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Smart Grid Revolution Should Lead to Job Creation Boom

By Will McNamara

The following article is an abbreviated version of a larger study that KEMA prepared for the GridWise Alliance.

As President-elect Obama takes office later this month, the Smart Grid sector of the energy industry will be watching closely to see the extent to which promises made will be delivered. The new administration plans to establish a Grid Modernization Commission to facilitate the adoption of Smart Grid practices and direct the Secretary of Energy to (i) establish a Smart Grid Investment Matching Grant Program, (ii) conduct programs designed to deploy Smart Grid advanced technologies, and (iii) establish demonstration projects focused on Smart Grid advanced technologies.

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Inside

Did You Hear?

Pertinent Market News Over the Last Month

- Commonwealth Edison Company, a subsidiary of US-based electricity generator Exelon, has added 50 new Toyota Prius hybrids and plug-in electric hybrids to a fleet that now numbers more than 2,100 environmentally friendly vehicles. ComEd meter readers in Chicago and the company's Maywood office will use the 50 new Priuses, including 10 Priuses that have been specially converted into electric plug-in hybrids.The plug-in conversion is expected to significantly increase fuel efficiency by providing greater electric-drive capability.

- Echelon Corporation announced that the technologies underlying Echelon's LonWorks platform have been approved as a global control standard by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). Tens of millions of LonWorks based devices have been installed in a wide variety of applications worldwide – in buildings, factories, trains, electric utilities, coal mines, and homes around the world.

- Officials of Hawaiian Electric Co. and Sensus Metering Systems announced a 15-year definitive agreement for mass deployment of Sensus Metering Systems' FlexNet wireless smart grid solution. The decision comes after two years of rigorous field testing of the FlexNet system,

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Further, a high-level DOE advisory panel is likely to recommend that the department create an office dedicated exclusively to the development of Smart Grid technologies and policies, according to the panel's deliberations and draft documents. The DOE Electricity Advisory Committee, tasked with submitting policy recommendations to the incoming Assistant Secretary for Electricity Delivery and Energy Reliability, will likely recommend that the DOE create a "Smart Grid Program Office," according to the draft. The office would disseminate information on Smart Grid, develop Smart Grid educational materials for state regulators, and coordinate various Smart Grid activities with other organizations.

All of this bodes well, not only for the utilities and technology providers actively developing the Smart Grid's future, but also for the U.S. economy as a whole, which as we all know is facing the worst financial challenges in many decades.

During the next four years, KEMA's projection anticipates that a potential disbursement of $16 billion in Smart Grid incentives would act as a catalyst in driving associated Smart Grid projects that are worth $64 billion. The impact of these projects would result in the direct creation of approximately 280,000 new positions across various categories, of which more than 150,000 will be created by the end of 2009. Furthermore, we estimate that nearly 140,000 new direct jobs would persist beyond the Smart Grid deployment as permanent, on-going high-value positions.

where thousands of smart electric meters were tested in a variety of settings, terrains and environments on Oahu. Subject to Hawaii Public Utilities Commission approval of Hawaiian Electric's AMI plan, approximately 430,000 residential and commercial electric customers will be transitioned to the Sensus FlexNet smart meters between 2009 and 2015. Just 19 tower network sites throughout Oahu, Maui, and Hawaii Island will provide the advanced, two-way radio frequency network coverage based on Sensus' primary use licensed frequency, which allows for secure, reliable transmissions over a wide range.

The indirect jobs, while more difficult to quantify, are substantially larger. Smart Grid is universally understood to be the key enabling technology for the nation's ambitions for renewable energy development, electric vehicle adoption, and energy efficiency improvements. In the absence of Smart Grid investments, many more hundreds of thousands of jobs in these related sectors will either be deferred or not created due to the inability of the electric infrastructure to incorporate these new technologies. Smart Grid is to the electric energy sector what the Internet was to the communications sector and should be viewed and supported on that basis.

