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The Smart Utility is Over-Hyped: What Technologies Will Survive?

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I. Executive Summary and Intro

The utility industry seems to be in a frenzy over all things smart: the smart grid, the intelligent utility, the smart utility. Apparently this "smart" phenomena is so important that the United States Federal Government is doling out millions, if not billions, of dollars to "smart" projects in order to get the economy going again.

Hype is nothing new to many industries historically. E-Commerce was supposed to surpass brick-and-mortar retail sales during a time frame known as the "dot-com" era. E-commerce finally did fulfill that promise but only after taking longer than industry analysts had estimated and also after the "dot-com" era had collapsed. Today what was known as e-commerce has simply been replaced by commerce. The Internet has become an integral part of the retail solution. Another example includes the deregulated energy markets. Both of these industries eventually deliver, but not on their "hyped" cycle.

Will the smart phone eventually become a phone? Will the smart meter eventually become a meter? Will smart utility technology and functionality eventually become the way the utility industry does business in delivering reliable commodities to its rate payers while ensuring a return for its investors? The one thing each of these industries has in common is the consumer. In each case the consumer has to go through an evolution of sorts to adopt new technology and functionality.

The utility industry is now faced with many new "smart" technologies and functionalities that are supposed to eventually touch the consumer. A partial list includes dynamic pricing, smart appliances, customer portals/customer self-service, pre-pay, new communication channels, and real-time billing. Will all of these survive the hype and eventually become the way the industry does business? Some will and some will not. The smart utility concept will eventually deliver on its promise, but only after a correction takes place, the benefits promised take longer than expected to deliver, and potentially under a different name.

II. Timeline of Events Leading to a Hyped "Smart" Technology Cycle

The "smart" adjective is arguably used in reference to the "smart grid" in the mid-2000s although it can be found as early as the late nineties. With a term being used that denotes "smart," the actual technologies that we find associated with "smart" can be found in the eighties and nineties.
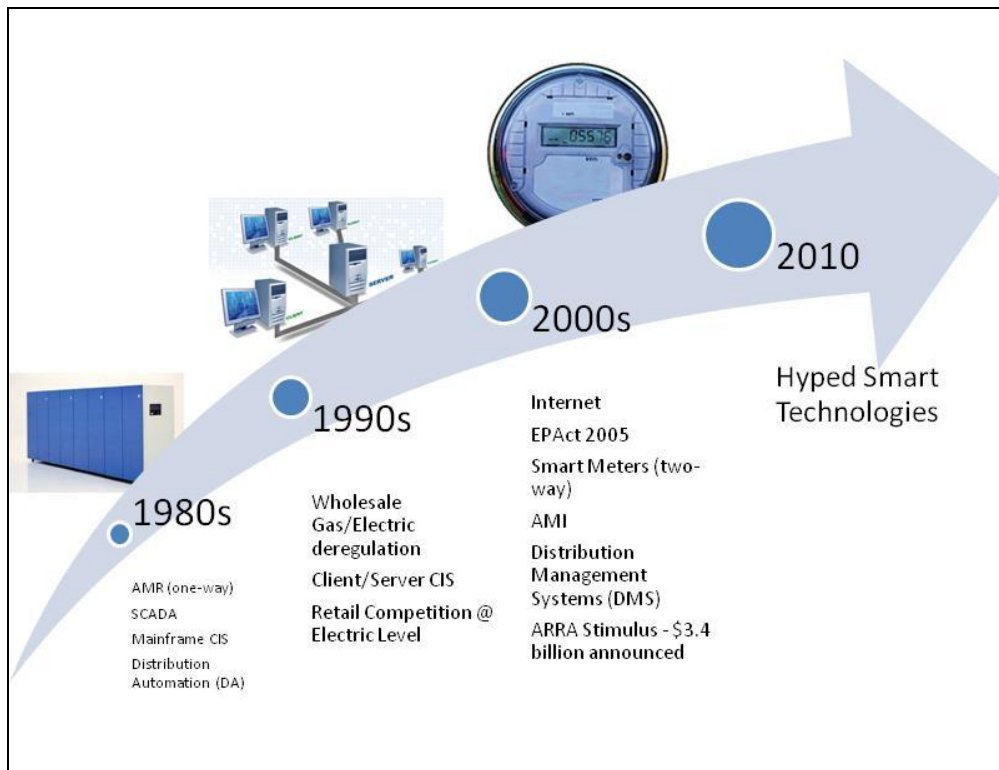
Source: Desert Sky Group, LLC

