EXECUTIVE SUMMARY

National Center for Medical Legal Partnership

The Health Impact Assessment (HIA)

of the Commonwealth Edison (ComEd) Advanced Metering Infrastructure (AMI) Deployment

Megan Sandel MD, MPH, Emily Suther MA,

NATIONAL CENTER FOR MEDICAL-LEGAL PARTNERSHIP

KRISTIN MUNSCH JD, CITIZENS UTILITY BOARD

LYNNE SNYDER PHD, MPH, ENERGY PROGRAMS CONSORTIUM

BARBARA R. ALEXANDER, CONSUMER AFFAIRS CONSULTANT

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WHAT IS THE ISSUE?

Over the course of the twentieth century and into the twenty first century, access to electrical service has become increasingly central to the lives of United States residents, from an economic perspective as well as a health one.

AMI or Advanced Metering Initiative

For the purpose of this report, refers to replacing existing meters with digital, or "smart" meters to obtain real time usage, change pricing hour by hour and connect and disconnect remotely. The new metering system also includes a wireless two-way communication system. The term "smart grid" is sometimes used to refer to AMI, but can also mean additional investments in the utility's distribution and transmission system. This HIA report focuses on an AMI as a stand-alone proposal.

Electricity consumption by residential customers is measured through a meter, which displays the number of kilowatt hours used by the household. Approximately every thirty days, a utility will capture that information by doing a manual read of the meter's consumption, and this information appears on the customer's bill as the total kilowatt hours consumed during the prior billing period.

Advanced Metering Infrastructure (AMI) replaces existing mechanical meters with digital or "advanced" meters that record customer usage in 15-minute increments. The new meters, coupled with a new two-way communication system and new data management systems, allow the utility to remotely connect and disconnect service, as well as read and obtain detailed customer usage on a 24/7 basis.

AMI is also typically associated with the introduction of new pricing programs as a mechanism for decreasing overall usage and changing when electricity is used. These pricing programs, referred to as "dynamic" or "time-based," track the operation of the wholesale electricity markets. In these markets, electricity prices are higher during "peak" times when overall demand for electricity is high and the most expensive generators are used to provide this higher demand. These market costs are passed through to customers. Similarly, AMI can be used to offer rebates or penalties around peak usage (in the case of rebates, commonly referred to as a "peak time rebate," and in the case of penalties, commonly referred to as "critical peak pricing"). In Illinois and in many other states, this time of "peak" demand typically occurs during hot summer afternoons. The use of time-based pricing programs differs from the traditional pricing structure, which typically charges customers one fixed price

per kilowatt hour for all electricity consumed regardless of the time of day with only seasonal changes (winter and summer).

In 2008, Commonwealth Edison (ComEd) requested that the Illinois Commerce Commission (ICC) approve a "system modernization project" to include AMI investments. The ICC rejected ComEd's request, largely because the Commission felt it lacked sufficient information regarding the costs and benefits and for this reason ordered that an AMI pilot be conducted.

WHAT IS THE AMI PILOT?

In October 2009, the ICC approved a pilot consisting of approximately 100,000 meters in the Company's Maywood Operating Area (the I-290 corridor of the Chicago area composed of suburban communities) and 30,000 meters in the Chicago metropolitan area. The ICC also approved a smaller subset of the meters to be used as a test of dynamic pricing programs vs. customers staying on traditional "flat rate" programs, and home energy management tools (a "Customer Applications Pilot" or CAP). ComEd installed this metering system in late 2009 and early 2010 and implemented the CAP starting in June 2010 through May 2011.

This test of approximately 8,000 residential customers was one of the largest in the country, and the only one of its kind to be designed as an "opt-out" test of dynamic pricing. Customers were randomly assigned to a new rate and provided with a variety of in-home devices and different pricing programs. The purpose of this CAP was to determine if customers would change their usage behavior, i.e., use less overall or use less during peak periods. If one or more of the pilot options could be predicted to have a significant impact, these actions could result in lower electricity prices for all customers. The rates that the CAP tested included:

- An inclining block rate, where the customer pays more for each block of use – e.g. 7.5 cents for the first 100 kWh, 9.5 cents for the second 100, 12.5 cents for the third.

- A “critical peak price” which imposes a very high price for energy use at designated “critical peak” times, such as from noon until 5 p.m. Customers using electricity during those times are charged more than they are at all other times.
- A “peak time rebate” which does the same thing as a critical peak price but instead of charging more, customers who use less energy during peak hours receive a bill credit.