Job creation projections by category are summarized in Exhibit 1. These jobs are created by Smart Grid projects

Exhibit 1: Total Smart Grid Jobs Created and Transitioned

Category	Deployment Period (2009 to 2012)	Steady State Period (2013 to 2018)	Comments
Direct Utility Smart Grid	48,300	5,800	Direct utility jobs created by Smart Grid programs
Transitioned Utility Jobs	-11,400	-32,000	Utility positions (e.g. meter reading) transitioned to other roles
Contractors	19,000	2,000	External installation and service providers
Direct Utility Suppliers	117,700	90,000	Smart Grid equipment suppliers (e.g. metering)
Indirect Utility Supply ..... Chain	79,300	22,500	Suppliers to Direct Utility Suppliers
New Utility / ESCO Jobs	25,700	51,400	New jobs from new Smart Grid business models
Total Jobs Created	**278,600**	**139,700**	**Total new jobs at end of each period**

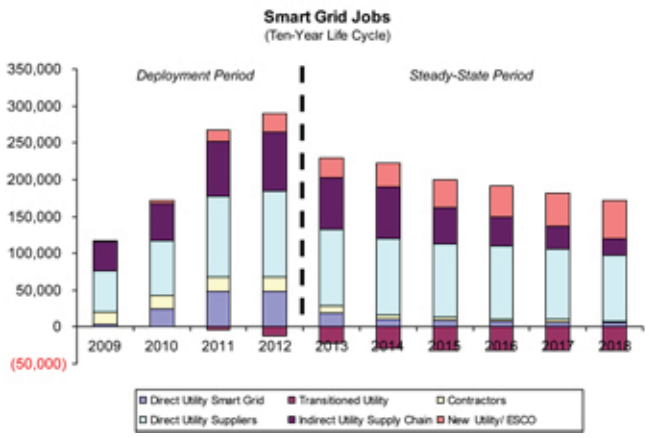
which are already planned and “shovel ready”; however, some await final regulatory approval. The impetus of Smart Grid incentives should result in rapidly advancing the approval and commencement of these projects in 2009, in time to spur the employment growth forecast between 2009 and 2012, as shown in Exhibit 2, and to create 150,000 new jobs by the end of 2009.

These positions would result from a number of key factors that are driven by the accelerated deployment of Smart Grid technologies and systems over the next 10 years. The analysis examines the net impact of increased jobs that would be required to satisfy the needs in the following areas:

- Direct Utility Smart Grid - this category is the net of the addition of new skills and transition of displaced, lower-skilled workers
- Contractors – employees and/or outside services providers who would be employed to accelerate the installation and deployment of these services
- Direct (Tier 1) Utility Suppliers - supply chain providers whose equipment would be procured and deployed by utilities. This would include:
  - Meter manufacturers
  - Intelligent Transmission and Distribution (T&D) automation device producers
  - Communications system products and services providers
  - Software system providers and integrators
  - Indirect Utility Supply Chain – suppliers of raw materials and finished components to the direct, Tier 1, equipment manufacturers. Many meter manufacturers, for example, source components from third-party suppliers, who are expected to meet the volumetric requirements associated with market growth
  - New Utility/ Energy Service Companies (ESCOs) - providers and aggregator jobs created in the broad “Energy Services” sector, whether at utilities or other independent firms, which would be derived from the richer and more varied business of structuring and managing consumer relationships with energy providers. While largely non-existent today, there is considerable expectation that multiple products and cottage industries will emerge in relation to the broader adoption of automation and communications technologies by the utility industry. As previously referenced, this includes new jobs formed for related service industries, including the installation, servicing, and operation of new technologies such as rooftop solar energy and Home Area Network devices and systems such as thermostats, display units and other new technologies.
- Additionally, there are many Industries related to the utility sector whose business will be accelerated by the adoption of these devices. Job creation in these industries is not calculated as part of the Smart Grid jobs creation. Those jobs are often quoted under the heading of those industries. This would include:
  - Renewable Energy Source suppliers whose jobs would be stimulated and accelerated by the advancement of enabling technologies
  - Distributed Generation suppliers of products and services for which demand would increase as a result of increasing end-user demand for the products
  - Plug-in Electric Hybrid Vehicles (PHEV) providers whose products have a success dependency on supporting charging and billing systems

The jobs created are shown over time in Exhibit 2 below.

Exhibit 2: Smart Grid Jobs, Ten-Year Life Cycle



Direct Utility Employees Job Estimate

Presently, approximately 70 utilities have filed some form of AMI plan which also include pilots of this technology. Many have also filed business cases for implementation approval with their respective regulatory body. This activity represents progress in nearly 30 states.

