



Initial Report on the Feasibility of:  
A Smart Grid and Green Technology Development Initiative  
Between  
The State of Illinois and Korea

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This report provides observations from initial research efforts into the feasibility of developing a substantial collaborative agreement between the State of Illinois in the United States and the Country of Korea. The focus of this agreement would be to develop and apply hardware, software, business/technical processes, energy policy, and human resources that will enhance the reliability of the electricity grid and provide positive economic and environmental benefits to both the People of the State of Illinois and the People of Korea. These reliability, economic, and environmental improvements are possible with a host of new technologies, processes, and policies that improve the quality and efficiency of the electricity grid. Together, these efficiency and quality improvements are commonly referred to as components of a modern or “smart grid.”

**The following sections describe:**

- The smart grid
- The status of smart grid development and deployment in Illinois
- Opportunities for collaboration between Korea and Illinois
- Potential partnerships
- Critical components of successful collaboration
- Possible collaboration counterparts and timeline

## I. The Smart Grid<sup>1</sup>

The existing electricity infrastructure of both Korea and Illinois is facing a set of unprecedented challenges. These challenges include:

**Increased likelihood of a carbon constrained future to mitigate the effects of human-induced climate change:** Environmental concerns will continue to place restrictions on the uses of traditional fossil fuel energy sources as the world prepares for, and adapts to, a carbon-constrained future.

**Significant new infrastructure investment:** Huge new investment needs are required to both replace a rapidly aging electricity infrastructure as well as build to meet new demands. In addition, electricity infrastructure will compete with other public infrastructure needs in the coming years. Investment in the roads, railways and public transport networks, water, sewer, natural gas and oil delivery systems, schools, waterways, airports, and other public infrastructure investment is expected to balloon as existing infrastructure is replaced and new infrastructure is added.

**New uses of electricity:** Electricity has become a more important energy source as new digital technologies and sophisticated production techniques penetrate markets, which adds to the total demand for power and adds stress to the power grid. The push to electrify the transportation sector will only magnify these problems.

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<sup>1</sup> A more detailed discussion of these issues can be found in Empowering Consumers Through a Modern Electric Grid, a Report of the Illinois Smart Grid Initiative, available at <http://www.cnt.org/repository/ISGI.FinalReport.pdf>

**Continued globalization:** Local economies will continue to feel pressure from the global flow of capital. Power cost and quality for both consumers and producers will gain importance as local economic growth begins to depend more heavily on the electric grid.

**Increasing energy prices:** Although the global economic crisis has put downward pressure on energy prices, all indications are that as growth return and demand from the globalization of the economic system increases, the competition for energy resources will only become more acute.

The scope and scale of these challenges is unprecedented, and meeting them will require a level of efficiency in the electric system beyond anything achievable in the current system. This level of efficiency requires a system that is much smarter, self-aware and interconnected than the system that we currently have. This is commonly referred to as the smart grid. However, because of the scale and scope of these changes a workable definition of “smart grid” is far more than just an engineering definition. The smart grid is an entirely new system affecting both energy delivery and energy consumption behavior.

There are four major components of this new system:

**Smart technologies** – Smart technologies encompasses both utility-side technologies, better equipment along the wires and poles of the distribution system that turn the grid a dynamic system, as well as consumer-side technologies that encompass appliances and devices that can respond to information about energy prices and grid conditions and adjust energy consumption accordingly.

**Smart rates** – Smart rates provide opportunities for consumers to reduce their electric bills through energy management, taking advantage of the opportunities that new technologies enable. Such rates must recognize and reward the shifts in risk management that new and innovative rates will create.

**Smart consumers** – Smart technologies and smart rates create opportunities for consumers. But opportunities are not enough. If those technologies and rates aren't used by consumers, their value is lost. Robust, clear and ongoing educational and marketing efforts will be essential to enabling consumers to make smart choices that optimize their energy use and cost and benefit the energy system.