WHAT HAS ILLINOIS DECIDED ON AMI DEPLOYMENT?

In November 2011, the Illinois General Assembly authorized a new program for increases in electric rates based on a formula if specific performance metrics are reached. As part of its obligations under the new rate structure, ComEd committed to spend approximately $1.1 billion investing in smart grid technologies, including AMI, over a ten-year period across its entire service territory. The law requires ComEd to prioritize its investments based upon how quickly customer value from those investments can be created. It also requires ComEd to detail its consumer education strategies that will accompany its investments, and creates a consumer education fund.

In April 2012, the ICC is expected to receive ComEd’s plan for AMI deployment and to rule on proposed changes in terms of electrical service and pricing in connection with AMI. At that time, interested parties will have the chance to weigh in on ComEd’s proposed deployment plan. Under the law, the ICC must approve ComEd’s plan if it concludes that ComEd’s plan will be cost-beneficial to consumers, and ComEd is required to introduce a peak time rebate program 60 days after deployment approval.

WHY DOES THIS MATTER?

Deployment of AMI within ComEd’s service territory represents a transformation of the relationship between the utility and residential customers, facilitating the collection and dissemination of more detailed information about energy usage, new opportunities to

communicate this information in order to influence customer behavior around energy usage, and managing energy consumption from the standpoint of infrastructure operations as well as rates governing the pricing of electrical service. It may also have unintended consequences; for example, deployment is likely to influence the health of the Illinois population given the connections between access to electrical service, health and safety, especially for residents of low- and moderate-income households. This HIA identifies and analyzes the elements of this transformation related to the cost and terms of residential electrical service, with the goal of making visible the implications for health of AMI deployment in order to inform decision-making.

WHY A HEALTH IMPACT ASSESSMENT?

A Health Impact Assessment is "a combination of procedures, methods and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, program or project on the health of a population and the distribution of those effects within the population. HIA identifies appropriate actions to manage those effects" (Quigley et al International Association for Health Impact, 2006). A core principle of Health Impact Assessment is health equity and particularly focuses on the health impact of policies on vulnerable populations. HIA is a flexible research process that typically involves six steps:

1. **Screening** involves determining whether or not a HIA is warranted and would be useful in the decision-making process;
2. **Scoping** collaboratively determines which health impacts to evaluate, the methods for analysis, and the workplan for completing the assessment;
3. **Assessment** includes gathering existing conditions data and predicting future health impacts using qualitative and quantitative research methods;
4. Developing **recommendations** engages partners by prioritizing evidence-based proposals to mitigate negative and elevate positive health outcomes of the proposal;
5. **Reporting** communicates findings; and
6. **Monitoring** evaluates the effects of a HIA on the decision and its implementation as well as on health determinants and health status.

"Vulnerable Populations"

Refers to five groups within the general population that are at greater risk for adverse health outcomes. They include:
the very young (from birth to age 5), older individuals (age 65 and older), individuals with a functional disability such as impaired mobility, persons who are socially isolated, and those who have limited English literacy or English proficiency.

WHAT DID THIS HIA LOOK AT?

The purpose of this HIA is to evaluate the potential health impacts of the deployment of AMI for residential customers in the ComEd service territory in Illinois. The purpose of this HIA is not to evaluate whether or not AMI meters should or should not be deployed, but rather to highlight the health and safety aspects of AMI for consideration by the (ICC) as it reviews proposed AMI deployment plans. The data-driven, systematic nature of HIA offers a unique opportunity to incorporate health explicitly into the terms set by the ICC so that AMI deployment maximizes its potential to promote health and minimizes the likelihood that consumers, especially those from households that struggle to pay utility bills, will be harmed.

For the purposes of this HIA, there are three aspects to the AMI deployment that were examined and three main questions about their potential health impacts, particularly on vulnerable customers:

1. First, whether or not AMI will raise customer rates for electricity service because of the additional infrastructure investment costs the utility will recover from its customers. If AMI does not provide operational benefits to offset its costs, fuel poverty experienced by vulnerable customers will be exacerbated. Since AMI deployment requires a large capital investment, the principals sought to answer how vulnerable populations might be adversely affected by the increased electricity rates necessary to pay for an AMI investment. AMI deployments, as well as other large utility investments, are generally evaluated on a 15-20 year timeframe for the analysis of costs and benefits, and cost recovery from customers is collected over the same time period.