Assuming a full-scale implementation for these AMI programs, the total number of electric meters that would be involved represents a potential of more than 70 million

meters, though the total number of projects that are approved to-date represent a market size of approximately 30 million meters. Likewise, since many of these projects are in early stages of deployment or are in limited deployment pilots, fewer than 1 million AMI devices are actually deployed.

Typical AMI and Smart Grid regulatory filings present a business case with favorable benefit-to-cost ratios that may also include social benefits such as improved reliability and lower wholesale energy prices at peak. When these societal benefits are also factored in, the overall consumer benefit will further improve the financial attractiveness of AMI and Smart Grid as an investment.

Implementing a Smart Grid represents an enterprise-wide initiative and impacts virtually the entire utility organization. Therefore, these projects will require a wide range of new skills, education, and talent. The list on this page and the following page describes the typical position types that will have full-time job allocations at some level. These jobs would be expected to be filled by a mix of existing utility employees and outside consultants.

Typically, utility jobs such as equipment installation and testing require specific training and experience. It normally takes several years to qualify to do this work. Given the level of training required for these jobs, the use of outside resources in this area would be limited to existing outside contractors that are already are under contract to utility companies. However, there could be more extensive use of outside resource for IT, communications, and other system integration and support services.

Calculation

There are an estimated 150 million meters in the U.S. This number has to be reduced by 10-15 percent to account for the deployments already underway in California and Texas and other utilities that are already in AMI deployment, and where many of the jobs are already being created. So we used 128 million meters as a remaining population. To facilitate the simplicity of the calculations, we also assumed that there would be approximately 128 Smart Grid projects at 1 million meters per project. We then used the $500 million dollar projected projects cost, times 150, to get the estimated $64 billion Smart Grid spend.

Smart Grid Position	During Implementation	Steady-State Position
Project Office Leadership		
- Project Manager	X	
- Executive Assistant	X	
- Lead consultant	X	
Program Support		
- Scheduler(s)	X	
- Budget Analyst	X	
- Contracts Administrator	X	
- Resource Manager	X	
- Communications Manager	X	
- Change Management Lead	X	
- Legal Support	X	
Quality Assurance		
- Vendor Management	X	
- Test and Verfication Supervisor	X	
- Performance Analysis	X	
Planning		
- Requirements Development Manager	X	
- Business Case Manager	X	
- Telecom/Communications	X	
- IT Interface (software, DB)	X	
- Grid Upgrades (e.g., Dist. Auto.)	X	
- Regulatory support for rate planning	X	
- Marketing and Outreach planning	X	
Functional Support		
- Rate Design Implementation	X	
- Marketing Implementation	X	
- Public Relations	X	
- Revenue Cycle services	X	
Implementation Operations & Support		
- Supply Chain and inventory Mgmt.	X	X
- Logistics	X	X
- Meter Receipt Testing	X	X

We could project a "potential" Smart Grid jobs impact assuming that every eligible utility in the U.S. moved to full deployment immediately. However, we realize that some reduced percentage of implementation exists based on local power system economics, regulatory perspectives, public/private utility ownership, and the level of Smart Grid incentives. Additionally, there will be some limitations on the ability of the utilities and their suppliers to find and train some of the more demanding positions created by Smart Grid. We therefore used an estimate of the percentage of potential Smart Grid projects that start in each of the four years, 2009-2012, (as shown in Exhibit 8) of 30 percent, 40 percent, 25 percent, and 5 percent, respectively. We also used the Smart Utility projected budget over a three to five year deployment period as a proxy for how labor and other costs are dispersed over time. The Smart Utility filing has 30 percent of the total budget planned as utility labor; at an average cost of $75,000 per Full Time Equivalent (FTE), which we can then translate the budgeted spend over time into FTEs over time. The projects started per year and the Smart Grid spending is shown in Exhibit 3.

In addition, once a Smart Grid system is deployed, there will be several thousand utility jobs needed to maintain the Smart Gird. We estimated this number as just under 5,800 new positions. The on-going number is not expected to be higher due to the operational efficiencies gained.

Broad Industry Job Estimates

Accelerated deployment of a Smart Grid would provide an incentive for accelerated development and deployment of new technologies, such as plug-in hybrid electric vehicles (PHEVs), smart appliances, home automation hardware and software, and distributed renewable energy resources (e.g., rooftop photovoltaic systems, small wind turbines, geothermal heat pumps).