**Smart governance** – To take full advantage of the opportunities of the smart grid requires changes in the traditional relationships between utilities, customers and regulators. New rules may be needed for a range of issues from establishing standards of service, consumer protections, rate making and investment decisions, reliability standards with new rewards and penalties, and more.

There is strong federal support for the smart grid from the office of US president Barack Obama, and a number of efforts are underway to standardize deployment in a way that creates a truly interoperable system that provides the efficiency needed to deal with the significant challenges facing the current system.

## II. Status of Smart Grid Development and Deployment in Illinois

Smart Grid development efforts began in Illinois in 2008 when the Center for Neighborhood Technologies (“CNT”) formed the Illinois Smart Grid Initiative (“ISGI”), a public-private working group chaired by Chicago Mayor Richard M. Daley and Former Speaker of the US House, J. Dennis Hastert<sup>2</sup>. The purpose of the ISGI was to engage Illinoisans in examining the nature and potential benefits of a modernized electric grid, and to map a policy path for achieving those benefits for consumers and the economy. The ISGI held a series of roundtable meetings in Chicago during the summer and fall of 2008. These meetings featured presentations and discussions about the smart grid concept, and focused on public policy formulation. A final report was issued in April of 2009<sup>3</sup>.

Following these meetings, the utility regulator, the Illinois Commerce Commission (“ICC”), ordered the establishment of smart grid collaborative efforts in Illinois. The ICC evaluated a smart grid deployment proposal made by Commonwealth Edison Company (“ComEd”), and based upon a proposal made by the Citizens Utility Board (Illinois largest non-profit utility consumer advocacy organization), determined that the public interest could best be served by developing pilots and strategic plans for smart grid deployment in Illinois through collaborative efforts. Two specific efforts were initiated. The first was a series of workshops evaluating advanced metering infrastructure (“AMI”) and tasked with developing AMI project goals, timelines, and evaluation criteria (hereafter the “AMI Collaborative”). The AMI collaborative was completed in early 2009 and resulted in an AMI pilot project in ComEd’s service territory which was approved by the Commission, and will be operational during 2010. The second effort was a bigger broader Statewide Smart Grid Initiative (“SSGI”) to consider the potential costs and benefits of smart grid implementation and develop a strategic plan for such implementation. This activity is ongoing and is scheduled to conclude by the end of 2010.

The ICC developed the following policy objectives for the SSGI to evaluate:

- 1) definition of a smart grid and its functionalities;
- 2) principles Illinois should use to guide smart grid planning and deployment, for example, interoperability, open architecture, and non-discriminatory access;
- 3) uniform standards;
- 4) methods of estimating, calculating and assessing benefits and costs, including evaluation of non-quantifiable benefits (and costs);

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<sup>2</sup> The ISGI was funded by the Galvin Project, Inc and assisted by the Galvin Electricity Initiative and the U.S. DoE Modern Grid Strategy team.

<sup>3</sup> The report can be found at: <http://www.cnt.org/repository/ISGI.FinalReport.pdf>

- 5) implications of smart grid technology for future policies regarding rate design, consumer protection, and customer choice;
- 6) effect of statutory renewable resource, demand response and energy efficiency goals on smart grid planning and implementation;
- 7) consumer education and dissemination of information about smart grid technologies, demand response programs and alternative rate structures;
- 8) access by electricity market participants to smart grid functionalities;
- 9) data collection, storage, management, security, and availability to third parties;
- 10) standards for interconnection of third party equipment;
- 11) mechanisms to flow through to customers any utility smart grid revenues;
- 12) adoption of new demand response programs; and
- 13) open architecture and inter-operability standards for technological connectivity to the RTO and/or ISO to which a utility may belong.

### **ComEd's AMI Pilot**

Following the AMI collaborative process, the ICC approved a one-year AMI pilot for ComEd, slated to begin in 2010. This is the first smart meter project in the US designed to comprehensively test the full customer experience with AMI technology, including how its use will change customers' energy consumption. This ground-breaking pilot is also testing how technology can improve service reliability, help customers make smarter decisions about energy use, and contribute to lower energy costs and reduced carbon emissions.