1980's

As far as technologies are concerned, automatic meter reading, or AMR, finds its roots in the early eighties as a technology used to read meters automatically for industrial consumers first and eventually for commercial and residential consumers. Known as supervisory control and data acquisition, a SCADA system is sometimes considered a part of distribution

automation although it is really a monitoring and control tool used for distribution and transmission. Sub-station automation, automatic re-closing, and voltage conservation have all been in existence for some time. The customer information system (CIS) is largely a mainframe application in the eighties.

1990's

In the nineties Peoplesoft proved that client-server applications could scale, starting a re-architecting of the CIS by many application providers at the time. The client-server trend also started a move away from "green-screen" technology to Windows-based graphical user interfaces. The Federal Energy Regulatory Commission (FERC) 636 ruling deregulated wholesale natural gas in the early nineties and in the mid-nineties FERC 888 deregulated wholesale electricity. In the late nineties, California opened its market to retail electric competition.

2000's

In the early 2000s the Internet goes through its own hype correction, California suspends retail choice while FERC proposes a standard market design for regional transmission organizations. The utility industry in North America had entered a retrenchment phase, regardless of commodity (electric, gas, or water). In 2005 the industry received an Energy Policy Act which was supposed to spur renewed interest in mergers & acquisitions (M&A) due to the repeal of the Public Utility Holding Company Act (PUHCA). The Energy Policy Act of 2005 does give a boost to AMI and dynamic pricing, which in turn begins an increase in something new to the utility industry: the meter data management (MDM) application. New AMI requires "smart" meters and the new "smart" meters provide a large amount of data -- data that the CIS has not had to handle historically. Then in 2009 President Barack Obama announced $3.4 billion of smart grid investment grants from the US government as a part of the American Recovery and Re-investment Act (ARRA). The smart grid investment grant includes money for AMI, Customer Systems, MDM, Electric Distribution, Electric Transmission, Equipment Manufacturing, and Integrated and/or Cross-Cutting systems.

Today

IT analysts at the Gartner Group report that smart grid technologies serving the utility industry are nearing the peak of their "hype cycle." The hype cycle consists of five phases: On the Rise; At the Peak; Sliding into the Trough; Climbing the Slope; and Entering the Plateau. According to Gartner, smart grid technologies for the utility industry are nearing the peak, preparing to "slide into the trough."

III. What Can We Learn From Outcomes of Other Hype Cycles

Retail Deregulation

The period is now 1998-2000 and retail deregulation is in full-swing in the United States. Enron has put the fear of God into the heart of the utility industry by testifying in front of just about every state commission about the stodgy utilities and how the market needs to be open allowing them the freedom to "wheel" power. This will create competition and as a result energy prices will fall and consumers will win. Centrica (British Gas) is eyeing the North American market as a huge opportunity where it can bring its expertise with deregulation in the United Kingdom to bear. New Power is formed as a partnership between AOL, IBM, and Enron. Green Mountain Power is going to create an entirely new type of retailer that is focused on environmentally friendly generation. Southern Company is branding itself on the national television market as the 900 pound gorilla to be reckoned with. The US Department of Energy has to update its map of states deregulating monthly because of the frequent changes and the states appear to be falling in line on who will deregulate next. OK, you get the picture. The hype is so thick that it would give trouble to my new Cutco knife set.

Many utilities begin to work on creating what is known in many industries as "the killer app." I must have heard every utility claim that it was going to create the "caller-id" of the energy industry and change the way the industry interacts with its customers. Sounds a lot like the smart grid, doesn't it? As it turns out, many utilities spent millions of dollars trying to differentiate their solutions for consumers so they could "win" or "retain" consumer bases. Little did the industry realize that caller-id had been on the shelf of Bell Labs awaiting an excuse to be launched into the consumer marketplace. The utility industry had no such "killer app" awaiting deregulation to occur. Instead, the retail organizations that fared quite well during that timeframe were the ones who could navigate the morass of new rate requirements and successfully get a bill to the end consumer that was correct.