By enabling accelerated deployment of these technologies, an investment in the Smart Grid has the potential to create additional jobs in these sectors. As these are emerging technologies in a sector of the economy with significant entrepreneurial activity, it is difficult to assess just how many jobs could be created in these sectors. One proxy for identifying the level of economic growth that could be anticipated is the interest from venture capital groups like Goldman Sachs and Kleiner Perkins Caufield & Byers (KPCB) and the commitment of funding from technology powerhouse Google.

Smart Grid Position	During Implementation	Steady-State Position
- Meter disposal	X	X
- Meter Installation (incl. field testing)	X	X
- Grid Component Installation Mgmt.	X	
- Transformers	X	
- Reclosers	X	
- Sensors	X	
- Communications Installation Mgmt.	X	X
- IT software upgrades, replacement and new applications	X	X
- CIS	X	
- AMI	X	
- MDM	X	
- WAM	X	
- Net Metering Applications	X	
- OMS	X	
- DMS/SCADA	X	
- Demand Response	X	
- Asset Management	X	
- Customer Service (Call centers, account managers)	X	X
Functional Specialties		
- Special Metering	X	X
- Outage Management	X	X
- Net Metering (Solar, Wind, other DG)	X	X
- Prepaid Services	X	X
- Demand Response	X	X
- Special Billing	X	X
- Vehicle to Grid	X	X
- Theft prevention	X	X
- Field Technical support	X	X
- Distribution Automation	X	X
- System Planners & Engineers	X	X
- Asset Management	X	X
- Power Quality	X	X

Exhibit 3: Projected U.S. Smart Grid Projects and Spending

No. of Programs Started	Budget	2009	2010	2011	2012	2013	2014	2015	2016
38	$19,200	$2,880	$4,800	$5,760	$2,880	$2,880			
51	$25,600		$3,840	$6,400	$7,680	$3,840	$3,840		
32	$16,000			$2,400	$4,000	$4,800	$2,400	$2,400	
6	$3,200				$480	$800	$960	$480	$480
Annual Spend	**$64,000**	**$2,880**	**$8,640**	**$14,560**	**$15,040**	**$12,320**	**$7,200**	**$2,880**	**$480**

In June 2007, Google announced the launch of the RechargeIT initiative to accelerate adoption of PHEVs. Google awarded $1 million in grants and promised another $10 million to fund development, adoption and commercialization of PHEVs and vehicle-to-grid technology. In July 2008, Google awarded $5.8 million to ActaCell, to advance commercialization of its lithium-ion battery, and $2.5 million to Aptera, for market integration of its all-electric Typ-1 supercar.

VentureBeat, an online portal that tracks venture capital funding, reported in May 2008 that funding in the Smart Grid space was "hot and heavy," with well over half a dozen large fundings in the months preceding the article. Among the companies receiving funding were Optimal Technologies ($25 million from Goldman Sachs), a start-up company with technology to manage electricity allocation on local utility grids, and SmartSynch ($20 million from Credit Suisse), a company that supplies major meter manufactures with internal communication technology for their smart meters. In October 2008, KPCB announced that it was investing $75 million through its Green Growth Fund in Silver Spring Networks, a Smart Grid solution provider with technology to help consumers manage their energy use more efficiently.

In addition to increasing venture capital investment in the "clean" technology sector, and Smart Grid in particular, electric utilities are investing in distributed renewable generation, for which the deployment of a Smart Grid is an enabling factor. In March 2008, Southern California Edison (SCE) announced an $875 million program to install 250 MW of solar photovoltaic (PV) systems on commercial rooftops throughout their service territory. The 1 to 2 MW utility-owned PV systems will be installed on unused commercial rooftops and connected directly to the distribution system to meet the energy needs of the fastest growing areas in the region. The SCE program is intended to drive down the current cost of solar photovoltaic systems and to help California meet goals set forth in the Renewable Portfolio Standard and the California Solar Initiative ("Million Solar Roofs").

The SCE program has been a model for other electric utilities trying to achieve goals for renewable and distributed energy, including Duke Energy, which has proposed a $50 million program to install 16 MW of solar PV systems at up to 850 North Carolina sites, including homes, schools, and commercial and industrial facilities. Smart Grid technologies, including smart meters with net metering capabilities, greatly facilitate the increasing penetration of distributed renewable energy technologies, which creates jobs for solar system manufacturers and installers.