Approximately 131,000 smart meters will be deployed in 11 suburban communities and in the City of Chicago as part of one of the most comprehensive tests of smart meters in the nation. As of the date of this report, ComEd has begun to install meters. The Company is studying the meters and associated infrastructure by conducting field testing and analysis of AMI systems and their ability to deliver operational and reliability benefits to ComEd and customers. Through a variety of Web interfaces, in-home displays, and rate design options associated with about 7% of the meters, ComEd's AMI pilot is testing many aspect of the customer experience, including how customers can maximize their personal benefit from the information available through the AMI system.

### **Vendor Relationships**

ComEd has announced that it plans to use GE meters" and Silver Spring Networks (SSN) open standards-based, secure, wireless network communications software and services in support of the project.

The Company has also developed vendor relationships with Itron, and Accenture to manage the information necessary to implement the AMI system.

Requests for proposals have been issued and are outstanding for other aspects of the pilot. Potential vendors include Tendril networks, Open Peak, and CNT

### **Funding from the US Government**

In mid-February of 2009, President Barack Obama signed the American Recovery and Reinvestment Act of 2009 [ARRA], a massive spending bill that included two US Department of Energy (“DOE”) grant programs directed to stimulate the deployment of smart grid development and deployment. These programs include:

#### **\$3.375 billion for Smart Grid Investment Grant Program (“SGIG”)**

DOE’s Smart Grid Investment Grant Program provides matching grants of up to 50 percent for investments planned by electric utilities and other entities to deploy smart grid technologies.

#### **\$615 million for Smart Grid Demonstration Projects (“Demonstration Grant”)**

DOE’s Smart Grid Demonstration Grant Program provides funding for smart grid demonstration projects that demonstrate regional benefits, utility scale energy storage technologies, and grid monitoring capabilities.

### **Project Proposal for stimulus funding made in Illinois**

#### **Commonwealth Edison**

ComEd submitted a proposal for \$175 million to support a project expected to cost \$350 million. ComEd’s proposal included a comprehensive project involving customer systems, advanced metering infrastructure, electric distribution systems and electric transmission systems. ComEd proposed to complete the project within 2 years, as DOE preferred.

In addition to seeking funding for the meters approved as part of the AMI pilot, ComEd sought funding for the following additional investments:

- The installation of an additional 120,000 AMI meters to complete deployment of meters throughout the Maywood operating center, which was chosen for the AMI pilot;
- The installation of 19,000 advanced two-way air conditioning control switches capable of communicating with the AMI meters;
- The installation of 2,000 advanced meters as part of a joint project with the Chicago Building Owners and Managers Association to test the ability of large office buildings to aggregate demand response;

- The installation of 59,000 AMI meters in two Chicago communities where they will be integrated with available energy efficiency services and associated environmental initiatives in those communities permitting the demonstration of smart grid's ability to advance community climate action and economic development strategies.
- The deployment of up to 50,000 in-home devices in residences in these two Chicago communities.
- The deployment of a full suite of smart grid technologies, including 700 distribution automation switches, 4 intelligent substations, the installation of dynamic voltage management and conservation voltage reduction ("CVR") technology in two of the substations, a fiber ring and SCADA (i.e. supervisory control and data acquisition) core network upgrade. This deployment will provide a template for the future rollout of the smart grid throughout the ComEd service territory.

On October 27, 2009, this project was denied funding. There are no plans to move forward with any of the proposed investments.

### **The Building Owners and Managers Association of Chicago (BOMA)**

BOMA of Chicago, a trade association for the commercial real estate industry in Chicago, proposed the first commercial office building smart grid program in the US. BOMA applied for \$92.7 million in SGIG matching funds for a 30-month, \$185.4 million project designed to retrofit buildings to participate fully in energy markets. The installation of devices such as variable frequency drives, updating building automation systems, and creating a network operations center would allow buildings to optimize their operations with prices in the capacity, energy, and ancillary services markets operated by PJM interconnection, the RTO for the Chicago area. The initial proposal was for 50 buildings in downtown Chicago, including the Hancock Center, the Aon building and the Willis Tower, formerly the Sears Tower.