Interesting isn't it? Plain old billing becoming the differentiator. Nothing exciting or "killer app" like. Why? I will offer an opinion that the consumers were quite confused with deregulation and were not ready for new products and services. After all, the consumer has to go through an evolution of sorts to begin to understand what deregulation is all about, how it works, and how it affects what they pay for the commodity.

I know of one example where a retailer offered 15 minute usage data via the Internet to a mid-sized commercial consumer that operated retail outlets after some period of deregulated billing and the consumer thought that was the "killer app." Remember, this was 1999 and to those of us in the industry, we were quite perplexed as we thought, "he's excited about seeing

his usage data?" After all, we took that data for granted from within the utility but offering it to a consumer that had never seen his usage data you would have thought we were heroic.

E-Commerce

Let's take a look at retail sales and the Internet. It is a similar timeframe as deregulated energy markets -- January 2000. Analysts are proclaiming that bricks-and-mortar have once again outsold "dot-coms" for the Christmas buying season of 1999. If you recall the "dot-com" era was one of great hype around what we called then "e-commerce." Building a website and selling products online were supposed to surpass the mighty retailer's hold on the consumer. It didn't happen, at least not in 1999-2000. The major concern at the time was security. Why would I enter my credit card data on a website? Someone might steal it. How can I be assured that submitting my personal information electronically is safe and secure? Again, sounds a lot like the smart grid today, doesn't it? And like the smart grid, e-commerce had one thing in common, the consumer.

In the case of e-commerce, the consumer had to gain a comfort level that online sales were safe and secure. But before consumers had to evaluate safety and security in their own minds, the infrastructure had to be in place and working reliably. The Internet itself had to propagate sufficiently. Netscape had to make a serious run at the browser market. Microsoft had to counter with free Explorer. There is a lot that had to happen before we even got to the consumer and selling products online.

March 10, 2000 brings the peak of "dot-coms" being over-valued as the NASDAQ hits 5132.52 before the "dot-com" collapse occurs. Later in the mid-2000s "dot-coms" and e-commerce do fulfill their promise by surpassing brick-and-mortar sales. Just as "dot-coms" were over-hyped in the late nineties and eventually came to fulfill their promise in the mid 2000s, so smart grid for electric utilities and smart technologies for all utilities will fall short of delivering on its promises in the short term and then will deliver on promises in the longer term.

