DRAFT
NextGrid Report
Chapter 1: Introduction

Building on two decades of leadership in public utility policy and infrastructure investment in Illinois, the Illinois Commerce Commission (ICC or Commission) launched *NextGrid, Illinois' Utility of the Future Study* via resolution on March 22, 2017[1]. The study's purpose is to identify and address the critical issues, challenges, and opportunities in the development of a modernized electric grid, by analyzing the deployment of new technologies; the formulation of appropriate policies; the development of analytical tools and implementation practices to increase customer choice, at possibly lower prices, for cleaner and reliable electricity. It is a consumer-focused study with an emphasis on stakeholder participation.

This NextGrid Final Report presents a comprehensive view of the options to further modernize the Illinois Grid to ensure a resilient, reliable and safe grid for the benefit of customers and communities across the state. The Report has three critical goals: to *educate energy stakeholders, policy makers and the public; to provide a full picture of the tools, technologies, policy and regulatory options available to state leaders; and to assess how potential changes would impact customers.* This introductory chapter provides a brief overview of the NextGrid study and sets the appropriate Illinois-specific context for the identified challenges, opportunities and possible actions to implement grid modernization in Illinois.

1.1 Overview of Illinois Electricity in 2018

1.1.1. *Illinois Leadership in Electricity Policy and Practice*

Illinois has long been a pioneer and leader in electricity, dating back more than a century to when Samuel Insull, Thomas Edison's secretary, moved to Chicago and helped establish what became the modern public utility. More recently, Illinois re-established itself as a leader in electricity policy and practice, starting with establishment of customer choice in 1997. Over the past decade, the pace of change in electricity regulation, delivery and use has increased rapidly – pushed by advances in technology, emergence of new markets, and changes in public goals, with momentum from legislation like the Illinois Power Agency Act in 2007, the Energy Infrastructure Modernization Act (IEMA) in 2011 and the Future Energy Jobs Act (FEJA) of 2016.

Illinois' leadership and vision in electricity policy and practice has resulted in multiple benefits, including:

- stable energy bills;
- lower energy rates below the national average rates;
- improved reliability;
- reduced adverse environmental impacts from energy production and use;

[1] https://nextgrid.illinois.gov/resolution.pdf

- deployment of smart meter technology providing granular data that can help consumers manage their energy usage and reduce their costs; and
- economic growth and job creation.

The NextGrid study continues Illinois' forward-looking approach to electricity policy and practice and is consistent with the ICC's role as a policy-making, regulatory and rate-setting agency that has the consumers' interest first and foremost. The study builds on past utility investment in grid modernization that has already produced significant benefits, to prepare Illinois for additional grid modernization activities to create further benefits in the future.

Illinois' transformation into an energy leader began with the Electric Service Customer Choice and Rate Relief Law of 1997 (220 ILCS 5/Art. XVI. PUA), which restructured the electric industry to turn power generation and supply into competitive businesses and introduced a new class of entities called alternative retail electric suppliers (ARES) to compete with incumbent utilities to supply customers' electricity needs. As a restructured state, large public utilities do not own generation in Illinois and customers have a range of supply options. The utility is responsible for delivery services, and consumers can choose to secure their energy supply from ARES, from the utility, from a retailer chosen by their municipality, or through hourly wholesale market pricing.

The ICC is charged with the certification of the competing ARES and the promotion of electric choice to Illinois residents through its Office of Retail Market Development (ORMD), and must track and present data on the retail market to legislative leaders annually.

As of August 2007, Section 16-113(f) of the Public Utility Act (PUA) declared the provision of electric power and energy to retail customers of the Illinois' largest investor owned utilities with peak demands of at least 400 kilowatts to be a competitive service. As a result, utilities discontinued the provision of fixed-price bundled service to declared competitive customers since early 2008. Section 16-113(g) of the PUA allowed utilities to extend the class of declared competitive customers, with Commission approval, to include those with peak demands of at least 100 kilowatts. Customers declared to be competitive take supply service from an ARES or from the utility on an hourly-pricing basis, while smaller customers, including all residential customers, still retain the option of tariffed utility supply service.

