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What business or developmental opportunities do you see in your space for the smart grid?

Matthew Tyler, ON Semiconductor, www.onsemi.com

As the term “Smart Grid” expands beyond its original concept due to granular load shedding and information based behavior, so do the potential solutions and touch-points to the grid. There is a greater need than ever for suppliers to provide a broad portfolio of products and solutions for the Smart Grid and everything that connects to it. We are seeing an evolution of Home Area Networks (HAN) and Neighborhood Area Networks (NAN) and the ways in which metrology and communications might expand in these areas. We are also seeing growth opportunities in areas that support and optimize the grid including the need for greater energy efficiency and power optimization as well as the increased functional demands on Microcontrollers and communications solutions for next generation end-markets.

One specific area of growth is in Point of Load (POL) energy metering solutions that are easy to integrate. Traditional metering solutions come with a lot of integration overhead and potential in-line manufacturing costs requiring a great deal of trimming and calibration. The need to merge predictive system usage information with true POL monitoring will yield significant value to the end user as long as the total system cost is low enough for broad integration.

Ross Sabolcik, Silicon Laboratories, www.silabs.com

The smart grid, and in particular the smart metering and communications infrastructure, requires robust and reliable performance, which drives the need for underlying semiconductor building blocks in the areas of wireline and wireless communications, safety and isolation, computation, sensing and timing (clock generation and frequency control).

As a high-performance, analog-intensive mixed-signal semiconductor company, Silicon Labs is helping customers build these robust smart grid solutions. Leveraging high-performance wireless radio links to interconnect the metering mesh networks tied to a wide range of computational cores ranging from 8-bit through 32-bit, developers can create optimized computation and communication networks for the smart grid. These communication networks are being standardized by several organizations including the IEEE 802.15.4 G/E committees. Underlying this communication infrastructure is the need for high-performance and frequency-flexible timing solutions to co-ordinate and synchronize the networks, sensing subsystems to measure electricity

usage or water and gas flow, and robust CMOS-based digital isolation technology to ensure precise electricity measurement, meet safety requirements, provide anti-tampering features and shield sensitive communication buses from noise.

Smart grid system design requires expertise in fusing high-performance, high-reliability analog functionality with digital systems to sample and control the infrastructure and provide sophisticated metrology and sensing capabilities. Silicon Labs provides this system integration expertise, coupled with a comprehensive range of mixed-signal ICs essential for smart grid applications.

Mel Berman, TDK-Lambda Americas, www.us.tdk-lambda.com/lp

There are many different views of what constitutes the “Smart Grid” and indeed its definition and scope is still evolving. However, I think we all agree with the main goals of the “smart grid,” which is: to maximize the efficiency of existing power generation and transmission, develop alternative/renewable power sources and utilize the power we have more efficiently. Towards this end, I recently had my home’s electric and gas meters replaced by smart meters, courtesy of the local utility provider. This change has put some meter-readers out of work, but will enable the utility company to monitor, in real time, the electricity usage of communities, towns and cities and adjust their power generation and resource allocations more quickly and efficiently.

TDK-Lambda is a technology provider to many facets of the “Smart Grid.” For example, we have provided ac-dc power supplies and dc-dc converters to electric vehicle re-charging stations that are being installed worldwide. We have provided products to power the motors that optimize the angle of solar panels/reflectors which are used to generate electricity. Our products are powering backlighting LEDs used in LCD panels that can provide visual data concerning the usage and control of smart home energy systems, the electric grid and power generating facilities. Most power generating and transmission stations are located in remote areas, especially new solar and wind turbine power farms. Therefore, we have focused on expanding the field life of our power products (e.g., by designing with 10-year rated capacitors), since maintenance calls to remote locations can be very expensive and disruptive. And, we continue to develop smaller and higher-efficiency power products (90% and greater) to reduce the power that would otherwise be wasted; to power the next generation of “smart grid” devices.

Harvey Wilkinson, Ioxus, www.ioxus.com

Currently, ultracapacitors are being used in utility meters to provide power required to remotely query the meters and gather and provide usage data. They are ideal for this application because of the very long cycle life, high burst power and wide temperature operating range. On a related application, ultracapacitors can provide backup power for grid transmission and distribution communications when the grid has a power outage. Having a long, maintenance free life, an ultracapacitor is much better suited for this application than a battery.

The smart grid will facilitate more renewable sources of energy such as solar and wind energy to be integrated and controlled on the grid. Ultracapacitors are being used now in pitch control systems of wind turbines to provide emergency power to protect the wind turbines in case of power outages during high wind situations.

Most offshore wind turbines and increasingly more land-based wind turbines use ultracapacitors for this purpose.

Ultracapacitors can also be used in conjunction with lead acid batteries to provide frequency regulation ancillary services on the grid. The technology will meet the grid requirement for very fast response, frequently cycled power to closely balance the grid supply with load. In the longer term, as ultracapacitors increase in energy density several fold, they will be used in standalone systems to provide this important grid regulation, particularly as more renewables are added to the grid.