2. Second, whether or not new pricing programs enabled by AMI will provide benefits to customers or increase costs to vulnerable customers at a time when they can least afford it. Proponents of dynamic pricing argue that by linking prices

"The term "fuel poverty"

Means the inability to afford basic electrical service or other energy needs. The term describes the condition of households that pay more than 10% of available income for energy. In the general population that is not low income, households typically pay no more than 4% of total household income for energy.

for the average residential consumer more closely to the actual costs, customers will be motivated to reduce electricity usage during peak times and to reduce overall consumption. Opponents of dynamic pricing are concerned that more volatile prices will cause economic hardship for vulnerable populations, such as low-income or fixed-income individuals, if these dynamic programs are made mandatory vs. continued use of flat rate pricing, or if the impact of those who participate voluntarily does not result in the predicted impact on electricity prices for all customers. Because the cost recovery of these AMI projects is typically started in the first five to seven years, it is important to focus in the potential health impacts over that time.

3. Third, whether or not the use of a remote service switch to connect or disconnect service, particularly in the case of disconnection for nonpayment, will have adverse impacts on vulnerable populations. While service restoration times should improve, disconnection for nonpayment will likely happen much more rapidly for customers than under current practice, which requires disconnection manually. Remote disconnection can be detrimental to the health of vulnerable populations, particularly those who rely on medical devices, such as nebulizers.

WHAT DID WE FIND ABOUT HEALTH IMPACT OF ELECTRIC RATES?

Significant proportions of residents have characteristics that put them at greater than average risk of adverse health impacts if they have less access to electrical service, or characteristics that indicate a heightened health risk, including:

- difficulties paying for housing, health care, and food
- problems heating or cooling their homes due to cost (including a lack of access to central air-conditioning, the single strongest protection against heat-related illness);

- reliance on electricity for heat or to power medical devices;
- and substandard housing quality.

Based on the literature review, fuel poverty is tied to the diminished capacity of households to purchase basic necessities such as food and clothing, less access to health care and prescription medications, greater likelihood of involuntary loss of utility service for nonpayment, and greater hunger among seniors and young children. Fuel-poor households close off parts of their home to reduce energy bills and leave home for part of the day, incurring stress that can lead to criminal activity among teenagers and increased social isolation among adults. Even for seniors who are not low-income, sensitivity to the perceived price of electrical service can influence a decision not to use air-conditioning during summer heat. The implications of AMI for fuel poverty will determine whether these health outcomes are more or less likely, and are summarized in Table 1.

In addition to the literature review, the HIA also generated original data to document experiences of at-risk residents in the pilot footprint neighborhood of Maywood, with selected quotes in this executive summary (see full report for details).

"And I guess for me I think what would be more helpful is understanding more about how to change things in the home so that you're not forced to use so much electricity or things like that. And I know that they send little notes in the bills about... I don't find them that helpful. "

-Maywood Resident ID #28

WHAT DID WE FIND ABOUT THE ELECTRIC RATES FOR AMI PILOT?

The investment in AMI equipment is expected to cost residential customers $2-3 more per month. While the average bill for customers on dynamic pricing programs was on average slightly lower than the average bill for all residential customers without an AMI meter, the average bill for customers on the flat rate, which we expect will be used in the AMI deployment, was higher. (See full report for details).

The costs for deploying AMI could lead to increased delivery services rates to pay for AMI prior to the realization of any benefits in the form of potential reductions in utility costs. Any increase in customer bills will exacerbate the impact of higher prices to pay for AMI for

vulnerable customers. In the short term, if the AMI technology and pricing programs were deployed as they were in the pilot, there is no certainty that these pricing programs and in-home technologies would result in lower customer bills to help offset the higher costs to pay for AMI, though operational benefits recognized by the utility are to contribute to the majority of cost savings from AMI.

WHAT DID WE FIND ABOUT HEALTH IMPACT OF PRICING PROGRAMS?

Nationally, there is evidence of peak load reduction due to dynamic pricing programs using both critical peak pricing and peak time rebates on a voluntary basis. However, among low income households with dynamic pricing programs there is only limited reduction. Evidence also suggests that customers on a critical peak pricing plan did not lower overall energy usage, instead shifting usage to lower priced time periods.