Summary and Recommendations

The Obama-Biden plan for Smart Grid incentives would compensate qualifying Smart Grid projects for up to 25 percent of the initial investment cost. By reducing the utility investment by 25 percent this will make the cost benefit analysis that much more favorable.

In conclusion, Smart Grid incentives should focus on achieving the benefits of Smart Grid. The Grid Modernization Commission can be a vehicle for achieving best practices and comprehensive benefits from Smart Grid projects. Smart Grid investments have the potential to accomplish numerous benefits for the industry and the nation, including:

- Generate 280,000 new positions, many of which are high-value.
- Spur development of a domestic Smart Grid supplier's industry, which will create 140,000 ongoing high-value jobs.
- Position the U.S. as a global supplier of Smart Grid technologies, given the parallel rising interest in international Smart Grid efforts.

To view the full report prepared by KEMA for the GridWise Alliance, visit us at www.kema.com/INC and click on the side link entitled *The U.S. Smart Grid Revolution*.

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Status Report on Plug-In Electric Vehicles and Plug-in Electric Hybrids

By Aaron Schneider

The plug-in electric vehicle is one of the fundamental components of creating a new energy economy in the U.S. and worldwide. The development and production of electric vehicles (EVs) for mainstream consumption will lead to a significant change in the transportation and energy industries. The replacement of gas stations with electric re-charging stations at homes and on the road is in the near future. Furthermore, the steep rise in oil price this summer, in combination with a growing global awareness of the energy and environmental challenges ahead, has served to ignite the development of a plug-in electric vehicle manufacturing industry in the U.S. and abroad. Electric vehicles are a major area of interest to an incredibly wide variety of stakeholders. Major car manufacturers, utilities, governments, technology start-ups, and individuals have all demonstrated and expressed a strong commitment towards producing electric vehicles for mainstream consumption. President-Elect Obama has made the development of electric vehicles one of the signature components of his proposed stimulus bill. There is a strong need in the U.S. for a revamped and reconstructed transportation infrastructure. The plug-in electric vehicle represents an incredible opportunity to create a new transportation system that is efficient, robust, and sustainable. However, the current situation is still a mash-up of technologies, ideas, and innovations. A number of trends are emerging and the barriers are becoming more defined. Despite the current economic recession and the drop-off in oil price, large-scale production of plug-in electric vehicles (PEVs) and plug-in electric hybrids (PHEVs) from major car manufacturers appears imminent within the next two to four years.

What are the plug-in plans of the major U.S. and international car manufacturers?

The major U.S. car manufacturers appear to be pursuing a course towards producing more hybrid vehicles with a goal of eventually manufacturing plug-in hybrid electric vehicles for mass consumption. International manufacturers appear to be more focused on producing pure electric plug-in vehicles. In general, U.S. manufacturers are definitively behind in offering plug-in electric vehicles (pure electric and/or hybrid). Financial constraints, the current economy, lack of developed technology, and an inadequate U.S. supply chain for plug-in electric vehicle parts are all major barriers. Both U.S. and international manufacturers have begun to form strategic partnerships within the growing plug-in electric industry with the goal of developing and establishing a robust supply chain. In terms of technology trends, the primary energy storage device being developed and used in PEVs and PHEVs continues to be a lithium-ion battery.

The following is an overview of the efforts of current U.S. in comparison to international car manufacturers:

United States

General Motors is planning to begin producing its first plug-in electric vehicle for mass consumption in November 2010. The car is being built with an electric battery mileage of approximately 40 miles. In addition, the car will feature a six to seven gallon gas tank providing the car an overall range of approximately 400 miles before refuel.

General Motors plans to manufacture their own lithium-ion batteries in lieu of forming a strategic partnership with an independent energy-storage company. The batteries will be recharged via a 110-volt household outlet or a 220-volt outlet. Recharge times are estimated to be 6.5 hours for a 110-volt recharge and 3 hours for 220-volt recharge. The estimated price range of the vehicle is in the $30,000 - $40,000 price range with the price initially starting off at the upper-end. The high-price of the car, lack of electrical vehicle manufacturing experience and an undefined supply chain are significant challenges to address for GM.

