



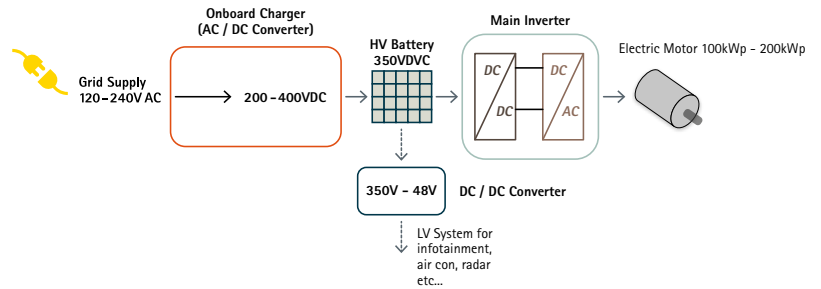
Power electronics to increase copper use

Study Name: Copper Demand in Power Electronic Devices
Study Author: IDTechEx
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Over the next two decades, the widespread adoption of power electronics devices in electric vehicles and renewable energy sources, such as wind turbines and solar farms, will significantly increase copper demand.

The opportunity in power electronics

Research, commissioned by the International Copper Association (ICA) and carried out by IDTechEx, explores opportunities for copper within power electronics – solid-state electronic devices which control and convert electrical power. Within electric vehicles (EVs), power electronics facilitate several critical functions: (1) the onboard charger, which allows AC charging; (2) the main inverter, for the smooth operation of the electric traction motor; and (3) DC-to-DC converters to help power the low voltage battery circuit.



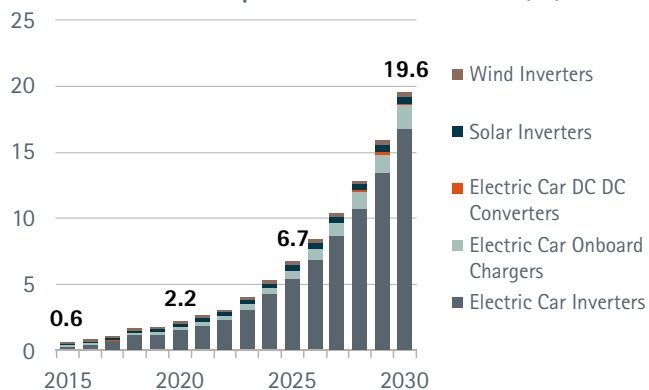
Environmental shifts

Increase in the use of power electronics due to shifts from internal combustion-engines to EVs, and from fossil fuels to renewables, will prove advantageous for copper. By 2030, around 20 kilotonnes of copper will be required per year for renewable energy and electric car power electronics devices alone, including inverters, onboard chargers and DC-to-DC converters.

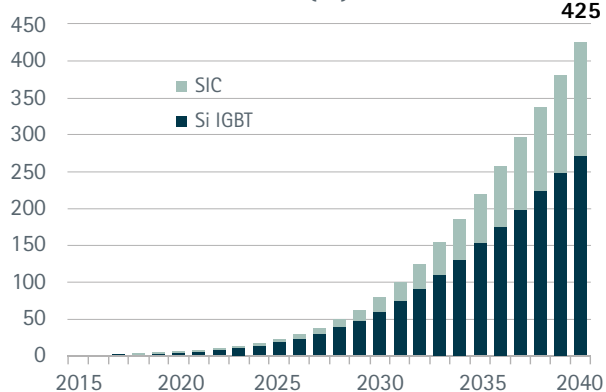
Copper demand continuing to increase

Copper demand from power electronics is predicted to follow a similar trajectory to plug-in electric cars, which IDTechEx expects to grow from just over 4 percent of the global auto market today to over 80 percent in 2040. Between 2015 and 2040 an accumulated 425 kilotonnes of copper will be required for the main inverters of plug-in electric cars, even accounting for a transition to wide-bandgap semiconductors such as silicon carbide, which reduces inverter volume and weight.

Cu demand from power electronics devices (kT)



Cumulative Cu demand from electric car inverters (kT)



For the full IDTechEx research on Copper Demand in Power Electronic Devices click [here](#).