ComEd's AMI pilot found no statistically significant overall reduction in usage overall or at times of peak load for the electrical grid, for any of the tested combinations of pricing and technology options. As cited in the report by the Electric Power Research Institute on the ComEd pilot, the pilot did show a reduction in peak load of 32-37% in a small group (5-6%) of respondents but this was not statistically significant and cannot be generalized to the larger population. There was little demographic difference between the survey customers who responded to the pricing programs (the 10% who did respond) and those who did not respond to the pricing programs.[1]

ComEd's AMI pilot also found only small predicted reductions in greenhouse gas emissions. Deployment is likely to result in reduced

> "... The last bill I got a couple of days ago was $230 and I have to pay it on time and so something is going to have to go missing. So it is a...I hate that by me being on so many medications that I have to juggle either to pay my utilities, buy my food or get my medication. So, I'm not going to cry [starts crying]... I have to juggle it. I have to have the lights, I have to have the medication, and I have to...to be honest with you I have cut back on the food. I mean, the refrigerator gets cut off and I just cannot deal with it. So I mean I have to... I think their rates have gotten a lot higher but the economy, living on a fixed income of seven hundred dollars a month, how far does that go?"
>
> - Maywood Resident ID #44 *(COPD, asthma, diabetes)*

[1] Electric Power Research Institute. 2011. The Effect of Electricity Consumption of the Commonwealth Edison Customer Application Program Pilot: Phase 2 Final Analysis.1023644 Technical Update. Palo Alto, CA: EPRI Section 6.15, Table 6-4, page6-11.

emissions from ComEd vehicles no longer needed to conduct premise visits to read meters or connect and disconnect meters. However, the potential health impacts of reduced vehicle emissions are at best negligible, removing approximately 25,000 tons of CO2 from the roughly 40 million tons in total CO2 emissions for the Chicago metropolitan areas.

A separate analysis of the AMI pilot conducted for ComEd by the consulting firm Black and Veatch estimated that 30,000 MWh of electric generation would be avoided from programs that ComEd did not test in the pilot, such as exposing customers to more detailed usage information on the Company's website and educating customers on how to reduce energy by analyzing the customer's usage profile and stimulating voluntary changes in usage behavior.[2] Even this estimate, however, is a very small amount of energy savings (0.03% of ComEd's total of 91.1 million MWh in sales in 2010).[3] This energy savings translates to an estimated CO2 reduction of 23,000 tons per year,[4] which is a negligible reduction of greenhouse gas in relation to the 40 million tons in total CO2 emissions for Chicago.

"I think that our community does need a better outreach or understanding how to downsize energy, okay. We're not… we're not real educated on using the better style light bulb or our seniors… our community is like 60 percent senior, so and then the other 40 is unemployed, okay? So then here we go. So we do need that educational piece."

- Maywood Resident ID #37

Unless more effort is put into consumer education and energy awareness, new dynamic pricing plans, or other programs implemented to take advantage of AMI technology, will not significantly lower peak load and overall energy usage. The opt-out nature of ComEd's pilot also suggests, as shown nationally, voluntary dynamic pricing programs are likely to have better results. Since the pilot did not show any meaningful difference in response between

[2] Electric Power Research Institute. 2011. The Effect of Electricity Consumption of the Commonwealth Edison Customer Application Program Pilot: Phase 2 Final Analysis.1023644 Technical Update. Palo Alto, CA: EPRI. Section 14.1.

[3] Greater - but still modest - reductions in consumption are attributed to reducing unaccounted for energy (UFE, 350,000 MWh annually). We do not consider these energy savings to result in actual emission reductions because as discussed in Section 7.9 of B&V report, most customers found to be receiving unmetered power are expected to begin paying for power.

[4] Using Black and Veatch's CO2 emission factor in Section 9.5

critical peak pricing and peak time rebates, a peak time rebate should be used since it would not adversely penalize low-income customers.

WHAT DID WE FIND ABOUT HEALTH IMPACT OF REMOTE TURNING ON AND OFF OF ELECTRIC SERVICE?

Interruptions or loss of service jeopardizes the safety of those who rely on electrically-powered medical devices such as nebulizers, and sleep apnea devices (CPAP). In addition, carbon monoxide poisonings, residential fire injuries, and related deaths are much more likely in homes where electricity has been disconnected for nonpayment.