In 2007, the Illinois General Assembly established the Illinois Power Agency (IPA) through the Illinois Power Agency Act. This independent state agency was established to develop electricity procurement plans for customers that continue to take fixed-price bundled service from the state's major investor owned utilities. The IPA conducts a competitive procurement process for the electricity supply resources identified in the IPA procurement plan approved by the ICC through a docketed proceeding. After its inception, the IPA received the additional responsibility to procure both renewable resources and energy efficiency measures on behalf of Illinois electricity customers. In order to meet the Renewable Portfolio Standards (RPS), Illinois laws require utilities and ARES to fund the purchases of renewable source outputs. Electricity suppliers can meet their requirements through purchases of renewable energy credits (RECs), bundles of energy and RECs, or through alternative compliance payments. Utility obligations to meet the RPS standards are subject to the statutory limitations on the amounts utilities may spend on the acquisition of new renewable energy resources. The passage of Public Act 96-0176

amended the IPA Act to allow municipalities and counties to adopt an ordinance under which it may aggregate electrical load, effective January 1, 2010. Municipal corporate authorities or county boards are permitted to aggregate residential and small commercial retail electrical loads located within their jurisdiction and to enter into service agreements for the sale and purchase of electricity on behalf of those customers. Individual customers are allowed to opt-out of this aggregation and choose their own suppliers in they want.

In 2011, the EIMA legislation launched the Smart Grid in Illinois through a $2.6 billion investment plan to upgrade the existing grid infrastructure and digitize the grid in the Commonwealth Edison (ComEd) and Ameren Illinois service areas. As of the end of 2018, more than four million smart meters have been installed in Illinois, and the full rollout of advanced metering infrastructure will be completed by the end of 2019 with the deployment of six million smart meters Utilities can now leverage data from the smart grid to give customers more insights into their usage, offer different customer pricing programs, and improve reliability.

The FEJA legislation in 2016 dramatically increased the state's investment in energy efficiency and requires that the IPA develop and implement a Zero Emission Standard Procurement Plan and a Long-Term Renewable Resources Procurement Plan, subject to approval by the ICC. The Zero Emission Standard allows the purchase of environmental credits from nuclear facilities with zero carbon emissions, in a similar manner to the RECs sold by wind and solar resources. The Long-Term Renewable Resources Procurement Plan includes the purchase of RECs from new utility-scale solar and wind renewable resources, distributed renewable energy resources, and community renewable resources. Community renewable resources are renewable resources interconnected to the electric distribution system that credit the value of electricity generated by the facility to subscribers of the facility (e.g., a solar facility located in a town square subscribed to by members of the surrounding community).

In addition to providing for environmental credits, FEJA allows for owners of and subscribers to distributed and community renewable generation to provide excess electricity they generate to their electricity provider and receive net metering credits for such excess at the subscriber's supply rate. FEJA further incents renewable resource deployment through a new program that provides rebates that defray the costs of deploying distributed and community renewable generation.

FEJA also established significant funding to support the creation of clean energy jobs and the set-up of economic activity in low-income communities. FEJA provides funding for renewable resources related job training, with an emphasis on funding for low-income communities and for training of qualified applicants that were foster children or with records that are transiting. FEJA further provides funding to reduce electricity bills for vulnerable populations including low-income seniors, disabled veterans, and small businesses and non-profit organizations with demonstrable hardships. In addition, FEJA has several provisions to help disadvantaged communities and customers realize the benefits of the clean energy economy, including, job placement, clean energy supply options and tailored and targeted community outreach and education.

1.1.2 *Illinois Progress on Grid Modernization*

The two-major investor-owned utilities – ComEd and Ameren Illinois – serve the majority of the electricity customers in the state of Illinois. ComEd serves the northern part of the state and Ameren serves the central and southern sections of the state. Fig. 1 displays the geographic footprints of the two utilities. Both ComEd and Ameren Illinois have made substantial investments in grid modernization as a result of EIMA, enacted by the Illinois General Assembly on October 27, 2011.

ComEd is spending $2.6 billion to modernize the grid as a result of EIMA. Key investments include:

- Four million smart meters installed in homes and businesses in ComEd's service territory by the end of 2018;
- Refurbishment or replacement of thousands of miles of cable, including underground residential cable, mainline cable and high voltage underground cable;
- Distribution Automation, which detects issues on the distribution system and automatically re-routes power to reduce frequency and duration of service interruptions;
- Digital upgrades to 16 substations through installation of microprocessor-based devices that remotely monitor the health of transformers and improve visibility to the ComEd system;
- Assessing more than 31,000 manholes on its system, replacing or repairing cable systems and performing structural work ranging from minor refurbishment to complete replacement;
- Inspecting more than 880,000 wood poles, reinforcing and replacing more than 25,000 of them;
- Storm hardening, to reduce susceptibility of certain circuits to storm-related damage, including high winds, thunder storms and ice storms; these improvements include installation of tree resistant cable, tree trimming and additional vegetation management and other engineered solutions.