So if we have history as a teacher on our side and we know that a specific segment of the market (in this case the smart technologies) is over-hyped, then why are we running like lemmings toward a cliff we know exists? Or do we know it exists? It is unfair to lump multiple technologies into a basket called "smart." Let's take a closer look at them at the very least at a high level.
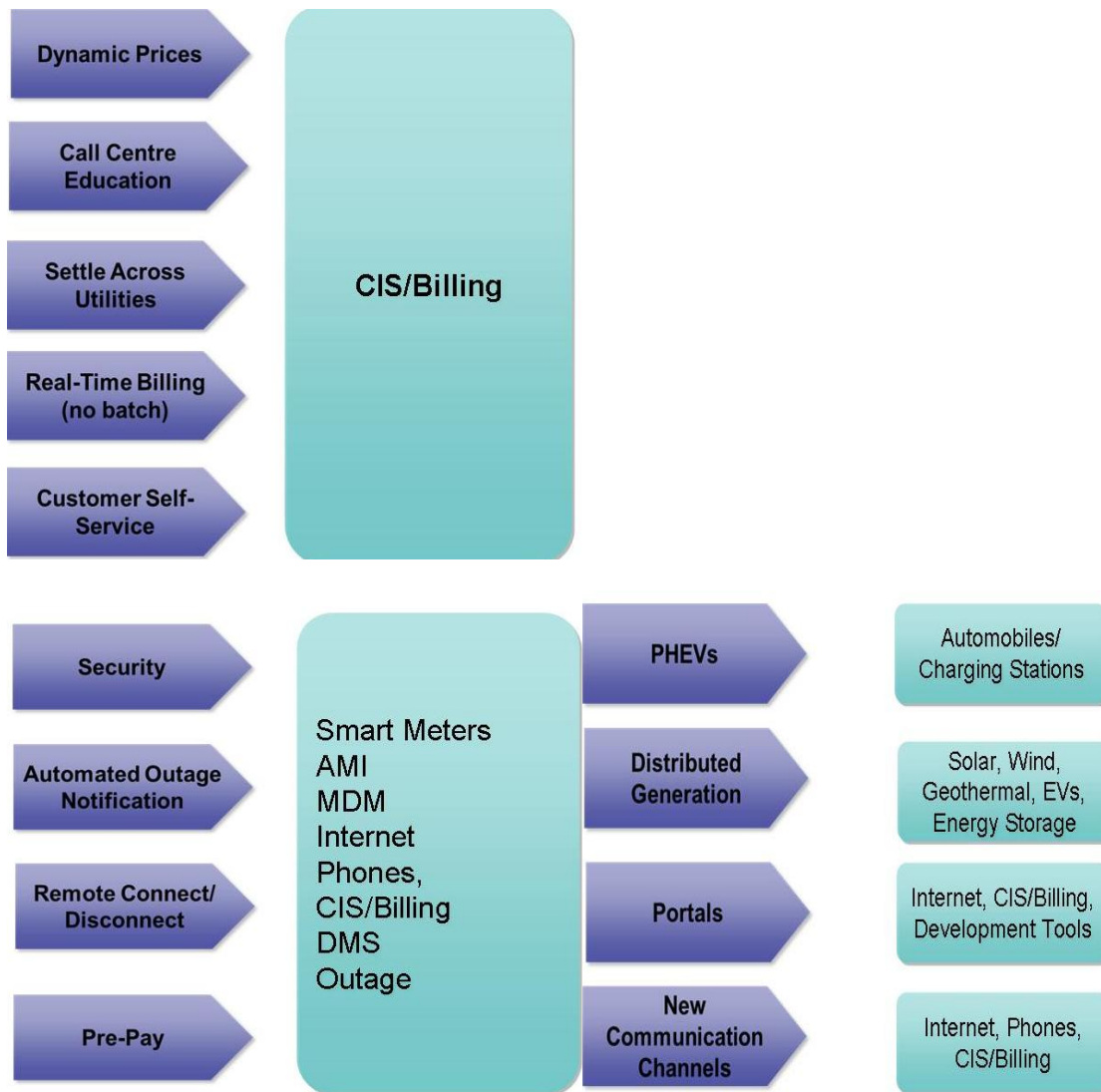
IV.   Technologies and Functionalities That Will Survive the Hype in the Utilities Industry

Underscoring the movement to a "smart" utility (since consumer acceptance is the ultimate gauge of success) are the potential new requirements facing utility customer service organizations. Based on feedback from utilities in North America, some of the new customer service requirements can be summarized as follows.

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Dynamic Pricing	Security
Smart Appliances	Call Center Education
PHEV's	Real-Time Billing
Distributed Generation	Customer Self Service
Call Centre	Pre-Pay
New Communication Channels	Settle Across Utilities
Remote connect/ Disconnect	Automated Outage Notification

Source: Desert Sky Group, LLC

To deliver new functionalities, technology is associated with that functionality. If we take a look at the new functionalities and align them with their associated technologies, we get:

Source: Desert Sky Group, LLC

These new functionalities and their associated technologies take what was already a complex industry and move complexity to another level. The utility industry currently has many efforts underway to create standards for exchanging large amounts of data. A recent example is the logical architecture emerging from a National Institute of Standards and Technology (NIST) standards setting exercise on how the utility will look in a "smart" world.
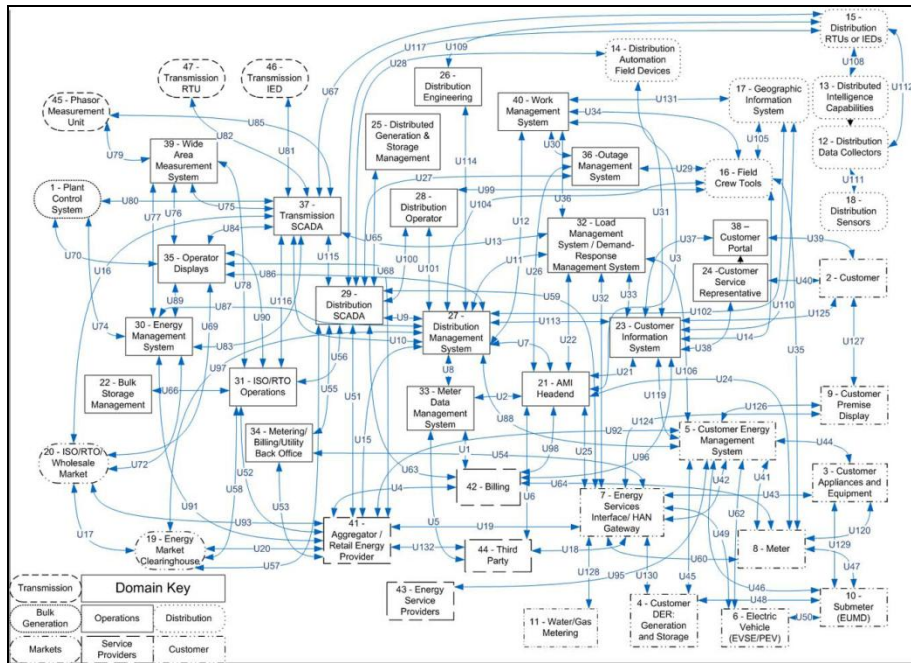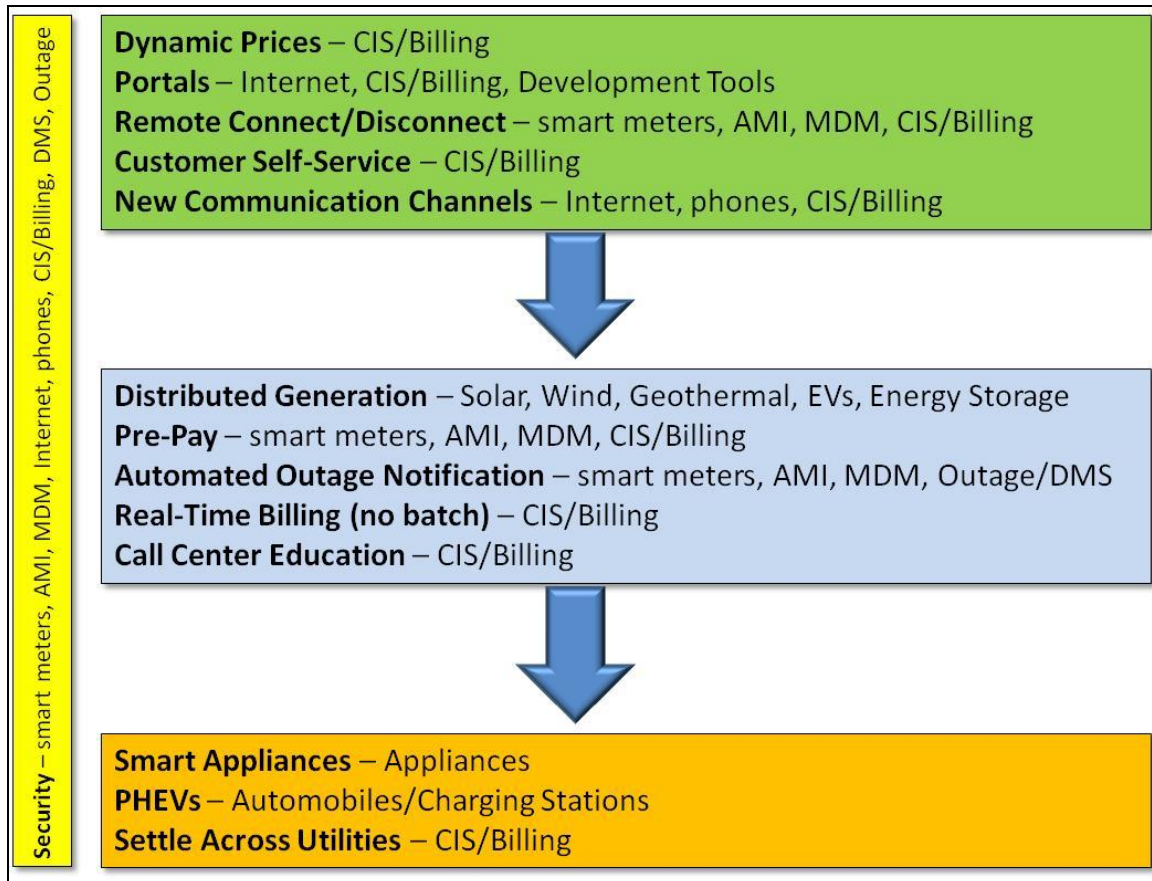
Source: National Institute of Standards and Technology: US Department of Commerce