There were no measurements of actual outage duration and response time during the ComEd pilot, though the new system was deemed to be able to provide such data in the future. As a result, the HIA cannot draw specific conclusions on service improvements associated with the deployment of AMI.

Reductions in the use of ComEd trucks to obtain meter readings, and connect or disconnect service, will likely result in lowering of ambient air pollution load and greenhouse gas emissions. Customer adoption of dynamic pricing programs may result in reduced demand for power generation at peak times from fuel sources associated with air pollution, including emission of greenhouse gases. Current education during the ComEd pilot did not demonstrate this, but studies in other states have shown more reduced usage with volunteers. Improved customer education, including improvements in energy efficiency and demand response programs, is necessary to ensure customers are interested and able to take advantage of pricing programs and technology investments that will shift and reduce energy usage.

Remote connection and disconnection of service was not tested in the ComEd pilot, although ComEd's business case for AMI depends on implementation of remote disconnection and calculates potential cost savings in avoiding premise visits for this function. If this functionality disconnects customers remotely for nonpayment,

current consumer protections associated with a premise visit and attempted contact may be threatened. Analysis of ComEd billing records from 2009 (the year before the pilot) and 2010 (the pilot year) for customers enrolled in the CAP (dynamic pricing rate design) component of the ComEd pilot indicates increasing numbers of households that would be eligible for disconnection in 2010, compared with 2009.

IN SUMMARY

Table 1 places the key findings from the HIA into the context of the health determinants that were the focus on the HIA: fuel poverty, adequacy of housing, AMI's enhanced two-way functionality, unintentional injuries and premature deaths, vulnerability to heat or cold, and ambient air pollution. Findings are presented according to the direction of impact, magnitude of impact, severity and likelihood of impact, distribution of impact, and the quality of the evidence. While the average bill for customers on dynamic pricing programs was slightly lower than the average bill for all residential customers without an AMI meter, the average bill for customers on the flat rate, which we expect will be used in the AMI deployment, was higher. Therefore, this table characterizes the health impact of higher electric bills. If the recommendations are implemented, and electric bills decrease, the direction of many arrows will change.

PREDICTED HEALTH IMPACTS OF AMI IN COMMONWEALTH EDISON SERVICE TERRITORY

Health Determinants and Outcomes	Size of At-Risk Group (Direction Negative Unless Otherwise Noted)	Severity/ Likelihood	Quality of Evidence
FUEL POVERTY FROM HIGHER ELECTRICITY COSTS			
Pressure on Household Budgets	All households with AMI	▼▼▼	● ● ●
Poor Nutritional status	12% of Illinois households that are food insecure	▼▼▼	● ● ●
Decreased Access to Health Care	10.2% of adults report limited access to physician due to cost	▼▼▼	● ●
	12.4% of adults report limited access to prescription Rx due to cost	▼▼▼	● ●
Poor Housing Quality	5.2% of households report moderate/severe housing problems	▼	● ● ● ●
HEALTH IMPACTS RELATED TO AMI TECHNOLOGY			
Reduced Air Pollution from Fewer Emissions	28.9% of adults report high blood pressure or cardiovascular disease	=	● ● ●
	14% children, 13% adult population with asthma		
Remote Connection After Disconnection	All households with AMI	=	●
Remote Disconnect for Nonpayment	47% of households have housing costs > 30% of income;	▼▼	● ●
Exposure to Non-ionizing Radiation	All Households with AMI	=	●
UNINTENTIONAL INJURIES & PREMATURE DEATHS FROM DISCONNECTED SERVICE			
No Access to Electrically Powered Devices for Medical Uses	25% of low income households use electrically-powered medical device	▼▼	●
Use of Alternative, Risky Sources for Heat & Light	0.2% of poor households nationally heat home with cook stove	▼▼	● ● ●
	13.3% of households use portable electric space heater		
TEMPERATURE-SENSITIVE CONDITIONS MADE WORSE BY EXPOSURE TO HEAT OR COLD			
Decreased Access to Cooling	56.6% of low income households report no central a/c (37.9% of all households)	▼▼▼	● ● ● ●
Decreased Access to Heating	20.3% of low-income households report electricity as main heating fuel (11.3% of all households)	▼▼	● ● ● ●
Heat and Cold-related Illness (e.g., heat cramps, hyperthermia, hypothermia)	**Age** (7.2% of households include child < 5 yrs, 11.2% of households include elder 65 yrs +) **Social isolation** (18% adults report no social support; 31.6% of low-income seniors live independently) **Disability status** (5.6% households include member living with mobility-limiting disability; 10.2% of low-income households include member living with mobility-limiting disability)	▼▼▼▼	● ● ● ●
Heart Disease	28.9% of adults report high blood pressure or cardiovascular disease	▼▼▼	● ● ● ●
Respiratory Disease	14% children, 13% adult population with asthma	▼▼▼▼	● ● ● ●
Diabetes	8% of adults report diabetes diagnosis	▼▼	● ● ●