The benefits of these and other investments to ComEd customers include:

- Significant capital infused into the Illinois economy, with over $5.52 billion in supply chain expenditures in Illinois since 2011, and over $2.2 billion in diverse supply chain spending.
- More than 4,500 full-time employee jobs created during the peak EIMA program year.
- More than 7.6 million avoided outages since the launch of the EIMA program, a reduction in the average frequency and duration of outages by nearly 50 percent, and an associated $1.4 billion in societal savings.
- Reduction in the number of ComEd customers impacted by storms by 37 percent since 2012.
- Rate stability and affordability; ten years ago, the average residential customer bill was approximately $81, and in January of 2017 it was approximately $82.

- ComEd's per kWh residential rates trend below the average price across the entire U.S., including nearly 14 percent below the top 20 U.S. cities and 19 percent below the top 10 U.S. cities (by population) as of June 2017.

** Information above provided by ComEd.

As part of its Modernization Action Plan, Ameren Illinois has focused on modernizing the grid in the following key areas:

- Implementing an advanced distribution management system (ADMS) with enhanced Supervisory Control and Data Acquisition (SCADA) and enhancing associated monitoring, control, and operating systems;
- Enhancing its communication infrastructure;
- Automating the high voltage and primary distribution systems;
- Adding remote metering and monitoring capabilities to distribution substations;
- Replacing electro-mechanical high voltage distribution relaying with solid state devices;
- Adding remote communication and monitoring capabilities to its underground network system;
- Adding communication and control to voltage control devices to enhance voltage optimization; and
- Implementing a smart grid test bed, including distributed energy resource (DER) integration and microgrid testing infrastructure.

Through these initiatives, from 2013 to 2017, the percentage of:

- Distribution substations with remote control and/or monitoring capabilities increased from 48% to 69%.
- High voltage distribution circuits with remotely controlled and/or monitored devices increased from 91.0% to 99.6%.
- Primary distribution circuits with remotely controlled and/or monitored devices increased from 57% to 75%.
- Meters served from an automated primary distribution line increased from 2% to 19%.

These initiatives, coupled with other infrastructure and operating programs, have resulted in 238,000 fewer electricity service interruptions on average and a 17 % increase in overall reliability.

By the end of 2019, Ameren Illinois will have deployed electric smart meters to its 1.25 million customers (more than 1 million electric smart meters will be deployed by the end of 2018). Along with the deployment of smart meters, Ameren Illinois will have a radio field area network that can be leveraged for other grid modernization efforts that require, or can use, wireless communication channels. The Company is using its smart meter solution for billing, interval usage collection, customer data presentment, third-party data access, remote service orders, operational analytics, Peak Time Rewards, integration with outage management, and communication with behind-the-meter Home Area Network devices. In 2018, Ameren Illinois began collecting and analyzing interval data beyond just usage, including voltage, temperature, and amperage to improve operations and provide better customer service.

1.1.3 *Illinois Need for and Expectations from Future Grid Modernization*

While Illinois has made considerable progress in grid modernization, the rapid advancements in technology, information, communications and computing and their implementation create new impetus for further grid modernization efforts. Some of the key drivers to continue grid modernization efforts include:

- The intensified expansion of clean and distributed energy resources, including wind, solar, demand response, electric vehicles, energy efficiency and better and cheaper energy storage options.
- The implementation of new grid architectures – microgrids – presents new opportunities for delivery of electricity with increases in resilience and efficiency.
- The effective deployment of better and more timely electricity usage data, newly developed analytics and other data-driven tools and the ability to provide improved data to customers create new opportunities for customer energy management and bill reduction.
- The broader deployment of computers and computing in every part of the electricity sector creates increased vulnerabilities to the grid from cyber-attacks in addition to the security of the physical assets, which are visible virtually everywhere.