The eye chart provided by NIST confirms that complexity in the utility industry is growing exponentially. It underscores the need for a reliable architecture to be implemented and tested thoroughly before starting to offer new products and services to consumers.

Assuming that history is a teacher and assuming that we have learned from previous hype cycles such as energy deregulation and the "dot-com" era, we should prioritize the current "smart" utility functionality and associated technologies related to the consumer in order to limit the "hype" corrections that occur in the marketplace.

V. Prioritizing "Smart" Functionality and Associated Technologies – How Utilities Can Focus Their Efforts

Security – smart meters, AMI, MDM, Internet, phones, CIS/Billing, DMS, Outage

Dynamic Prices – CIS/Billing
Portals – Internet, CIS/Billing, Development Tools
Remote Connect/Disconnect – smart meters, AMI, MDM, CIS/Billing
Customer Self-Service – CIS/Billing
New Communication Channels – Internet, phones, CIS/Billing

Distributed Generation – Solar, Wind, Geothermal, EVs, Energy Storage
Pre-Pay – smart meters, AMI, MDM, CIS/Billing
Automated Outage Notification – smart meters, AMI, MDM, Outage/DMS
Real-Time Billing (no batch) – CIS/Billing
Call Center Education – CIS/Billing

Smart Appliances – Appliances
PHEVs – Automobiles/Charging Stations
Settle Across Utilities – CIS/Billing

Source: Desert Sky Group, LLC

Remember what initially worked in the deregulated marketplace? Simple billing and display of usage data. In order to limit consumer backlash on the rollout of new functionality and technologies, I propose an initial focus on fundamentals. What good is a PHEV that can charge from and power your home if the infrastructure cannot support it and the utility cannot bill and settle for the transaction?

The utility needs to first focus on the large amounts of data that will be coming into the back-office and then bill from it correctly and at scale. It should also focus on something that may sound simple but that consumers have never had – the display of their usage data.

To accomplish this I propose that utilities focus on a plan to deploy fundamental technologies with clear ROI in order to avoid falling into the "hype cycle". Obviously each utility's specific scenarios are different, but the following would represent such a prioritization of technology projects:

- Dynamic prices at scale in the current CIS/Billing system,
- Portals/consumer self service,
- Remote connect/disconnect for the consumers that have smart meters/AMI, and
- New communication channels.

The new communication channels are somewhat reliant on other industries such as the telecommunications and mobile space. By focusing on the fundamentals, the utility will ensure a higher chance of success for the functionalities listed early and for the functionalities to come.

Educating consumers on their usage is the starting point for other "smart" functionalities and technologies. Having the ability to bill for a variety of new pricing options will ensure that consumers do not have a bad taste in their mouth as many did when deregulation caused billing errors and delays.