BOMA predicts that the project will save Chicagoans \$82 million a year in power costs, once all of the 262 member commercial office buildings take part. These savings come from an almost 20% or 200 mw peak load reduction. Response strategies include activities such as dimming lights, running fewer elevators and turning down water heaters when DR is called for. If BOMA got all of its members to take part, it estimates they could cut carbon emissions by 300 million pounds/year.

The BOMA project is designed as a complete test of a new business model to develop a clear market for demand response, and is based on a performance-based contracting model. Basically the buildings will pay the debt service on the project's bank loans using market revenues. This model is first of its kind, and is a blueprint that other major markets with congestion issues can follow.

On October 27, 2009, this project was denied funding. BOMA plans to move forward with some of the projects included in the grant proposal. It is expected that an announcement will be made within the next month.

### **The Illinois Institute of Technology (“IIT”)**

The Illinois Institute of Technology (IIT) applied for a \$60 million Demonstration Project grant to help finance a proposed \$120 million project. IIT’s plan is to make Illinois a national center for innovation, validation, deployment and evaluation of new Smart Grid technologies. IIT is leading the effort with the University of Illinois at Urbana-Champaign (“UIUC”), and participants include Illinois state government, the City of Chicago, the Village of Oak Park, the Galvin Electricity Initiative, ComEd, Ameren and more than 50 private companies. Illinois Governor Pat Quinn who is a strong supporter of the project, as is Chicago Mayor Richard M. Daley.

The four primary components of the project are:

- IIT's Perfect Power System, which is to be a complete, reproducible and scalable demonstration of a reliable microgrid.
- Oak Park's Community Demonstration, which would incorporate the technological, financial and policy investments communities can make now, including smart metering infrastructure.
- IIT's Smart Grid Demonstration Center, a comprehensive technology development, demonstration and evaluation program for Smart Grid technologies that would allow companies to hook up to an existing Smart Grid and accelerate development of their own technologies and services.
- UIUC's Smart Grid Validation Facility, which would be an incubator, research center and test bed for companies that want to evaluate their Smart Grid technologies in terms of cyber security and interoperability standards before implementation.

DOE is expected to announce the funding status of demonstration projects by the end of November.

### **Other Relevant Projects**

#### **Smart Grid Photovoltaic Pilot**

Funding awarded by the U.S. Department of Energy (DOE) will be used to procure, install, and test distributed photovoltaic (PV) systems on a sample of homes within the footprint of ComEd’s AMI Pilot. Some of the systems will include battery storage and the intelligence/control systems needed to control battery charge/discharge under a variety of control schemes, including those keyed to dynamic pricing and the utility’s reliability needs.

Team members for the project include: ComEd, GridPoint, Argonne National Lab, and the University of Illinois Sustainable Technology Center (ISTC). The objective of this “Smart Grid Photovoltaic Pilot” is to understand behavioral impacts, within an AMI footprint, of customers with PV in combination with advanced pricing structures such as real-time pricing and net metering. Additionally, the project seeks to explore the impacts to utility grid reliability of customer sited PV within an AMI footprint.

### III. Opportunities for Collaboration

There are a host of opportunities available in Illinois, as demonstrated by the current development and deployment activities. There is significant interest in smart grid as a vehicle to stimulate economic development, reduce energy costs, improve reliability, and improve environmental quality. These interests are highly aligned with the goals of Korea, and create an unprecedented opportunity to collaborate and to stimulate significant public interest and goodwill for all involved.

One of the key unanswered questions surrounding smart grid development and deployment is how to stimulate technology deployment that delivers the promised benefits. The market structure, development activities, and political interest in Illinois are all aligned to test the potential of new technologies, but despite the BOMA project there is little work being done to develop clear business cases for smart grid technology. This is a necessary piece of any plan to bring new technology to market and should be the focus of any future collaborative efforts.