It is precisely such drivers that provided the motivation for the ICC to spearhead this NextGrid Study to better prepare the State of Illinois for its electricity future.

1.4 The Illinois Context

Illinois is the fifth most populous state in the nation and is anchored by Chicago, the nation's third most populous city and a global leader with, by some measures, the fifth largest GDP of any city in the world.

Chicago's central geographic location and proximity to waterways have made it into a major North American transportation hub. With its navigable system of waterways leading to the Mississippi River, Chicago is the only direct maritime connection between the Great Lakes and the Mississippi River basins. Chicago's O'Hare International Airport is the third busiest airport in the country and fifth busiest in the world. And the Chicago region is the nation's main rail freight hub, with approximately 25 percent of all freight trains and 50 percent of all intermodal trains in the nation passing through metropolitan Chicago, which serves as the continent's main interchange point between western and eastern railroads[2]

Outside the Chicago region, Illinois has approximately 27 million acres of farmland and ranks among the top 10 states in the market value of agricultural products sold.[3] Illinois is one of the top

[2] Chicago Metropolitan Agency for Planning ON TO 2050 and the Regional Strategic Freight Direction, 2017. GG Note: pls use the Title case for the report title and not all CAPS.
[3] https://www.eia.gov/state/print.php?sid=IL

ethanol-producing states and, is also a leader in biodiesel production capacity. It has over 4,200 MW of utility-scale, wind-powered electricity generating capacity.[4]

Illinois is a key transportation hub for crude oil and natural gas.[5] The state currently has eight crude oil pipelines, eight petroleum product pipelines, 18 interstate natural gas pipelines, two natural gas market centers, and two petroleum ports.[6]

Illinois also has the largest fleet of nuclear power plants in the nation. With a total capacity of about 11,600 MWs, about one-eighth of the nation's nuclear power generation, and more than half of all electricity generation in Illinois is produced by the state's six nuclear power plants, housing a total of 11 generating units.[7] All nuclear plants in Illinois are owned by Exelon Generation Company, with the exception of the Quad Cities Nuclear Generation Station, which is owned by both Exelon Generation Company (75%) and Mid-American Energy Company (25%).

1.4.1 *Illinois Bulk Transmission Grid and Its Wholesale Electricity Markets*

Illinois's transmission owning utilities are members of two Regional Transmission Organizations (RTOs), whose footprints cover different portions of the state. ComEd is a member of PJM, while Ameren Illinois and MidAmerican are members of the Midcontinent Independent System Operator (MISO). The geographic footprints of the two RTOs are shown in Figure YY. An RTO is an independent, not-for-profit entity regulated by the Federal Energy Regulatory Commission (FERC) that operates side-by-side the transmission grid and its wholesale electricity markets. An RTO is the "cop on the beat" whose primary responsibility is to ensure the reliability of the grid. While an RTO does not own any assets other than its offices and its Energy Management System to control the grid, its activities in market and system operations ensure that the second-by-second supply–demand balance is maintained around the clock so as to operate the system securely and in an economically efficient manner. In addition, the RTO must ensure resource adequacy and transmission planning to ensure the grid will be able to meet future electricity demands on its footprint.

[4] https://www.eia.gov/state/print.php?sid=IL
[5] https://www.eia.gov/state/print.php?sid=IL
[6] https://www.eia.gov/state/print.php?sid=IL
[7] https://www.eia.gov/state/print.php?sid=IL

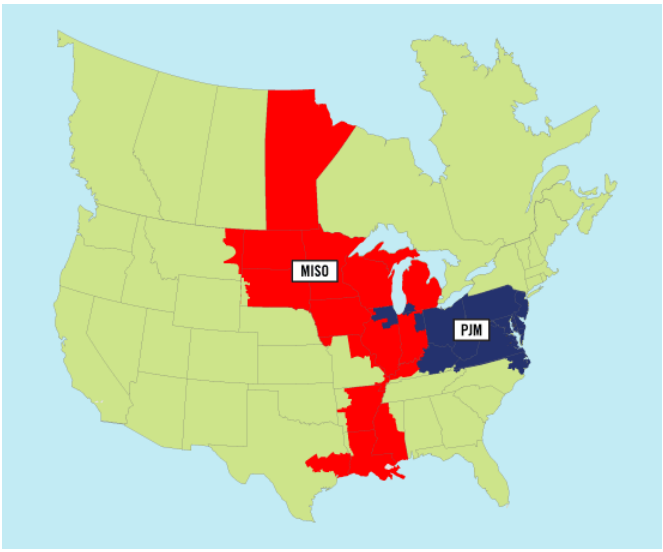

Figure YY. The geographic footprints of PJM and MISO cover complementary sections of Illinois