Ford has made significant inroads in developing hybrid vehicles but remains several years away from offering plug-in electric vehicles. The company plans to offer both plug-in electric and plug-in hybrid vehicles in the next four years and recently announced that it would offer a small, plug-in electric vehicle in 2011. The plug-in electric vehicle would have a range of 100 miles per charge and be powered by a lithium-ion battery. In terms of its supply chain for plug-in vehicles, this January, Ford entered into a strategic alliance with Magna International, a major Canadian auto parts supplier. Magna has proven that it can engineer Ford cars to run on battery power and the new alliance will increase Ford's ability to quickly begin producing plug-in electric and plug-in hybrid vehicles.

Chrysler faces the greatest difficulties in producing plug-in electric vehicles. While the company announced its intentions to begin selling a plug-in electric vehicle by 2010, no further details regarding the car have been forthcoming. The company plans to have four plug-in electric vehicles available by 2013. However, the combination of financial constraints and the lack of EV manufacturing experience are significant barriers towards development that the company must address.

International

Toyota has a number of initiatives related to plug-in electric vehicles and plug-in hybrids, and retains a significant advantage in producing both types of plug-in vehicles due to its wealth of experience and tremendous success in manufacturing hybrid vehicles. As the largest producer of hybrid vehicles in the world, Toyota has established a reliable battery supply for production through a partnership with Panasonic. The current hybrids in production by Toyota use nickel metal-hydride batteries; however, Toyota and Panasonic plan to add a separate line at the assembly plant to produce lithium-ion batteries for future plug-in electric vehicles.

The company plans to lease its first-generation of plug-in electric vehicles to fleet operators in order to measure performance before pursuing high-volume sales, and recently announced that it will begin delivering 500 plug-in hybrids with lithium-ion batteries at some point in 2009 (Bloomberg News). In addition, Toyota announced that it plans to offer a pure electric plug-in vehicle to U.S. customers by 2012. The planned vehicle will have an estimated range of 50 miles.

In addition, a number of small companies have begun offering conversion services for current Toyota hybrid owners to make their vehicles plug-in capable. The trials and successes of plug-in conversion companies is likely to create a small 'electric conversion' industry due to the large number of hybrid vehicles that Toyota and other car manufactures plan to produce in the next five to ten years. A small indicator of the potential of this industry is the recent ComEd purchase of ten converted plug-in hybrid electric vehicles out of ComEd's overall purchase of fifty Toyota hybrids. ComEd plans to use the vehicles for its meter readers. It will be interesting to see if other utilities decide to explore the ComEd route.

Renault-Nissan has begun signing electric vehicle and infrastructure deals with countries, U.S. states, and cities throughout the world. While the provisions of these electric vehicle and infrastructure agreements have differed from deal to deal, the basic Nissan offering has remained the same: a pure electric vehicle with a range of 100 miles that will plug into local recharging stations provided by a local government, utility, or business.

Renault-Nissan EV Infrastructure Partnerships

- Better Place - Partnerships for Israel, Denmark, and Portugal
- EDF Utility Company – Partnerships for France and the City of Yokohama, Japan
- State of Tennessee and The Tennessee Valley Authority
  - Governor signed memorandum of understanding in July
  - No Charging stations installed to date
- State of Oregon and Portland General Electric
  - Nissan will supply vehicles to the state
  - State and PGE will create an EV charging network
  - PGE has installed six charging stations to date
  - Oregon Governor is proposing a $5,000 tax credit to anyone who buys zero-emission vehicle
- Principality of Monaco

Mitsubishi has developed a plug-in electric vehicle using a lithium-ion battery and plans to sell approximately 2,000 electric vehicles in Japan this year. Japanese incentives for electric vehicles are close $16,000 dollars off the retail price according to Mitsubishi Research and Design. In addition, Japan offers reductions in road-tax and registration fees for electric vehicles. These incentives have made vehicle costs a non-issue for Mitsubishi and have allowed the company to fast-track the development of its EV division and also compete price-wise against standard vehicles.

BYD Auto is emerging as one of the leaders in plug-in electric vehicles. The company has already begun selling plug-in electric vehicles in China and plans to introduce their cars to the European and U.S. markets in 2010. The vehicle being produced now is based upon a lithium-ion battery and has a range of 50 to 60 miles before a recharge is needed. In contrast to the major U.S. manufacturers, BYD's primary experience is in developing electric batteries for vehicles. BYD has invested significantly in time and money for researching and developing plug-in electric vehicles, and its wealth of experience in developing lithium-ion batteries is a tremendous asset. BYD appears poised to be one of the leading global manufacturers of plug-in electric vehicles.