LEGEND:

- ▼▼▼▼ Strong impact on many
- ▼▼▼ Strong impact for medium number or moderate impact on many
- ▼▼ Moderate impact on medium number or strong impact on few
- ▼ Moderate impact on few

- ● ● ● ● 10+ Strong studies
- ● ● ● 5-10 + Strong studies or data analysis
- ● ● < 5 Strong studies OR 5 or more studies of moderate quality
- ● < 5 studies of moderate quality OR studies with mixed results

- ● There is evidence to suggest impact, however none was found during the pilot or there was insufficient evidence to comment

RECOMMENDATIONS

1. Analyze proposed terms of deployment with respect to clearly defined groups and at-risk residential customers, including an analysis of the likely impacts on health and safety.

Regulators and policy makers should carefully review and evaluate the costs and the benefits from the perspective of vulnerable customers and include a consideration of health impacts for not only the average customers, but those most vulnerable to higher prices for essential electricity service. This analysis should focus on ensuring that AMI deployment delivers the expected customer benefits in the form of reduced operational costs, within the period of AMI deployment, and review of any proposed cost recovery mechanism to determine the adverse implications of higher bills for vulnerable customers. Pertinent information should be analyzed as described in section III, in which this HIA analyzes the primary data collected from the ComEd pilot program. In addition, data must be collected about characteristics or indicators of vulnerability for residential customers, to permit designating of their accounts for analysis of AMI impacts. Data parameters should include indications of hardship, such as missed payments, delayed payments, or non-payments. Applications for utility financial assistance should also be considered an indicator of vulnerability, as should any appeal made by a residential customer to the utility company for assistance, including application for medical considerations including but not limited to the submission of a 30 day Certificate of Illness in accordance with Illinois Administrative Code Part 280.130(j) or an application for the Life Support Registry in accordance with the Public Utilities Act (220 ILCS 5/8-204) (from Ch. 111 2/3, par. 8-204). Periodic surveying of residents should take place to determine the prevalence of disease, changes in the disease status, and the presence of increased hardship across the board. Surveys should also be used to determine whether there has been any widespread changes in the general population (including job status, health

developments among children, or any new injuries/disabilities) to determine if cost recovery practices are appropriate.

2. Proposed cost recovery from electric customers should link benefits and costs for vulnerable customers specifically, in addition to linking benefits that are documented and realized for all customers.

Costs should not be imposed on vulnerable customers unless the benefits are realized at the time that costs are imposed. The cost recovery method should consider the potential for eliminating rate increases to pay for AMI for low income customers if the benefits cannot be delivered at the time of imposing the costs. Utilities should be required to make enforceable commitments concerning costs and benefit estimates and penalized for the failure to meet specific performance requirements during AMI deployment. Utilities should be required to enhance and further develop their ability to identify and respond to the needs of their vulnerable populations. Specific cost indicators should be monitored throughout the first years of deployment, such as reporting on utility bill impacts for vulnerable customers.

3. Proposed time-based pricing programs for AMI should offer incentives for vulnerable households to optimize their use of electricity from the perspectives of health as well as of energy efficiency.

Programs that reward customers for reduced usage (such as a Peak Time Rebate) rather than charging very high prices for certain times of day (such as Critical Peak Pricing) will benefit vulnerable customers. Components of this recommendation include:

a. All dynamic pricing programs should be offered on an opt-in basis to improve customer response.

b. A Peak Time Rebate program should be offered to all customers. Any other time-based pricing programs should be offered as an option and not imposed on customers as a mandatory or "default" price design.

c. Customers must be allowed to revert back to flat rate pricing at any time without penalty.

d. Customers on a dynamic pricing plan must be given timely information regarding their cost and usage status, including insight as to what their bill would be if they were on an alternative plan offered by that utility.