Illinois' customer choice legislation in 1997 led to vertical unbundling of Illinois utilities' assets. The utilities divested their generation assets or transferred them to unregulated affiliate companies. In certain cases, they sold generation holdings to independent power producers. Also, in conformance with FERC Order No. 888 and Order No. 889, Illinois utilities have retained their transmission and distribution system assets. All matters pertaining to transmission terms, rates and conditions fall under the exclusive jurisdiction of the FERC, but states retain jurisdiction over all siting issues. Utility distribution systems in Illinois fall under the jurisdiction of the ICC.

Transmission and distribution systems are commonly referred to as "grids". The backbone of the electricity system is comprised of its high-voltage transmission lines that connect the generation resources to the loads. This interconnection of the generation and load resources with the transmission network is referred to as the "bulk" power system, which is designed to move large volumes of electricity over long distances from the source of generation to the point of distribution for consumption. Illinois' transmission system conducts electricity at voltages ranging from 69,000 Volts (69 kV) to 765,000 Volts (765 kV).

The electric transmission system in the United States is owned by various private and public electric entities. The Illinois transmission grid consists of numerous sections, each with unique ownership. The principal entities that own parts of the grid are:

- ComEd transmission networks has 5,300 miles of lines;
- Ameren Illinois transmission network has 4,638 miles of lines;
- MidAmerican Energy Company's Illinois transmission network has 336 miles of lines;
- Ameren Transmission Company of Illinois (ATXI) owns 303 miles of transmission lines;
- Several municipal and cooperative utilities also own transmission lines in Illinois.

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Thus, the Illinois transmission grid ownership is very diverse with, virtually, all segments of the electricity industry represented.

1.4.2 *Profiles of the Two Largest Illinois Investor-Owned Utilities*

Ameren Customers and Their Energy Demand

Based on the 2010 Census, 68 % of the counties that Ameren Illinois serves are categorized to be urban and the remaining 32 % are rural. Ameren Illinois classifies its customers as residential, commercial, and industrial with fractions of 32%, 36%, and 32%, respectively. Typically, Ameren Illinois' average load is lower in the fall and spring, and higher in summer and winter time periods. In the summer, there is a single, daily maximum demand in the mid-to-late afternoon, one of which sets the annual peak. In the winter season, there are many days with double peaks – one in the morning as people start their day and another in the evening, as people return home and use their appliances, TVs, hot water heaters and other electric loads. Typically, the evening peak sets the daily peak in the winter season.

Prior to the 2008 recession, the annual growth rate of Ameren Illinois' loads was in the 1–1.5 % range. Subsequently, the customer class loads became flat or decreased, with the most pronounced drop in the industrial sector. Ameren Illinois' future outlook is for loads to remain flat or decline. The basis for this outlook is the forecast of the combined impacts of the numerous factors that influence future load, such as economic factors – population growth, manufacturing sector performance, especially in the primary metals sector, GDP and economic development, energy efficiency implementation, deeper penetrations of distributed energy resources, increased sales of electrical vehicles and future electrification.

Table 1 provides a summary of the sizes of the Ameren customer classes and indicates the share of the consumption met by ARES for the year ending on February 28, 2018. The impacts of retail switching on the Ameren system in the two customer classes in terms of customer numbers are rather similar but on the customer class consumption are markedly different.

Table 1: Ameren Customers and Their Electricity Consumption

quantity	**Residential**	**Non-Residential**	**Total Company**
Number of Customers	1,060,685	163,052	1,223,737
ARES-Supplied	629,723*	94,422	724,145
ARES-Supplied % share	59.4	57.9	59.2
Monthly kWh Usage	1,081,668,741	1,905,126,068	2,986,794,809
ARES-Supplied	628,929,022	1,652,257,359	2,281,286,381
ARES-Supplied % share	58.1	86.7	76.4

* In May 2017, 56% of Illinois residential ARES customers were part of a municipal/county and community load aggregation program. A total of 746 communities have passed an opt-out aggregation referendum to date. More detail can be found in the Annual Report of the ICC Office of Retail Market Development. [8]

Ameren Illinois does not own any generation; therefore, the Company uses MISO-generation data to estimate the electric supply mix provided to its customers. Data for the five years 2013 through

[8] Add citation and link.