Key potential benefits of collaboration include:

- Demonstrate technologies not currently being adopted
- Introduce Korean manufacturers to the US market through demonstration
- Contribute to international standardization through smart grid development
- Create opportunities for Korean and Illinois technology companies to develop new technologies and bring them to market in a sustainable way

Key questions to research and study include:

- Evaluation of smart grid
- Investigation of business models for the sustainable deployment of smart grid technologies
- Demand response technology and policy
- Energy efficient buildings including zero emission buildings (ZEB)
- Electric and plug-in hybrid electric vehicles and related infrastructure issues
- Storage technology
- Interconnection issues with renewable resources

## IV. Potential Partners

The information in this section of the report is based on a combination of direct discussion with and/or public comments made by the following key potential partners to future collaborative efforts within Illinois. Our research and discussions with the following potential partners indicates that a collaborative effort designed as described in this feasibility study has a very high probability of success.

### ***Government***

#### **Illinois Governor Pat Quinn**

Illinois Governor Pat Quinn has devoted his life to standing up for the working people of Illinois and fighting political corruption, government waste, and unfair taxes. He has earned a national reputation as an honest leader who has never been afraid to speak his mind and battle special interests on behalf of everyday men and women. He has long been a champion of consumer rights, and an advocate of policies that deliver real benefits to consumers and the environment. The Governor has been a supporter of grid modernization – including using \$30 million in state matching funds for the IIT project – and has said publicly that “this collaboration [the IIT Project] will help create an electrical grid that is secure and reliable. This investment will create jobs and ensure Illinois families and businesses have access to technology that will lower their energy use, and their energy costs.” This is not a unique statement, as the governor has long had a strong interest in projects and collaborative efforts with the strategic objectives of job creation, consumer empowerment, and helping Illinois families manage their energy costs. In Governor Quinn’s administration, there is strong interest in the future development of these strategic priorities and collaboration devoted to bringing the benefits of grid modernization to consumers has a very high probability of success.

When assessing a proposal for international collaboration, the Governor would likely what to ensure that:

- Project goals are clearly focused on consumer and environmental benefits while stimulating the economy
- Provides investment and job creation in Illinois
- Provides resources to support collaborative activities

### ***Agency for International Collaboration***

#### **ADICA**

ADICA is a worldwide provider of energy industry consulting and strategic analysis software. ADICA partners with Argonne National Laboratory to develop advanced analytics

used to make informed operational, investment, and policy decisions in a Smart Grid environment. Our Smart Market<sup>®</sup> software is distributed for use on five continents.

ADICA has a proven record of success in capacity building, decision support, and developing productive business relations among renowned government and private organizations, research centers and universities in Korea and the United States; including the Korean Ministry of Knowledge Economy, Korea Power Exchange (KPX), U.S. Department of Energy, Federal Energy Regulatory Commission, PJM and Argonne.

ADICA is committed to empowering people, companies and nations in pursuit of sustainable development. Consistent with this goal, in July 2008, ADICA launched an International Collaboration Program on Distributed Energy Resources to promote increased use of distributed generation, demand response, and energy efficiency in electricity markets around the world. Korea became a founding member of the international collaboration program to participate in research aimed to strengthen the planning, analysis and implementation of distributed resources.

In 2009, the scope of the international cooperation program was expanded to advocate for the adoption of innovative smart grid solutions. Members of this International Collaboration Program on Smart Grids (ICPSG) collaborate on the following topics:

- 1) Report on the current state of knowledge, experience and ongoing research into smart grid technologies and policy options in the US.
- 2) Facilitate effective cooperation and business relations with leading research institutes, federal, state and regional organizations, and technology vendors.
- 3) Develop, adapt, and apply software for analyzing smart grid solutions.
- 4) Conduct feasibility studies to assess the impact of smart grid solutions on power plant operations, consumption, electricity prices, environmental emissions, and generation company profitability.
- 5) Provide recommendations in support of smart grid policy-making.

