Investment in the electric transmission and distribution industry is booming, supporting fundamental needs within the system. Five years ago, we identified five industry megatrends — driven by demographics and technology — that are shaping the future. These megatrends continue to drive innovation and development today.
Four fundamental needs have been established by the investment in the electric transmission and distribution boom: the need to maintain system reliability, the need to deliver generation to load, the need for environmental and regulatory compliance, and the need to replace utility assets that have reached the end of useful life.

Notwithstanding this boom, the nation lacks a cogent energy policy to guide the investment that has occurred and will occur in years to come. Therefore, in an attempt to shape a national energy policy as it relates to electric transmission and distribution, it is helpful to identify the megatrends that are shaping our industry.

There is no uncertainty about a megatrend. Megatrends are driven by demographics and technology. Megatrends are immutable. There are five megatrends in the electric transmission and distribution industry: grid modernization, energy storage, maximum use of existing transmission rights-of-way, distributed energy resources (DER) and operational efficiency.

**Grid modernization**, often called smart grid, is here to stay. The definition of the smart grid is the convergence of information and operational technology on the electric grid, allowing sustainable options to customers and improved security, reliability and efficiency to utilities.

Old, conservative and typically late-adopting utility models will be challenged as utilities integrate smart solution sets that move at the speed of Moore’s Law.

**Energy storage** is a fundamental challenge to our industry. Large-scale batteries and community energy storage offer many advantages at price points that will come down with economies of scale. Moving from an industry that produces a product (energy) as needed to one that can store capacity will be facilitated by two other megatrends: grid modernization and DER.

**Maximum use of existing transmission rights-of-way** will be forced upon our industry by project opponents who reasonably ask the question “why not?” Advances and worldwide applications of EHV underground, composite core conductors and energized line construction will make better use of existing rights-of-way a logical economic and environmentally friendly choice for the future. More capacity can be achieved with less right-of-way.

**Distributed energy resources (DER)**, or on-site generation, will not replace central plants but will significantly impact the distribution grid. Small combustion turbines, combined heat and power (CHP) facilities, compact nuclear units, backup generators and maybe solar and plug-in hybrid electric vehicle (PHEV) batteries will be distributed around the system based on fuel pricing and availability. DER will enhance the grid but make its safe and reliable operation increasingly complex. Regardless, the economics of fuel, the cost to site new larger generation or lines, and the retirement of many urban generation units all contribute to this megatrend.

**Operational efficiency** will be fundamentally important to utilities that have increasing pressure on rates. State utility regulators are unlikely to raise utility rates in an uncertain economy, leaving utilities to improve operational efficiency in order to maintain shareholder value. Grid modernization will provide vast amounts of data for intelligent analysis and improved asset management decisions leading to better operational efficiency. Demand-side (consumer) programs will be a part of this improved efficiency.

Megatrends are driven by demographics and technology, and they are immutable. Megatrends will define the future of our industry. Are you preparing for this future?

**BIOGRAPHY**

**MIKE BEEHLER, PE**, is a vice president with Burns & McDonnell. After working as a transmission engineer and project manager for two investor-owned utilities, Mike led the company’s initial development of critical infrastructure protection and sustainability. Mike has written and presented extensively on the subjects of reliability-centered maintenance, program management and the smart grid. Subsequently, Burns & McDonnell has become the industry leader in major program management and developed several world-class grid modernization labs. More recently, Mike has written, presented and consulted on industry megatrends, the integrated grid and smart cities.