2017 is provided in the table below. It illustrates a decline in coal (-21%) which is offset by increases in natural gas (+13%), nuclear (+4%), oil (+2%), renewables (+1%) and other (+1%).

Table 1.2: The Changing Energy Resource Mix 2013 – 2017

Primary Energy Source for MISO Electricity (per Environmental Disclosure)					
	12 months of data ending in the 4th quarter of:				
	2017	2016	2015	2014	2013
Coal	50%	49%	52%	60%	71%
Hydro	1%	1%	1%	1%	1%
Gas	20%	22%	20%	16%	7%
Nuclear	16%	16%	16%	16%	12%
Oil-fired	3%	3%	3%	1%	1%
Renewable	9%	8%	7%	6%	8%
Other	1%	1%	1%	0%	0%
	100%	100%	100%	100%	100%

Commonwealth Edison Company – Service Territory Characteristics

ComEd is a unit of Chicago-based Exelon Corporation and provides service to approximately 4 million customers to meet the needs of 70 percent of the state's population, and the vast majority of the State's industrial companies. The ComEd service territory covers 11,411 square miles, from the Wisconsin border to as far south as Pontiac, and from the Indiana border to the Mississippi River.

ComEd's distribution system comprises more than 5,300 miles of overhead transmission lines, approximately 34,900 miles of overhead distribution lines, 29,700 miles of underground distribution lines, 28,000 manholes, and 1,300 substations.

ComEd does not own power plants and relies on the competitive wholesale generation supplied in the PJM system. Figure X shows the sources of electricity and their associated shares for the 2017 ComEd wholesale energy suppliers in the PJM system.

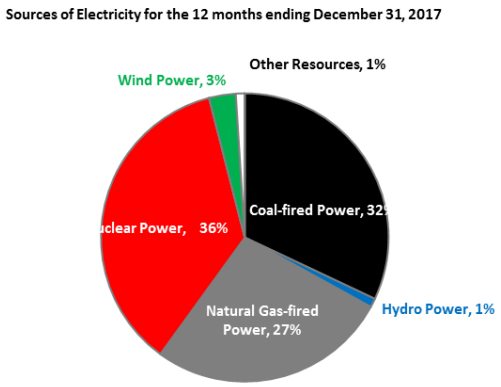

Figure X: Sources of ComEd Electricity Consumption for 2017

Sources of Electricity[9] Supplied For the 12 months ending December 31, 2017	**% of Total**
Biomass Power	0%
Coal-fired Power	32%
Hydro Power	1%
Natural Gas-fired Power	27%
Nuclear Power	36%
Oil-fired Power	0%
Solar Power	0%
Wind Power	3%
Other Resources	1%
Unknown Resources purchased from other companies	0%
TOTAL	100%

[9] These figures constitute the aggregation of information provided by ComEd's wholesale energy suppliers, all of whom have indicated that their source is the "PJM system mix". The PJM system mix data is from PJM Environmental Information Services, Inc. (www.pjm-eis.com).

1.5 The NextGrid Study

1.5.1 *The Study Overview*

The NextGrid is commissioned and managed by the ICC, as an extension of its scope of utility regulatory activities. This effort is also responsive to an action item in Governor Rauner's 2015 Transition Report which proposed an effort "to review the implications of the 'utility of the future' on existing laws and regulations, ownership structure, pricing designs, and incentives"[10] Furthermore, the study advances the ICC's mission to balance the interests of consumers and utilities to ensure adequate, efficient, reliable, safe and least-cost public utility services, while promoting the development of an effectively competitive energy supplier market. This mission encapsulates the legal authority of the agency, as outlined in the Public Utility Act (PUA) and the Illinois Retail Competitive Act of 2006.[11]

The NextGrid Study is not a docketed proceeding of the Commission and there will not be a Commission Order pursuant to this report. Through this study, the Commission has convened national and local thought leaders, subject matter experts, academic researchers and stakeholders - parties who may participate in or be affected by grid modernization efforts. The discussions were intended to identify and discuss issues that need to be considered to further grid modernization, identify opportunities, challenges and open questions and formulate possible directions for the future with the associated impacts appropriately assessed.