### ***Research Institutions***

#### **Argonne National Laboratory**

Argonne is one of the U.S. Department of Energy's oldest and largest national laboratories for science and engineering research that seeks solutions to pressing national problems in science and technology. Argonne employs roughly 2,900 employees, including about 1,000 scientists and engineers, three-quarters of whom hold doctoral degrees. Argonne researchers work closely with researchers from hundreds of companies, universities, and federal, state and municipal agencies to help them solve their specific problems, advance America's scientific leadership and prepare the nation for a better future.

Argonne's annual operating budget of around \$540 million supports leading-edge research in virtually every scientific discipline. Argonne is a recognized global leader in the development and applications of power market simulation models and the analysis of strategic power systems issues. As the smart grid moves from concept to reality, Argonne is helping to ensure this technology will interact seamlessly with the emergence of plug-in hybrid electric vehicles (PHEVs) through R&D into battery technology, "open" charging stations, vehicle instrumentation, data communication, customer behavior and grid impacts. Argonne also operates a well equipped Electrochemical Analysis and Diagnostics Laboratory established by the US DOE to provide independent evaluations of advanced battery systems for applications such as electric and hybrid electric vehicles, and stationary energy storage.

Argonne and KPX established an MOU for collaboration on research into analysis and planning of electricity markets.

**Illinois Institute of Technology (IIT)** is focused on enhancing the performance and security of the U.S. electric power infrastructure through its groundbreaking project on Smart Grid, which is known as the Perfect Power project. IIT partnered with the Galvin Electricity Initiative and U.S. DOE, in collaboration with S&C Electric, Endurant Energy, and ComEd, to develop a Perfect Power System design for IIT's Main Campus. IIT plans for the Perfect Power project to establish the Institute as the undisputed leader in microgrid demonstration.

IIT and KPX established an MOU for collaboration on graduate-level training on electricity markets.

**Northwestern University**, with more than \$475 million in sponsored research, often partners with Argonne National Laboratory, Fermilab, and local universities to solve society's problems and facilitate commercial use of their innovations. In the Department of Economics research focuses on regulation, restructuring, retail competition, and technological change in the electricity industry. Experimental economic research in electricity markets, investigates the impact of market design and regulatory policy. Research results are communicated to policymakers to enhance understanding of market processes in energy industries.

**University of Chicago (UC)** is one of the world's preeminent research universities. It is home to internationally renowned scholars, researchers, and intellectual pioneers. In the last century, the UC produced more than 70 Nobel laureates. As one of six professional schools at the UC, the Harris School of Public Policy Studies strives to understand and influence public policies by conducting policy-relevant research and preparing talented individuals to become leaders and agents of social change.

**University of Illinois at Urbana-Champaign (UIUC)** is one of the largest research institutions in the world. Researchers in UIUC's Department of Electrical and Computer Engineering (ECE) collaborate with industry, government, and peer institutions in the

search for solutions on a broad array of projects. Specific areas of interest include: Dynamics and Stability of Power Systems, Energy/Power System Economics, and Power System Computational & Visualization Techniques.

## ***Utility and RTO***

### **Commonwealth Edison Company**

Commonwealth Edison Company (ComEd) is a unit of Chicago-based Exelon Corporation, providing service to approximately 3.8 million customers across Northern Illinois, or 70 percent of the state's population. ComEd is an energy delivery company and does not own power plants and does not produce electricity. To deliver power to homes and businesses ComEd manages more than 90,000 miles of power lines in an 11,400-square-mile territory.

As the electricity delivery company for Northern Illinois, ComEd has established significant expertise in all aspects of energy, efficiency, and technologies. ComEd has a department of over 30 energy, program, and efficiency experts that provide efficiency programs, energy consulting, project management, turnkey efficiency project implementation, and demand reduction services to customers.

