The \*insert product name\* is a high power converter used primarily in the application of charging electric vehicles. The converter is bidirectional, meaning it is capable of charging the electric vehicles batteries at 100kW but can also be used in reverse to discharge those batteries back into the grid. Applications of this include users getting more involved with power economy and being able to take advantage of tariffs by selling their energy when it is expensive. The converter uses a bidirectional 3-phase AC/DC converter followed by a DC/DC resonant converter. These have control schemes that can be controlled by an FPGA increasing the level of design choices over things like operating frequency meaning passive components within the circuit can be chosen to be smaller and thus less expensive. The use of a resonant converter improves the safety of the product as there is electrical isolation between the output side and the grid so that the user will not be able to subject themselves to grid-size voltages/currents when plugging in the converter – the control may not be isolated. Using an FPGA allows for increased controllability by having adaptability in control scheme. FPGA has ultra-low latency calculations so that improves the control capability of the output voltage reducing the ripple (Ben said this).

Looking more to the future this technology could also be used on home-level. In the event of a natural disaster a house may lose its connection to the grid. This bidirectional technology could allow users to have basic access to hot water and light in these cases by running their house off their car batteries if required in an emergency.

Our main target clients are companies that require bidirectional vehicle to grid systems and other systems that require grid to storage processes and vice versa. Our solution fits the client’s needs as it gives them a more efficient power converter and control system that reduces leakage, charges the load faster, and is cheaper to produce. The economic and performance benefits our product brings is exactly what our clients need. Our approach of using FPGAs for the controller system also give our customers the benefit of keeping the most technologically advanced system components available in the future.

Most of EV power converters are controlled by ASICs or microcontrollers with very limited control update rates. While our product use FPGAs to control power converters . Compared to ASICS of microcontrollers, FPGAs are capable of much higher control frequency. So the size of passive components (inductors, capacitors, resistors) in our product are smaller than others, which also means the cost of our product is less. What’s more, using FPGAs, the control algorithms can be easily updated.

Electric Vehicle Charging Today:

Global sales of electric vehicles have increased by 43% in 2020 alone, and this trend is only expected to continue. More charging stations will be required to serve this increase in need. Level 3 & 4 chargers, which are high power and can charge a vehicle battery to full in as little as 20 mins, may be most useful to customers but requires the most capital and operational outlays. To make rapid charging as accessible as possible, it must be made as inexpensive as possible

What we can offer:

* Ultra high power chargers of >50kW currently on the market are controlled by ASIC chips

Unique Selling Points:

* Bidirectional charging allows users to become a part of the power grid, buying and selling electricity as can be seen in the Nissan Leaf
* FPGA powered

Benefits of FPGAs:

* FPGAs allow