4. The remote connection and disconnection functionality of AMI, especially in the case of involuntary loss of service for nonpayment, must be deployed to promote and not endanger the health and safety of vulnerable customers.

There was not full agreement among the HIA analytic team as to the optimal way to implement this recommendation.

All HIA team principals agree that, at present, Illinois does not have consumer protections that offer a targeted means to prevent disconnection remotely when health or safety is at risk for "vulnerable" customers because those customers, as defined in our HIA, are not identifiable in the utility's billing system. The HIA analysis of the ComEd pilot documented a potential for an increase in the incidence of disconnection for nonpayment among the households eligible for disconnection for nonpayment during the pilot period. It is likely that greater numbers of low-income households will lose their access to electrical service more quickly if a utility uses remote disconnection for nonpayment because (1) bills will be higher to pay for the new AMI and smart grid investments in the early years of deployment; (2) the elimination of the need for a truck and field personnel to disconnect will mean that larger

numbers of customers with overdue bills can be disconnected earlier in the collection cycle.

Currently in Illinois there are limited temperature-based proscription on utility shutoffs (220 ILCS 5/8-205) (from Ch. 111 2/3, par. 8-205) and a date-based proscription on shutoffs for LIHEAP recipients (280.136). This represents an inadequate patchwork of consumer protections that allow vulnerable households to suffer disconnects during dangerous temperature conditions even under traditional circumstances.

Best practices from other states include shutoff prohibitions for nonpayment during winter, either proscribing shutoff between specified dates (seasonal moratorium) or when temperatures drop below specific readings; prohibition of shutoff of electrical service for nonpayment during extreme heat, when ambient temperatures reach a specific reading or when the National Weather Service issues a heat advisory; and the delay of shutoff for nonpayment for consumers who obtain medical certification that a household member is an infant or young child, an elder, or someone living with a serious or life-threatening illness (specific provisions vary from state to state). In the case of remote disconnection, several states, including New York, Ohio, and Maryland, have mandated that AMI deployment not eliminate the requirement of a premise visit and attempt to contact the customer at the premises prior to disconnection for nonpayment, on health and safety grounds.

This HIA recommends that:

- Utilities should first attempt to promote efficiency programs that might reduce the size of the electric bill and reduce the potential for arrears balances that are unaffordable and be required to develop targeted messages and new programs that specifically make use of the AMI system to offer no cost or low cost efficiency and conservation programs. While lower income customers typically cannot afford additional investments for efficiency (such as weatherization or more efficient appliances), utility programs should include a

robust and well-funded program for no cost and low cost efficiency programs for qualified low income customers.

- Any approval for the deployment of AMI technology should be accompanied by a requirement that the utility sponsor and submit a community education and outreach plan that will integrate the programs that are enabled by AMI deployment and associated communication capabilities into existing programs that target isolated elderly, who may not have the means or understanding of how to contact their utility company, and medically vulnerable customers with options to respond to loss of power for essential heating and cooling and unaffordable electricity bills. For example, California regulations require a premise visit so that the customer has an opportunity to make a noncash payment for households where a member is flagged as being on life support (with a specific list of life support equipment included in the regulation) or having medical certification of a number of conditions (compromised immune system, life-threatening illness or other condition for which additional heating or cooling is medically necessary to sustain the person's life or prevent deterioration of the person's medical condition). Such medical certification may be specified for a set time period or be classified as permanent, with renewal every 2 years.

- Any approval for the deployment for AMI technology should also require the utility to analyze usage data to assist targeting of education, efficiency and demand response programs for all customers, but particularly those identified as low income as a result of their participation in utility-sponsored low income bill payment assistance programs or who receive state and federal energy payment assistance. The utility's education and outreach programs should provide individually tailored usage and bill impact information, including usage reduction and conservation information to such customers, using the communication

methods preferred by the customer. For those customers without high-speed internet access, such information should be provided through the mail and, where the customer agrees, through smart phone applications and text programs.

The current obligation of Illinois consumer protection regulations regarding customer contacts and the requirement of a premise visit prior to disconnection for nonpayment should not only be maintained, but expanded. In approving the ComEd Pilot, the ICC ruling states Illinois Law:

"clearly contemplates a site visit by a utility employee upon disconnection. While we acknowledge that the language in this regulation may have contemplated the world as it existed before AMI technology, a site visit upon disconnection affords a valuable service to consumers, and, in certain circumstances, (e.g., when a safety issue is detected upon the site visit) to ComEd. ComEd shall not remotely disconnect a program participant unless such disconnection is in accordance with 83 Ill. Adm. Code 280.130(d) and any other pertinent regulations."