As of June 1, 2009, the second year is underway for ComEd's Smart Ideas programs with nearly \$80 million in funding -- almost double the first program year -- and additional incentives offered. Customers in single-family all-electric homes can now participate in an energy efficiency tune-up. Residential customers with central air conditioning also may obtain a system tune-up or receive new installation services from ComEd-trained independent participating contractors.

ComEd is also at the forefront of implementing residential real time pricing, net metering, demand response, and Advanced Metering Infrastructure (AMI) programs. Under a legislatively mandated program approved by the Illinois Commerce Commission in 2006, all ComEd residential customers now have the option to participate in ComEd's Residential Real-Time Pricing (RRTP) program - where they will be billed for the electricity they consume based on hourly wholesale market prices, which fluctuate from hour to hour. Participants can access day ahead and current hourly pricing via [www.thewattspot.com](http://www.thewattspot.com).

Customers participating in the ComEd RRTP program will have the financial incentive to change their electricity usage habits to take advantage of lower-priced time periods and avoid heavy usage during higher-priced time periods. Generally, the more participants avoid using electricity when prices are high, the more they can potentially save with ComEd RRTP. Program participants have access to hourly prices, and receive high price notifications and alerts in addition to other useful information. The potential benefits of ComEd RRTP include reducing carbon emissions that lead to global warming and easing stress on the power distribution system during high demand periods.

As discussed above, ComEd intends to deploy approximately 131,000 Advanced Metering Infrastructure (AMI) meters in 2009 and 2010 in 11 suburban communities as well as the City of Chicago as a pilot program. Using a random sample of less than 10,000 customers, the pilot will test customer interaction with a variety of energy management features and technologies, including alternative pricing plans, Web interfaces, in-home displays, home area network control systems and programmable thermostats. ComEd has stated that this

pilot is part of a portfolio of energy efficiency programs developed to reduce energy consumption, peak load and carbon emissions, while saving customers money and positioning Illinois as a national leader in energy efficiency.

ComEd was denied SGIG funding for projects proposed by the Company, there is interest in pursuing these projects, but resources are not immediately available. ComEd is working to be on the leading edge of smart grid development, and there is a significant opportunity to develop collaborative agreements to this end. Resources are the most important success factor for this collaboration. Ongoing related project include solar interconnection and analysis, AMI infrastructure and information systems, and in-home devices.

### **PJM**

PJM Interconnection is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. Acting as a neutral, independent party, PJM operates a competitive wholesale electricity market and manages the high-voltage electricity grid to ensure reliability for more than 51 million people. PJM's vision is to be the electric industry leader – today and tomorrow – in reliable operations and efficient wholesale markets.

PJM and KPX established an MOU for collaboration on Smart Grid market design.

### ***Customer Representatives***

Customer representative are important collaborative partners in smart grid development and deployment. Because the potential benefits of a smart grid require a host of changes policy, regulation, and customer behavior it is important to collaborate with customer representatives actively engaged in maximizing customer benefits from grid modernization. In addition, collaboration with consumers will appeal strongly to the Quinn administration.

### **BOMA**

BOMA of Chicago, a trade association for the commercial real estate industry in Chicago, has been developing the first commercial office building smart grid program in the US. As described in previous sections of this report, the BOMA project is the first large scale project in the United States dedicated to developing a clear sustainable business model for market based customer load response. There are many curtailment service providers offering a variety of CSP services, but the BOMA project is different in that it is working to retrofit and retool building systems to optimize their operation with the wholesale market. The program is designed to return the maximum benefit of this response to customers, and as a result the program proposes a radical change in the structure of competition in the industry.

The BOMA project is moving forward and quick action is required to secure involvement. Resources are required to support outreach and education with large commercial customers.

### **The Citizens Utility Board (“CUB”)**

CUB is a non-profit representative of residential and small commercial customers in Illinois. Established by the Illinois Legislature in 1984 to protect the interests of small utility customers CUB has been active in all policy efforts related to the development and deployment of the smart grid in Illinois. It was CUB who initially envisioned the collaborative AMI and Statewide Smart Grid processes. CUB has a large outreach and education organization in place and is positioned to be a key outreach and education advocate for customers. CUB’s credible relationship with customers will create credibility in messages that can help deliver the promised smart grid benefits.

