SMART GRID OVERVIEW

Trilliant, Inc. **MissionPoint Capital Partners**

What is the Smart Grid?

The Smart Grid is a collection of energy control and monitoring devices, software, networking and communications infrastructure that are installed in homes, businesses, and throughout the electricity distribution grid. This collective system provides a "nervous system" for the grid and for customers that provides the ability to monitor and control energy consumption comprehensively in real time. Think of it as ***the Internet for Energy***.

Key elements of the Smart Grid include:

- **Intelligent networks:** Two-way "internet like" networking equipment and software, usually using wireless communications. The communications utilize standard protocols such as IEEE 802.11 and IEEE 802.14 to ensure compatibility and interoperability. The network extends from inside the home, to the electric meter or nearby power pole, through a series of data concentrators, and eventually through the internet. The system combines private communications for utility operations, and public, but secure, communications to allow consumers to interact with their energy control devices remotely.
- **In-home devices**: *Smart thermostats* that can be adjusted remotely by the utility, or the consumer to save energy during peak loads, high energy prices, or changes in renewable energy production. Thermostats manage up to 40% of household energy use and with proper controls and programming, can save 10% to 30% per year in heating and cooling costs, a total of over $300 per average home, or over $25 Billion per year in the U.S. (Data from EIA). *In-home energy displays* inform customers of their energy usage and cost in real time, and can communicate urgent messages from the utility. These have been shown to save an additional 5% of electricity use, or over $4 Billion per year. *Load control switches* can be connected to pool pumps electric water heaters, and other loads, saving an additional several percent of energy usage. There are already several million load control switches installed in the U.S. by utilities over the past 25 years.
- **Grid monitoring and control devices**: Transformer monitors, voltage sensors, and other devices help provide a more rapid response to power outages, and allow better coordination of the grid in response to renewable resources, solar, and distributed generation.
- **Electric vehicle integration:** Vehicle connection stations that support safe delivery of power to vehicles that draw as much as 5 homes, vehicle identification for billing purposes and the coordination necessary to let vehicles serve as batteries and backup power for the grid.

Who benefits from the Smart Grid?

The Smart Grid enables multiple constituencies to accomplish their economic and environmental goals related to energy use and energy production.

Consumers

- By providing information on energy use in real time, and by providing controls that are both more advanced and accessible from any location, consumers will be much more able to reduce their energy consumption, carbon footprint, and energy costs. Today, consumers have no "gas gauge" or "gas station prices" to inform their home energy decisions. It will be essential to provide these tools to consumers if we expect to make significant progress on energy efficiency.

Utilities

- Utilities need the Smart Grid to support increasing penetration and use of solar, wind, energy storage, and other clean energy technologies (especially "intermittent" and distributed generation), to be able to provide high quality, reliable power to drive economic growth, to properly bill their customers and implement Federal, State, and Local policy initiatives, and to avoid the construction of unnecessary fossil fuel fired generation and new transmission.

Communities

- Increasingly, real or virtual communities, such as cities, universities, major corporations, and even community based or national groups, are coming together to reduce their energy use, or integrate the energy use with renewable resources. These entities need a Smart Grid to have visibility, control, and coordination of their efforts to comply with environmental and economic initiatives, whether driven by regulation, or by their own sense of civic or environmental duty.

Key Policy Issues

- The Smart Grid is essential to achieving aggressive energy efficiency and renewable energy goals. Therefore, funding of initiatives to promote efficiency and renewables should include support for the Smart Grid technologies that will be foundational to their success.
- Implementing smart meters and time-of-use prices is important but not enough. Achieving the full benefits and energy savings will require providing customers with other components of the smart grid, including in-home tools and devices to manage their energy consumption proactively and automatically.
- As with the Internet, open standards and interoperability – rather than proprietary technologies -- are crucial to efficient and widespread use of the smart grid, including plug-and-play integration of new and innovative devices to come. With this architecture, obsolescence can be avoided and the benefits of smart grid investments today will be reaped for decades to come.

Federal policy should focus on the following:

- Providing substantial Federal financing to promote an expedited roll out of utility-based Smart Grid systems. This could include: a direct Federal cost-share; funding of the Grid Investment Matching Program; establishment of an Investment Tax Credit for qualifying smart grid technologies; further reduction of depreciation period for smart grid technologies to 5 years; and/or creation of a national smart grid infrastructure fund financed by a nationwide "system benefits charge" of a fraction of a cent at the wholesale transmission level.
- Any of the above could be incorporated into the pending stimulus package with an incentive structure favoring early decisions by utilities and their respective state public utility commissions. This would help achieve earlier economic and job creation benefits. For example, a Federal cost share could be offered with two distinct multi-year declining schedules (100% Federal coverage year one, 50% year two, etc.), with one schedule offering a higher Federal share only to those utilities who contract for a smart grid rollout and secure PUC approval by a near-term date certain.
- Insisting that open standards and interoperability are cornerstones of all deployments (TCP/IP, ANSI C12.22, IEEE 802.11, 802.15.4).
- Encouraging an active consumer role in all Smart Grid deployments.

Contacts:
Eric Miller, Chief Solutions Officer, Trilliant, Inc.: Eric.Miller@trilliantinc.com or 510.915.8742
Dan Abbasi, Senior Director, MissionPoint Capital Partners: Dabbasi@missionpointcapital.com or 203.286.0408