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Ideal Power Completes Department of Energy SBIR Phase I Project Deliverables for a B-TRAN™ Enabled AC Solid-State Circuit Breaker

AUSTIN, Texas, March 07, 2022 (GLOBE NEWSWIRE) -- Ideal Power Inc. (Nasdaq: IPWR), pioneering the development and commercialization of highly efficient and broadly patented B-TRAN™ bidirectional power switches, announced today that it has delivered on its Phase I project commitments under the Small Business Innovation Research (SBIR) grant awarded in collaboration with Diversified Technologies, Inc. (DTI) from the Department of Energy (DOE) to develop the conceptual design for a B-TRAN™-driven low-loss 50MW, 13.8 kV alternating current (AC) solid-state circuit breaker (SSCB). The SSCB is intended to be used in medium voltage power distribution and renewable energy / microgrid connection to the United States main power grid.

Under the Phase I project, Ideal Power conducted a comprehensive semiconductor device optimization, completed the B-TRAN™ device design and wafer layout for potential fabrication in Phase II, leveraging its existing design to accommodate a multi-die packaging design, and, with the assistance of a world-class packaging firm, completed the conceptual multi-die packaging design with double-sided cooling, modeling both the thermal performance and inductance. These designs demonstrate the ability of B-TRAN™ switch modules to interrupt AC power and confirm the efficiency and speed of B-TRAN™ devices in AC operation. The B-TRAN™-based SSCB is expected to limit fault energy by orders of magnitude compared to conventional mechanical circuit breakers.

“B-TRAN™-enabled SSCBs could potentially displace mechanical circuit breakers, which are roughly one hundred to one thousand times slower than SSCBs (operating in milliseconds rather than microseconds) and prone to arcing and wear, as well as solve the problems posed by SSCBs using conventional switches such as IGBTs that suffer high conduction losses, resulting in significant wasted energy that must be dissipated in the form of heat,” stated Dan Brdar, President and Chief Executive Officer of Ideal Power. “We look forward to moving to the next step with DTI, submission of a Phase II proposal to build and demonstrate a 50 MW, 13.8 kV AC SSCB, and are excited about B-TRAN™’s potential to revolutionize the SSCB market in both direct and alternating current applications.”

SSCBs prevent damage to downstream loads, upstream generators, and the grid itself by utilizing microsecond current interruption times. B-TRAN™ is expected to make SSCBs more efficient, smaller, and less expensive through:

- Elimination of the need for external cooling systems using instead passive cooling similar to a pad-mounted utility transformer;
- 50% lower conduction losses compared to conventional power semiconductor switches; and
- Reduced component/switch count and smaller footprint due to the unique bi-directional capability of B-TRAN™.

DTI and Ideal Power plan to collaborate on a grant application for a Phase II project. If awarded a Phase II grant by the DOE, DTI will build and test a full 50 MW AC SSCB using Ideal Power B-TRAN™ devices.

The global market for all circuit breakers, including SSCBs, is projected by Fortune Business Insights to grow at a compound annual growth rate of over 6% to $25.85 billion by 2027. There is a tremendous opportunity for SSCBs to displace mechanical breakers and gain incremental share across numerous medium voltage applications in the utility, distributed generation, and transmission/distribution markets, and in additional commercial and industrial power switching applications such as hybrid and electric vehicle power train and charging.

About Diversified Technologies, Inc.
Diversified Technologies, Inc. designs, manufactures, and markets the patented PowerMod™ line of high-voltage, solid-state, pulsed power modulators and switching power supplies. DTI's PowerMod technology is the recipient of prestigious local and national awards and is recognized as a true breakthrough in high-voltage electronic design. The company has shipped hundreds of systems to customers in the U.S. Departments of Energy and Defense, leading universities, and private sector companies for a range of applications including semiconductor fabrication, food processing, high energy physics research, medical electronics, and radar. For more information on DTI, please click here.

About Ideal Power Inc.
Ideal Power (NASDAQ: IPWR) is pioneering the development of its broadly patented bidirectional power switches, creating highly efficient and ecofriendly energy control solutions for electric vehicle, electric vehicle charging, renewable energy, energy storage, UPS / data center, solid-state circuit breaker and other industrial and military applications. The Company is focused on its patented Bidirectional, Bipolar Junction Transistor (B-TRAN™) semiconductor technology. B-TRAN™ is a unique double-sided bidirectional AC switch able to deliver substantial performance improvements over today's conventional power semiconductors. Ideal Power believes B-TRAN™ modules will reduce conduction and switching losses, complexity of thermal management and operating cost in medium voltage AC power switching and control circuitry. For more information, visit www.IdealPower.com.

Forward-Looking Statements

All statements in this release that are not based on historical fact are “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995 and the provisions of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These statements include, but are not limited to, statements regarding our expectations that B-TRAN™-based SSCB can limit fault energy by orders of magnitude compared to conventional mechanical circuit breakers, B-

TRAN™-enabled SSCBs could potentially displace mechanical circuit breakers as well as solve the problems posed by SSCBs using conventional switches, B-TRAN™'s potential to revolutionize the SSCB market in both direct and alternating current applications, that B-TRAN™ will make SSCBs more efficient, smaller, and less expensive, the plan to collaborate on a grant application for a Phase II project, the global market for all circuit breakers, including SSCBs, and the projected growth thereof and the opportunity for SSCBs to displace mechanical breakers and gain incremental share across numerous medium voltage applications in the utility, distributed generation, and transmission/distribution markets, and in additional commercial and industrial power switching applications. While Ideal Power's management has based any forward-looking statements included in this release on its current expectations, the information on which such expectations were based may change. These forward-looking statements rely on a number of assumptions concerning future events and are subject to a number of risks, uncertainties and other factors, many of which are outside of Ideal Power's control that could cause actual results to materially differ from such statements. Such risks, uncertainties, and other factors include, but are not limited to, the risks and uncertainties associated with market conditions as well as risks and uncertainties set forth in Ideal Power's quarterly, annual and other reports filed with the SEC. Furthermore, Ideal Power operates in a highly competitive and rapidly changing environment where new and unanticipated risks may arise. Accordingly, investors should not place any reliance on forward-looking statements as a prediction of actual results. Ideal Power disclaims any intention to, and undertake no obligation to, update or revise forward-looking statements.

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