By these early priorities I am not advocating entire enterprise change-outs. Some utilities will have an enterprise strategy and some a more modular approach. The modular approach can be more cost effective and therefore increase a utilities return on investment (ROI) in the early days of the smart utility hype. For instance, many are aware that a new CIS has limited return on investment because it is not necessarily a revenue generator but an absolute requirement to operate in the utility industry. However, adding modular components such as enabling tools for dynamic pricing at the residential level can have a much larger return than replacing the entire CIS for such functionality.

After addressing the fundamentals, utilities should begin to focus on distributed generation, pre-pay, automated outage notification, real-time billing (no batch), and call center education. Not that call center education should not be occurring throughout the entire lifecycle of the new "smart" functionalities as it certainly will. However, the call center will need additional education at this point as it starts to transform from a transactional in-bound based call center to a sales type organization that will need skills in educating consumers and potentially selling new products and services.

As the title of this white paper suggests, some of the new functionalities will not survive. At this point I am not certain that distributed generation will survive as a new "smart"

functionality in the short term. There may come a day when buying rooftop solar or garage located storage becomes economical and wide-spread but at this stage of the game, there are a lot of hurdles to overcome for it to become part of the mainstream. If it does survive then one would have to ask if the utility would play a role. Net metering of rooftop solar and billing for it involves the utility but buying a "magic box" from Lowes or Best-Buy that effectively disconnects a residence from the grid may have little to do with the utility. Granted there will be aspects that do survive, such as the potential high penetration of electric vehicles in the future. Should that occur, the utility would have a need to deal with them in a manner that may look like net metering for solar but on a different tariff potentially.

VI.   Conclusion

The smart utility is over-hyped. With history as a teacher, over-hyping is common and usually results in a delay of benefits occurring and a lower ROI. Focusing on the fundamentals would have saved millions of dollars during the retail deregulation period. The dot-com collapse probably would not have been averted, but again, millions of dollars could have been saved by a moderated transition from bricks and mortar to the Internet in the retail arena. Of course hind sight is always 20/20. Now that we find ourselves in a position that is all too familiar, we should take a hard look at what the smart utility looks like in the future and the technologies that will enable that vision to become a reality.

In my opinion when the consumer is involved, fundamentals for early focus include dynamic pricing, portals, remote connect/disconnect, customer self-service, and new communication channels as the key new functional aspects that utilities should be focusing on. Technologies that will enable these new functionalities are the CIS/Billing application, AMI, smart meters, MDM, and various communication networks. Security must also be a priority at all times when transitioning to new functionality that will require transmitting data that has not previously been communicated via a variety of networks.

Some of these technologies are new to the utility and will involve proper planning for successful implementation. However, the CIS/Billing application is not new to the utility. Taking a modular approach to adding new functionality as opposed to a wholesale change-out of the CIS/Billing application can save money, careers, and increase an ROI for an application that typically sees little to no return associated with it. There is a return for adding remote connect/disconnect functionality with an enabling CIS/Billing application. That return may be greatly diminished when it is buried within an entire CIS/Billing application replacement.

Years from now when the smart utility becomes the utility and the smart meter becomes the meter, we will look back on those who were more successful than others in implementing new functionalities with new or enhanced technologies. I am convinced the winners will be those who take a careful planned approach and let their consumers create the new requirements as they work diligently to fulfill those new requirements.

About the Author

Jon Brock is President of Desert Sky Group, LLC. He formed Desert Sky Group to address the needs of the utility and energy industries, specifically the need for independence and unbiased advice in changing markets. Formerly the co-founder and COO of utility advisor UtiliPoint International, Mr. Brock has over 22 years of experience delivering unmatched advice for today's utility and energy markets. In addition, Mr. Brock's expertise includes utility business design, business plan development and review, AMI, distribution technology, smart grid, customer service, outsourcing, benchmarking, business process optimization, quality assurance, and business infrastructure design and deployment. His previous work history includes experience at UtiliPoint International, SCIENTECH, Central and South West, Public Service Company of Oklahoma, and Amerada Hess. He has served on utility/energy-related boards in the member and advisory member positions and has provided testimony and audit services to state and provincial commissions related to utility technology and customer service investments. Mr. Brock holds a B.S. in management science/computer systems from Oklahoma State University and an M.B.A. from the University of Tulsa.