Honda continues to pursue a different course in the electrical vehicle industry and is largely eschewing the plug-in electric market. Honda is seeking to further develop its line of hybrid vehicles with a specific focus on reducing the price of the vehicle to customers. Honda has also devoted considerable resources towards producing a hydrogen fuel-cell vehicle.

Conclusions

The major manufacturers are also facing increasing competition from smaller start-up companies that exclusively manufacture and produce plug-in electric vehicles. The variety and intensity of competition in the plug-in electric vehicle industry is a strong signal that plug-in vehicles will soon be available for mass consumption. U.S. car manufacturers continue to remain behind the competition, although the U.S. energy-storage technology sector continues to develop. Foreign manufacturers in China and Japan have made significant headway towards offering plug-in electric vehicles for mass consumption and appear poised to deliver within the next two years.

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The Envision Center: Demonstrating new technologies for tomorrow's smart grid

By Tom Myers

KEMA is partnering with Duke Energy in the development and operation of the Envision Center, an interactive exhibit demonstrating how new energy technologies are transforming today's power delivery system into tomorrow's smart grid. This article addresses key questions and information about KEMA and the Envision Center.

What is the Envision Center?

The Envision Center, located in Erlanger, Kentucky (just a few miles from the Cinciannati airport), features modernized power equipment, a "smart" home, an apartment complex, and a power delivery work center. Demonstrations of smart grid functions are conducted in a theatrical style at each of these four scenes.

What is KEMA's relationship with Duke Energy and the Envision Center?

KEMA has been involved with Duke Energy for several years on their utility of the future and smart grid programs - from the development of use cases to the support of current field deployment efforts. KEMA's arrangement with Duke regarding the Envision Center is a natural extension of this relationship. The primary objec-

tive of the relationship is to mutually promote the merits of smart grid infrastructure investments to the utility industry by providing demonstrations, explanatory displays and facilitated tours of relevant automation technologies, processes and utility offerings. KEMA's objectives are aligned with the Envision Center's goals to further stakeholder education and interaction, influence industry innovation and promote adoption of smart grid technologies.

The three-year agreement calls for financial investments, office space and shared access to the center.

What does KEMA bring to this relationship?

KEMA brings much more than just a name on the door. KEMA's experts were a part of the project team from conceptual design through construction of the center. Going forward, KEMA will use its extensive utility experience in the U.S. and Internationally to provide ideas and strategies for future enhancements to the center. In addition, KEMA will have consulting personnel staffed at the center to support meetings, tours, and other activities.

How does KEMA plan to use the center?

KEMA plans to use the center to raise awareness among clients from around the globe about KEMA's expertise in building the utility of the future. KEMA will conduct tours to demonstrate aspects of the smart grid and KEMA's capabilities. KEMA will also host events to educate industry participants (e.g., utilities, vendors, regulators, energy media) about smart grids to facilitate collaboration on common issues, such as standards. The Envision Center setting is conducive to brainstorming and working sessions by having a 30-person state-of-the-art conference room adjacent to the exhibit area. This setting facilitates well-grounded discussions by having the actual equipment and technologies close at hand for reference. KEMA anticipates using this conference room to host a variety of internal and external meetings.

Where can I find out more information?

Tom Myers from KEMA and Mike Rowand from Duke will presenting a session about the Envision Center at the DistribuTECH conference in San Diego on Wednesday afternoon, February 4, 2009. Their session will discuss information about smart grid demonstration centers, Duke's experience with the Envision Center, and lessons-learned from the operation of the center up to this point. Tom Myers will also be available at the KEMA booth during the conference to provide information and answer questions.

How are visits arranged?

Since the Envision Center is a Duke Energy-owned facility, all visits and tours arranged and conducted by KEMA require advance planning. Certain steps must be taken to fully leverage the strategic value of KEMA's investment in the center and the relationship with Duke Energy. Each tour is also a unique experience that should be crafted to meet specific expectations. For any questions regarding meeting arrangements or requirements, please contact Tom Myers at thomas.myers@kema.com or directly at +1 (704) 905-6208.

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