All HIA principals agree that remote disconnection when requested by the customer, and remote re-connection are important uses of AMI technology. All HIA principals, agree that any disconnection for nonpayment must be done in accordance with current Illinois consumer protections. In particular, however, not all principals agreed that a premise visit would continue to be necessary and valuable in the "AMI world" contemplated by the ICC in 2009. Some principals (NCMLP, consultants B. Alexander, Lysander) believe the evidence in Illinois and nationally show that a premise visit and customer contact affords a service to customers, most often because customers can arrange for payment options or other programs that would prevent the disconnection of service. Other principals (CUB) question whether there is evidence in Illinois that a premise visit in an AMI regime would offer the benefits it might in other states, and that with AMI, payment troubled customers may well be better served. During the time it takes to schedule a premise visit, these

customers can accrue large unpaid balances, which are beyond what existing low-income assistance programs can address. Without large unpaid balances, these customers can pay their bill and be remotely re-connected quickly using AMI technology. Customers that remain connected with unpaid bills potentially endanger their credit report and the balance is collected from all other ComEd customers.

This requirement for a site visit and customer contact prior to disconnection of service is only one of a wide range of consumer protections that could be adopted to ensure that disconnection is the last resort and not the first resort in the collection of overdue bills, especially for low-income or vulnerable households. It is appropriate to recognize that the prohibition on the use of remote disconnection without compliance with the current premise visit and customer contact requirement is a blunt tool in response to the over-arching issue of fuel poverty and the need for essential electric service for vulnerable customers. Though it is not possible to consider a wide range of potential improvements in consumer protection policies in the context of a proposal for AMI deployment at this time,[5] in the long run it may be possible to craft more targeted consumer protection and assistance programs to vulnerable customers so that an elimination of the premise visit requirement may be more appropriate to consider. Until such time as Illinois consumer protection regulations devise alternate means to address the health and safety issues connected with remote disconnection, all HIA principals agree that the current Illinois rule should be maintained. Most HIA principals agree this requires a premise visit and customer contact and prohibits the use of remote disconnection for nonpayment.

[5] Such protections could include a more expansive use of medical certifications to prohibit disconnection for customers with ongoing medically certified conditions, summer and heat-related moratoria on service disconnection that are strengthened and enforced, more liberal payment arrangement terms, and fully funded low-income weatherization that could include appliance replacement and bill payment assistance programs.

5. Any AMI deployment and programs that seek customer engagement to make use of the new metering and communication system should be accompanied by robust consumer education and outreach to customers to obtain their awareness of and participation in approved programs.

An approval of AMI deployment should require the development of a Customer Education Plan that focuses on AMI-enabled programs with the input of stakeholders and include specific performance requirements to measure the utility's implementation of the approved plan, including the following requirements:

a. Outreach and education for any specific pricing or conservation program should target groups at higher than average risk for adverse impacts, including seniors during the summer months and low-income households that rely on electricity for their primary heating fuel in wintertime. The Customer Education Plan should be coordinated with the City of Chicago's heat health response plan, to ensure that access to adequate home cooling, or a centrally air-conditioned environment, is maintained for seniors within ComEd's service territory. This plan should include tutorials describing how new pricing programs and conservation initiatives can be helpful to such customers. Additionally, the utility's outreach program could include replacing old inefficient air conditioners with new energy efficient ones for vulnerable households, enrollment in energy saver plans and referrals to weatherization agencies.

b. This education and outreach should include participation and delivery of educational messages and information by local and neighborhood organizations that are mostly likely to interact with vulnerable

customers. These organizations could include utility assistance locations, healthcare practices, legal aid offices, etc. By having this information available, these organization will be able to offer advice for vulnerable customers, and resources should they require assistance with the any new programs that take advantage of the AMI technology.

CONCLUSION:

Given the rate and pace that AMI is being deployed in other states across the country, these Health Impact Assessment findings and recommendations should be incorporated into future policy decisions on AMI. Since the cost of electricity, variable pricing programs and other aspects of AMI can impact vulnerable populations and these groups exist in all states, the principals believe this HIA answers many questions relevant to the debate for policy-makers in Illinois and beyond.