Throughout the study, the ICC emphasized that its goal was not to drive stakeholders to reach consensus. Rather, it sought to develop a common knowledge base about grid modernization that reflects current best practices. In addition, the ICC afforded stakeholders the process to identify key issues, challenges and opportunities, and to help formulate legal, policy, market-based and technological options for the design and implementation of further grid modernization efforts.

1.5.2 *The Study Process*

The ICC formally launched the NextGrid study in September 28, 2017 with a one-day conference held at the University of Illinois-Chicago. The launch event included panel discussions on grid modernization, and featured Robert F. Powelson from the Federal Energy Regulatory Commission (FERC) as the keynote speaker, with more than 400 people in attendance.

The ICC selected The University of Illinois ("U of I") Department of Electrical and Computing Engineering as NextGrid Lead Facilitator. The U of I College of Engineering is a world-renowned research and education institution, with expertise and top-ranked departments and faculty in all engineering disciplines related to grid modernization. U of I helped structure the study, monitored and guided inquiries, and ensured that the report is technically rigorous, accurate and well supported by and grounded in the latest research and technology. The U of I prepared this draft

[10] Add citation and link to transition report.
[11] Add specific citation(s).

Final Next Grid Report based on the reports produced by individual Working Groups, (described below), and presented this report to the ICC. Members of the public had the opportunity to comment on the draft Final Next Grid Report when U of I submitted it to the ICC. The ICC reviewed the draft report and considered all comments before finalizing the report and releasing this Final Next Grid Report in December 2018.

The ICC and U of I have identified seven NextGrid Working Groups (WG) to investigate and assess the various policy and technological issues, challenges and opportunities associated with grid modernization. Each WG was led by one or a pair of independent subject matter experts selected by the ICC. WG Members were selected by the Working Group Leader(s) in consultation with ICC Staff and U of I. Each WG was responsible for preparing one draft chapter for the Final Report. Each WG Working began by identifying key questions and issues to be addressed and then engaged Working Group members and outside experts in a series of meetings and presentations intended to develop a common base of knowledge and to identify opportunities, challenges, open questions and options for next steps and policies. Based on the deliberations of the WG, the WG Leader(s) produced the draft WG report for submission to the U of I facilitators to compile into the Final Report.

In addition to the Working Groups, the ICC convened two advisory groups, the Stakeholder Advisory Council (SAC) and the Technical Advisory Group (TAG). The SAC was comprised of thought leaders representing the broad range of stakeholders of the utility industry, including environmental and business interests, consumer advocates, and state and local policymakers and vendors. The SAC held quarterly meetings to provide advice to the ICC and the Working Groups on the issues, challenges and opportunities. The TAG's membership of national and international subject matter experts, served as a resource to the Working Groups and the ICC for technical input. The TAG met sufficiently frequently throughout the study to provide specific guidance and feedback to the Working Groups and ensure that all relevant technical issues had been identified and appropriately addressed.

The ICC also hosted three public study update and comment sessions in Chicago, Urbana, and Carbondale. These sessions provided NextGrid Lead Facilitator, WG Leaders and ICC Commissioners the opportunity to report to the public on the progress of the Study and, in turn, for the public to comment on and ask questions about various issues. The readers of this Report may visit the NextGrid website to view all the Working Group agendas, presentations, meeting summaries and supporting documents.

Report Overview

The chapters in the report includes the reports prepared by each of the Working Groups. Chapter 9 is a list and description of "cross-cutting" issues that were identified and considered in more than one Working Group. Chapter 10 is the conclusory chapter that lists and describes policy and technological options for further Illinois grid modernization. The Appendices contain additional background information to help explain the information contained in the report chapters.

Here will be a listing of each chapter title with a brief description of each chapter and a brief summary of the appendices.

Chapter 2: New Technology Deployment and Grid Integration
Chapter 3: Metering, Communications and Data
Chapter 4: Reliability, Resiliency and Security
Chapter 5: Customer and Community Participation
Chapter 6: Electricity Markets
Chapter 8: Regulatory, Environmental and Policy Issues
Chapter 9: Ratemaking
Chapter 10: Cross-Cutting Issues
Chapter 11: Conclusion – Regulatory and Technological Options for Further Illinois Grid Modernization
Appendices