CUB is a key ally in building public support, and for communicating with Customers about the benefits achievable through the developing partnership. Resources are needed to support outreach and education for residential and small commercial customers.

### ***Non-profit groups***

#### **CNT**

CNT is a thought leader, as evidenced through its establishment of the Illinois Smart Grid Initiative that laid the groundwork for smart grid development and deployment in Illinois. CNT is a nonprofit organization working to empower communities to control their energy use and costs and to benefit from changes in energy technology and regulations. The organization also focuses on the implementation of energy and transportation programs for consumers.

Current projects include Power Smart Pricing, a real-time pricing program for residential customers served by Ameren Illinois Utilities (AmerenCILCO, AmerenCIPS and AmerenIP). This innovative program provides incentives for using energy wisely and helps residential customers manage their electricity bills. For more information, go to [www.powersmartpricing.org](http://www.powersmartpricing.org). CNT also operates the I-Go car sharing program which is focused on transportation efficiency. I-Go is keenly focused on electric vehicle issues and would be a key partner in testing. Resources are required to support individual customer communication issues when implementing programs for small customers.

#### **MEEA**

The Midwest Energy Efficiency Alliance (MEEA) is a collaborative network advancing energy efficiency in the Midwest to support sustainable economic development and environmental preservation. With over 100 members, MEEA represents a range of sectors

and diverse energy stakeholders including utilities, non-profits, government and policymakers, manufacturers, retailers, consultants and other energy professionals. Their members share a common passion for advancing energy efficiency and work collaboratively to affect measurable change in the region, and ultimately in the world.

As a central source for information and action, MEEA raises awareness, facilitates energy efficiency programs and strengthens policy across the Midwest region. MEEA brings together a respected network of members, partners, board and staff, and inspires others to create new technologies, new products and new ways of thinking when it comes to energy efficiency.

Resources are needed to develop and implement energy efficiency partnerships that fit with the collaborative effort.

## **V. Critical Components to Establish Collaboration**

There are two critical components necessary to establish the collaboration described in this feasibility report.

The first is quick action. The recent denial of stimulus funding in Illinois creates a unique opportunity. Moving very quickly on this opportunity will provide the most benefit to potential Illinois partners and will create the most interest and impact for the collaboration. Potential partners are actively looking for opportunities and it is important to move quickly to engage them in a collaborative relationship. This is a limited time opportunity, as potential partners will soon identify other opportunities to devote their time and energy.

The second necessary component is a significant resource commitment. Given the global economic crisis, potential partners in Illinois are all facing significant resource limitations. When deciding on the level of resource commitment, insights can be drawn from ADICA's report on the New Mexico State MOU with Japan, which notes initial Japanese public and private investment of \$20 million to \$30 million in clean energy and smart grid technology.

## **VI. Collaboration Counterparts and Timeline**

Our research and discussions with potential Illinois partners indicates that a collaborative effort designed as described in this feasibility study has a very high probability of success. The following timeline is aggressive and will produce the greatest opportunity for successful collaboration.

### **Timeline for Initial MOU development**

**As soon as Possible - MKE sends a letter to Governor Pat Quinn identifying the Opportunity for collaboration and requesting Initial discussions.**

**Initial Dialogs should be scheduled in November to develop draft vision document**

**MKE Officials should travel to Illinois in December to meet with the Governor and key partners to develop the MOU.**

**The public announcement and signing of the MOU should take place in early January of 2010.**

**Following the signing in Chicago, key partners will travel to the Korea Smart Grid World Forum in Seoul on January 20<sup>th</sup> .**

**A conference to develop relationships and structure the collaboration should take place in Chicago during February or early March of 2010. This meeting will develop timelines for individual projects and will structure the relationships necessary for successful collaboration**