Diversified Technologies, Inc. (DTI) has developed solid-state high voltage switching technology that allows efficient and cost effective high frequency switching directly at 10 kVDC levels, making medium voltage DC (MVDC) transmission and integration onto the grid efficient and inexpensive.

**Technology Overview**

DTI’s MVDC Conversion & Transmission System has the following characteristics:

- An MVDC Power Converter which takes in 3-phase AC power (at any voltage or frequency) and converts it to MVDC (5-50 kV).
- On-shore or off-shore MVDC conversion.
- Adaptive combining of power from multiple generators prior to MVDC transmission.
- A DC transmission cable which carries the power to the grid integration site.
- An MVDC Power Inverter which takes the MVDC and puts it onto a 13.8 kVAC, 3-phase, 60 Hz distribution grid.
- A total system efficiency of 97%.
- Capability to convert up to 1 MW of power.
DTI has experience with land as well as sea-based systems. DTI’s solid-state PowerMod™ systems employ proprietary high frequency switching technology to perform the conversion within a single unit, thereby reducing power losses during the multiple steps required when using traditional electronics. As a result, a greater portion of the input power is preserved, yielding lower power costs and reduced cooling requirements. DTI’s systems offer a modular design that can be scaled to different power requirements in virtually any combination of voltage and current. They feature high reliability, continued operation during instances of failure, and components that can be replaced easily during periodic maintenance.

**Power Feed Equipment** for the MVDC conversion and transmission system. This system is shore-located and is housed in two 20-foot ISO containers and powered by two 200 kV high voltage power supplies run in parallel.

**Full Bridge Inverter Topology.** Based on conventional full bridge inverter topology, DTI’s unique solid-state technology enables high frequency switching under full load (here, 10 kVDC, 100 A) in a compact, efficient, highly reliable power converter.

**PowerMod High Voltage Solid-State Switches.** Consisting of IGBTs in series, DTI’s patented technology is driven by inductive coupling to ensure that the stack acts as a single switch. Each plate pictured here comprises 20 IGBT.