the road. With bidirectional charging functions, the Audi A2 e-tron enables external devices to be supplied via Vehicle-to-Load (V2L) and the use of stored energy in the household via Vehicle-to-Home (V2H). In the future, Vehicle-to-Grid (V2G) will be added for feeding energy back into the public power grid.

Key facts at a glance

- New Audi A2 e-tron available to order in three battery variants (52, 61 and 84 kWh)
- DC charging power from 100 to 183 kWh
- DC charging from 10 to 80 percent in 24 to 29 minutes
- Vehicle-to-Load[1] (V2L) and Vehicle-to-Home[2] (V2H) expand the use of the high-voltage battery
- Vehicle-to-grid[3] (V2G) will enable energy to be fed into the public power grid in the future

Battery system with coordinated thermal management and charging electronics

With the A2 e-tron, Audi is offering an all-electric entry-level model in the compact class for the first time. Depending on the variant, different energy storage systems are used: an 84 kWh nickel-manganese-cobalt battery or a lithium iron phosphate battery, or LFP for short, with a capacity of 52 or 61 kWh. In the LFP storage systems, the cells are integrated directly into the battery pack in a cell-to-pack design. Due to the higher packing density made possible by this, the energy content and energy density of the HV system can be increased with a reduced space requirement.

Focus on thermal management and charging efficiency

The temperature and cooling strategy of the high-voltage battery was a central development area of the A2 e-tron. The thermal management system continuously coordinates the battery temperature, current flow and state of charge during charging and discharging. The control strategy is designed to operate the battery within defined temperature ranges and enable reproducible charging behavior. More precise

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[1] To use Vehicle-to-Load, the high-voltage battery's charge level must be at least 20%.
[2] The Vehicle-to-Home function requires a compatible, bidirectional DC wallbox. Additional hardware may be necessary depending on the existing home electrical installation. Energy transfer between the vehicle and the home power grid is only possible when the battery charge level is between 20% and 80%. If the battery charge level is within this range, the charging and discharging limits set for this charging location are taken into account. If the battery charge level is below 20%, the vehicle will only charge. If the battery charge level is above 80%, the vehicle will only discharge.
[3] The Vehicle-to-Grid function requires a compatible, bidirectional DC wallbox. Additional hardware may be necessary depending on the existing home electrical installation.

temperature control during charging and discharging makes a significant contribution to more stable battery behavior. For customers, this means not only a short charging time in everyday life, but also stable, comprehensible and reproducible charging and discharging behavior.

DC charging and integrated charging electronics

The following table provides an overview of the charging time for DC charging from 10 to 80 percent filling status of the battery, depending on the respective model variant and battery capacity.

Power in kW	125	140	170	240
Gross battery capacity in kWh	52	61	84	84
Charging time DC 10-80 % in min	24	26	29	29

The specified charging times apply under defined test conditions. The actual charging time may depend on battery temperature, state of charge and available charging power, among other things.

The battery in the A2 e-tron is not only designed for a short-term power peak. The focus for everyday use is on a plannable, controlled and usable charging process. For this purpose, an advanced component is used that combines on-board chargers and DC/DC converters, the so-called OCDC 2.0. It includes a higher number of metal-oxide-semiconductor field-effect transistors (MOSFETs), adapted AC output management and corresponding software adjustments.

Battery management

A battery management controller takes over the monitoring and regulation of the battery. In LFP batteries in particular, a flatter Open Circuit Voltage (OCV) characteristic curve of the cells makes it more difficult to precisely determine the state of charge and aging. For this reason, Audi uses an adapted algorithm. The information obtained is incorporated into the calculation of range, charging behavior and operating strategy.

Extended energy use

The battery in the A2 e-tron is not only used as an energy storage system for driving, but can also generate additional benefits outside the vehicle, depending on the application.

Vehicle-to-Load[1] (V2L) makes it possible to supply suitable external consumers with electrical energy via the vehicle. This makes the A2 e-tron a mobile and flexible energy

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source. The Vehicle-to-Home[2] (V2H) function uses the A2 e-tron as a large battery storage system and, in conjunction with a compatible, bidirectional DC wallbox, makes it possible to use the stored electricity for the household.

Depending on the market, vehicle equipment, compatible charging infrastructure, home installation, regulatory requirements and, if necessary, a suitable electricity tariff, the compact Audi will enable Vehicle-to-Grid[3] (V2G) in the future. Energy from the vehicle battery is provided for the public power grid. This makes the battery part of a larger energy system.

Conclusion

With the A2 e-tron, Audi is pursuing the goal of making electric mobility in the compact segment suitable for everyday use, efficient and flexible. The interplay of coordinated thermal management, intelligent charging electronics and advanced battery management ensures stable and reproducible charging behavior. At the same time, bidirectional charging functions extend the battery's range of application beyond driving and thus make the vehicle an active part of the energy system. In this way, the A2 e-tron combines efficient charging, intelligent energy use and a high level of everyday usability in a future-oriented overall concept.

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[3] The Vehicle-to-Grid function requires a compatible, bidirectional DC wallbox. Additional hardware may be necessary depending on the existing home electrical installation.

Frequently Asked Questions

What does bidirectional charging mean?

Bidirectional charging means that an electric car can not only absorb electricity from the grid, but also return it. This turns the vehicle into a flexible energy source.

What can be charged?

With bidirectional charging, it does not matter whether an external device is charged (Vehicle-to-Load[1]; V2L), a house is supplied with electricity (Vehicle-to-Home[2]; V2H) or energy is fed into the public power grid in the future (Vehicle-to-Grid[3]; V2G).

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About Audi

Audi combines premium mobility with technological progress and pioneering design. For more than five decades, “Vorsprung durch Technik” has embodied the technological aspirations of Audi.

Audi offers a broad portfolio of premium vehicles for different customer needs and regional requirements. The Audi Group operates in more than 100 markets, produces at 21 production sites in twelve countries, and employs more than 88,000 people worldwide. The brand’s history dates back to 1909. Since 2026, Audi has also been competing in Formula 1 with its own factory team.

In addition to the Audi brand, the Audi Group includes the sports car manufacturer Lamborghini, the luxury brand Bentley, and the motorcycle manufacturer Ducati.

Find out more about the Audi Group here.

Fuel/electric power consumption and emissions values of the models named above:

Audi A2 e-tron 125 kW
Combined electric power consumption in kWh/100 km: 15.7-13.7;
combined CO2 emissions in g/km: 0; CO2 class: A

Audi A2 e-tron 140 kW
Combined electric power consumption in kWh/100 km: 15.6-12.8;
combined CO2 emissions in g/km: 0; CO2 class: A

Audi A2 e-tron 170 kW
Combined electric power consumption in kWh/100 km: 15.7-13.9;
combined CO2 emissions in g/km: 0; CO2 class: A

Audi A2 e-tron 240 kW
Combined electric power consumption in kWh/100 km: 15.1-14.2;
combined CO2 emissions in g/km: 0; CO2 class: A