the battery is assumed to be used elsewhere, and only the used fraction of the battery is allocated to the car. In short, it is assumed that it is possible to use 1.2 or 2.3 batteries over the lifetime of a BEV, but never less than one complete battery.

Basic cabin thermal energy demand is assumed to be powertrain type independent, though dependent on vehicle class. For example, all lower medium sized vehicles are assumed to have a thermal heating demand of 200–400 W (most likely value 300 W) and a thermal cooling demand of 200–400 W (most likely value 300 W). In the future, the most likely value for these parameters is decreased by 5% and the lower bound is decreased by 10% due to expected improved cabin insulation. However, the actual increased load on engine or battery varies for each powertrain. For example, heat demand for combustion and fuel cell vehicles is supplied using waste heat from the powertrain, and thus poses no additional demand on the engine or fuel cell. Conversely, current BEV use energy directly from the battery to provide heat. Future BEV are assumed to use heat pumps and novel concepts such as localized cabin heating to reduce the power demand on the battery to30–100% (most likely value 80%) of the cabin heat demand. Cooling demands are assumed to be met by an air conditioner with a coefficient of performance between 0.83 and 1.25 (most likely value 1) for all powertrain types, increasing to 1–2 in the future.

The analysis shows that moving from combustion to electric powertrains is likely to reduce the burdens of passenger vehicle travel in most environmental impact categories, it also shows that gains on a similar scale can be made by selecting smaller vehicles and using them more intensely over their lifetimes. In fact, environmental burdens in all impact categories and total ownership costs are quite sensitive to decreasing vehicle mass and increasing vehicle lifetime.

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INNOVATION FROM AMBERSEMI: SILICON CHIP CAPABILITIES FOR PATENTED DIRECT DC AC POWER TECHNOLOGY

DMYTRO SHLIAHA, student
ALLA M. KROKHMAL Associate Professor, PhD in Pedagogy, Language Adviser
National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute»

The power electronics industry has taken a significant step forward with the successful launch of the tapeout silicon chip for AmberSemi’s patented Direct to

DC AC supply technology. AmberSemi, a leading provider of power electronics solutions, has developed a new converter that offers several advantages over traditional AC-DC converters, including higher efficiency, improved power quality, and lower costs.

The new technology developed by AmberSemi is a direct to DC AC supply technology, which means that it converts AC power directly to DC power without the need for an intermediary DC-DC converter. This approach has several advantages, including higher efficiency, lower cost, and improved power quality. The converter developed by AmberSemi is capable of converting AC power to a stable, regulated DC voltage, making it ideal for a wide range of applications, including LED lighting, data centers, telecommunications, and server rooms.

One of the key specifications of the new converter developed by AmberSemi is its high efficiency. The converter is capable of converting AC power to DC power with an efficiency of over 98%, which is significantly higher than traditional AC-DC converters. This increased efficiency leads to less energy loss during the conversion process, resulting in lower energy bills and reduced greenhouse gas emissions.

Another specification of the new converter developed by AmberSemi is its improved power quality. The converter is capable of producing a stable, regulated DC voltage with low ripple and noise, which is essential for electronic devices that are sensitive to voltage fluctuations. The improved power quality of the converter ensures that electronic devices operate more efficiently and last longer, leading to lower maintenance costs and fewer replacements.

The compact size of the converter is another specification that sets it apart from traditional AC-DC converters. The new converter developed by AmberSemi is significantly smaller than traditional AC-DC converters, making it easier to integrate into electronic devices and systems. The compact size of the converter also leads to lower manufacturing costs, making it a more cost-effective solution for a wide range of applications.

The low cost of the new converter is another key specification that makes it an attractive solution for a wide range of applications. The new converter developed by AmberSemi is significantly less expensive than traditional AC-DC converters, making it an ideal choice for developing countries where access to reliable electricity is limited. The low cost of the converter also makes it an attractive option for businesses and consumers who are looking to reduce their operating costs.

The successful launch of the tapeout silicon chip for AmberSemi’s Direct to DC AC supply technology is a significant achievement that is expected to have a lasting impact on the power electronics industry. The new converter developed by AmberSemi offers several advantages over traditional AC-DC converters, including higher efficiency, improved power quality, and lower costs. With its wide range of applications, potential for further developments, and contribution to sustainability, the new technology is poised to transform the power electronics

industry and play a critical role in the global shift towards renewable energy sources. In addition to its technical specifications, the successful launch of the tapeout silicon chip for AmberSemi's Direct to DC AC supply technology is also a significant achievement in terms of its potential impact on the environment. The increased efficiency of the converter developed by AmberSemi means that less energy is lost during the conversion process, resulting in lower energy consumption and reduced greenhouse gas emissions. This has important implications for the global shift towards renewable energy sources and the reduction of carbon emissions.

Furthermore, the development of this new technology by AmberSemi could also have far-reaching impacts on the power electronics industry as a whole. The increased efficiency and lower cost of the converter could lead to the development of more efficient and cost-effective electronic devices, creating new markets and opportunities for innovation. The new converter could also contribute to the development of smart grids, which could improve the efficiency of energy distribution and enable the integration of renewable energy sources into the grid.

In conclusion, the successful launch of the tapeout silicon chip for AmberSemi's Direct to DC AC supply technology represents a significant achievement for the power electronics industry. The new converter developed by AmberSemi offers several advantages over traditional AC-DC converters, including higher efficiency, improved power quality, and lower costs. With its wide range of applications, potential for further developments, and contribution to sustainability, the new technology is poised to transform the power electronics industry and play a critical role in the global shift towards renewable energy sources.

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