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DRIVERLESS TRANSPORT VEHICLE WITH HYBRID ENERGY STORAGE

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Initial situation:
In driverless transport systems that are not rail-bound or connected to a rigid track system, the energy for the traction current and the control system must be obtained from an energy storage device. In contrast, in a rail-bound system or rigid track system, an energy supply on the ground can secure the traction current, so that an energy storage unit is not required.
Batteries, usually lithium-ion batteries in newer systems, or supercaps are used as such energy storage devices. Lithium-ion batteries can store more energy than supercaps (with a comparable construction), but require a longer charging time because the current consumption is limited. The reverse is true for supercaps: here, charging currents comparable to capacitors are possible, i.e. they can absorb the energy faster, ergo shorter charging times. However, since they absorb less energy, the effective driving times are also shorter.

Solution:
The new idea is now to combine both forms of energy storage. Whenever the vehicle comes to a planned standstill because it is picking up or dropping off cargo, it is possible to charge the supercaps with the highest possible current. These then transfer the energy to the lithium-ion battery so that this is also charged again. Some of the energy from the supercaps thus goes into energy that is needed for driving and some as energy that is stored in the battery. If the energy supply from the supercaps has been used up until the next planned standstill has been reached, the vehicle draws on the lithium-ion battery. If its energy supply is also largely exhausted, a charging station must be approached.

Advantage:
Significantly longer usage times of the driverless transport vehicles. Ideally, a charging station never has to be approached.