



billion. This 3% decrease is mainly explained by the strong ASP decrease at IGBT<sup>3</sup> module level.

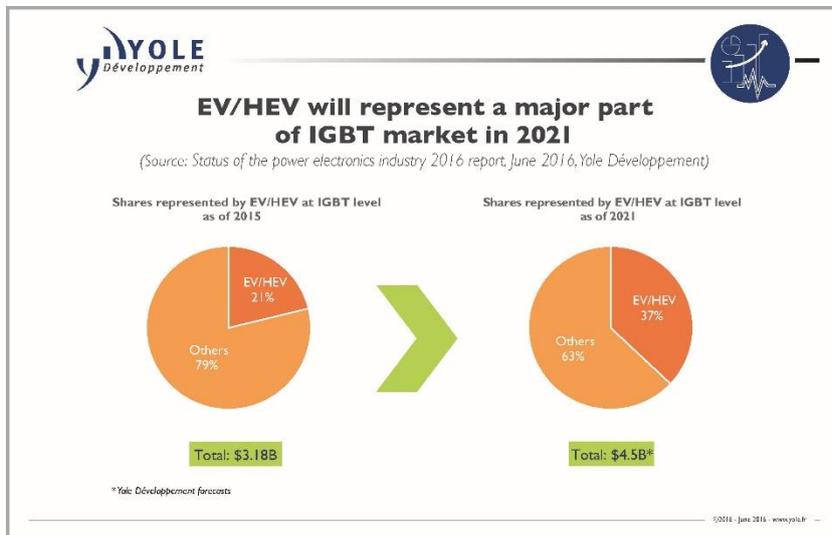
“We expect this ASP trend to continue, mainly because of price pressure from the automotive market”, explains **Coralie Le Bret, Technology & Market Analyst at Yole**. “But overall IGBT module and global power electronics market value should increase, as volume growth outweighs this ASP fall”.

Indeed the automotive market will strengthen its position, as Yole is expecting EV/HEV<sup>4</sup> market segment to represent a major part of the IGBT module market by 2021. Over this time the power MOSFET market is expected to grow slightly for all applications, going from US\$1 billion to US\$1.2 billion value.

In the “Status of Power Electronics Industry 2016” report Yole’s analysts forecast the power electronics market’s evolution, with two different scenarios depending for instance on the future of electrified vehicles. Thus many applications within the power electronics industry is depending on political decisions. These applications include renewable energies and electrified vehicles for instance. It is complex to estimate the evolution of the market: according to Yole’s nominal

scenario, the power electronics market will reach US\$27 billion by 2030; with a more pessimistic approach, such figure will be totally different.

From the technology side, the evolution is mainly driven by EV/HEV sector, as it is considered as the main power electronics market for the future. The power density increase is the main focus; it induces thermal management



challenges that need to be overcome thanks to power packaging evolution. Overmolded modules and double side cooling seem to be the future mainstream, especially for mid-power applications demanding low price. Module design may evolve, removing layers of the package in order to optimize thermal management.

Another trend identified by Yole’s analysts is the one focused on WBG<sup>5</sup> technologies. According to Yole, the adoption of WBG

<sup>3</sup> IGBT : Insulated Gate Bipolar Transistor  
<sup>4</sup> EV/HEV: Electric and Hybrid Electric Vehicles  
<sup>5</sup> WBG : Wide Band Gap

solutions will be generalized: most of players are already offering devices off-the-shelf and are involved in different R&D projects. “WBG devices are used in some applications thanks to the high energy density they offer and their efficiency”, asserts Coralie Le Bret from Yole. “In the future we expect multi-sourcing and price decrease to favor the WBG materials penetration. Packaging will have to be developed in accordance with the device in order to take the best of it”.

Yole Développement proposes a detailed description of this new technology and market analysis on [i-micronews.com, power electronics reports section](https://www.i-micronews.com/power-electronics-reports-section).

**About [Status of the Power Electronics Industry 2016](#) report**

*With strong price pressure and a very strong leader, how will the power electronics market and landscape evolve in the future?*

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**Coralie Le Bret** has been an analyst in power electronics and compound semiconductor technologies since 2014, at Yole Développement, the "More than Moore" market research and strategy consulting company. She graduated from INSA Lyon with an engineering degree in material sciences, specializing in semiconductors and microelectronics. At Yole Développement she is in charge of electro-mobility, and she uses her expertise on materials and semiconductors to follow power devices and power packaging evolution.

- Companies cited in the report:

ABB, AgileSwitch, Alpha and Omega Semiconductor (AOS), Alstom, Amantys, Avago, Bombardier, BYD, China's National Silicon, Continental, CRRC, Danfoss, Delphi, Diodes Incorporated, Dynex, Envision, Fairchild, Fuji Electric, Gamesa, General Electric, Global Wafers, Goldwind, Hitachi, Huawei, Infineon, Ixys, Macmic, Methode Electronics, Microsemi, Mitsubishi Electric, NXP / Freescale, Okmetic, ON Semiconductor, Panasonic, Powerex, Renesas, Rohm, Sanken, SBE Inc., Semikron, Shindengen, Siemens, Sino Microelectronics, ST Microelectronics, StarPower, Sungrow, Tesla Motors, Topsil, Toshiba, Toyota, Vensys, Vishay... and more.

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Founded in 1998, Yole Développement has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole Développement group has expanded to include more than 50 collaborators worldwide covering MEMS, Compound Semiconductors, LED, Image Sensors, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management.

The "More than Moore" company Yole and its partners System Plus Consulting, Blumorpho and KnowMade support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to develop their business.

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