Council for the City of New Orleans
Docket No. UD-18-01: An Inquiry into Establishing a Smart Cities Initiative for the City of New Orleans

Entergy New Orleans, LLC's Grid Modernization and Smart Cities Report

April 10, 2018

Contents

I. Background and Report Overview

On February 8, 2018, the Council for the City of New Orleans (the "Council") adopted Resolution No. R-18-36, *Resolution and Order Opening an Inquiry Into Establishing a Smart Cities Initiative for the City of New Orleans and Directing Entergy New Orleans, LLC to Report with Respect to Matters Related to Grid Modernization* (the "Resolution"). The Resolution established Council Docket No. UD-18-01, *An Inquiry Into Establishing a Smart Cities Initiative for the City of New Orleans*, and directed Entergy New Orleans, LLC ("ENO") to "file with the Council within sixty (60) days of the adoption of this resolution by the Council a report detailing available grid modernization technologies together with a description of how such modernization could be implemented by ENO." As such, this Report is filed in compliance with the Council's directive.

Beyond simply complying with the Council's directive, with this Report, ENO welcomes the opportunity to engage in a collaborative and ongoing effort focusing on the integration of various Grid Modernization and Smart Cities technologies into the City of New Orleans' infrastructure in a manner designed to benefit the entire New Orleans community.

To that end, this Report provides an overview of ENO's long-term vision for Grid Modernization within the City of New Orleans. More specifically, the Report contains (i) an overview of the technologies that are part of a Grid Modernization strategy, including applications and associated technologies, (ii) a description of potential customer benefits of Grid Modernization, (iii) a discussion of ENO's ongoing and contemplated approach to further incorporate such technologies into its daily operations within New Orleans, and (iv) information related to several Grid Modernization initiatives that ENO plans to deploy in the near future.

In addition to discussing the Grid Modernization concepts described above, ENO has also taken this opportunity to provide the Council with information concerning the Smart Cities concepts introduced in the Resolution. Specifically, ENO provides information on (i) how Grid Modernization facilitates applications that support the Smart Cities initiative, (ii) test concepts including one that ENO is currently implementing at its Dwyer Road Service Center and another proposed for the Poydras Corridor that ENO offers for the Council's further evaluation in connection with the efforts initiated in this Docket, and (iii) ENO's views of policy goals and collaboration roles to fully support the Smart Cities initiative that the Council has established.

ENO hopes the information provided in this Report will inform the Council about immediate, practical, and concrete steps ENO is taking with regard to Grid Modernization and contribute to a fruitful and collaborative dialogue with the Council, its Advisors, stakeholders, and the residents of the City who are focused on making New Orleans a technologically Smart City.

II. Grid Modernization Overview

While the notion of "the grid" can be an elusive concept to the average resident, the electric energy provided through the grid has become even more critical to those residents in light of rapid technological advances, warranting more attention from customers and utilities alike. The electric "grid" can be described generally as the physical network of transmission lines, substations, transformers, distribution lines, poles, and other equipment that safely and reliably deliver electricity from generation sources to homes and businesses.

The Council is familiar with the general concept of grid modernization. The recently approved Advanced Metering Infrastructure ("AMI")[1] initiative is a necessary foundation to and a component part of a grid modernization strategy. This Report focuses on another part of grid modernization—updating and upgrading the facilities between the transmission system's terminus and the customer's advanced meter (*i.e.*, distribution infrastructure).

Traditionally, distribution infrastructure was responsible for reliably and safely distributing energy in one direction – from large substations to end users – and measuring customers' energy usage and demand. However, technological advancements and increased adoption of distributed energy resources ("DERs") will require more functionality from distribution infrastructure than was traditionally needed. Due to their obligation to provide non-discriminatory service to all customers, public utilities like ENO are uniquely positioned to help ensure that all customers, and not just affluent early adopters of new technologies, share in the benefits of these advancements as they continue to evolve.

In order to translate the larger concept of grid modernization into practical and concrete steps that will benefit New Orleans and all of its residents, this Report contemplates "Grid Modernization" as an initiative that is focused on expanding the operational capabilities of the distribution elements of the grid. In this context, Grid Modernization refers to upgrading distribution infrastructure to add new technologies and intelligent devices that facilitate safe multi-directional energy flows, automate operations, enable wireless control, facilitate operational efficiency, improve service, increase reliability and resiliency, and expand options for customers. Thus, Grid Modernization is more than a one-time investment or a portfolio of projects. Instead, Grid Modernization is a fundamental change to a utility's approach on how to invest in, operate, and maintain the distribution system while monitoring and responding to the rapid pace of technological innovations and evolution of customer expectations.

[1] **Advanced Metering Infrastructure ("AMI"**) is an architecture for automated, two-way communication between a smart utility meter with an IP address and a utility company.

Grid Modernization Applications and Associated Technologies

The technology and infrastructure components that enable a comprehensive Grid Modernization strategy can be thought of in three broad pillars that support beneficial applications.

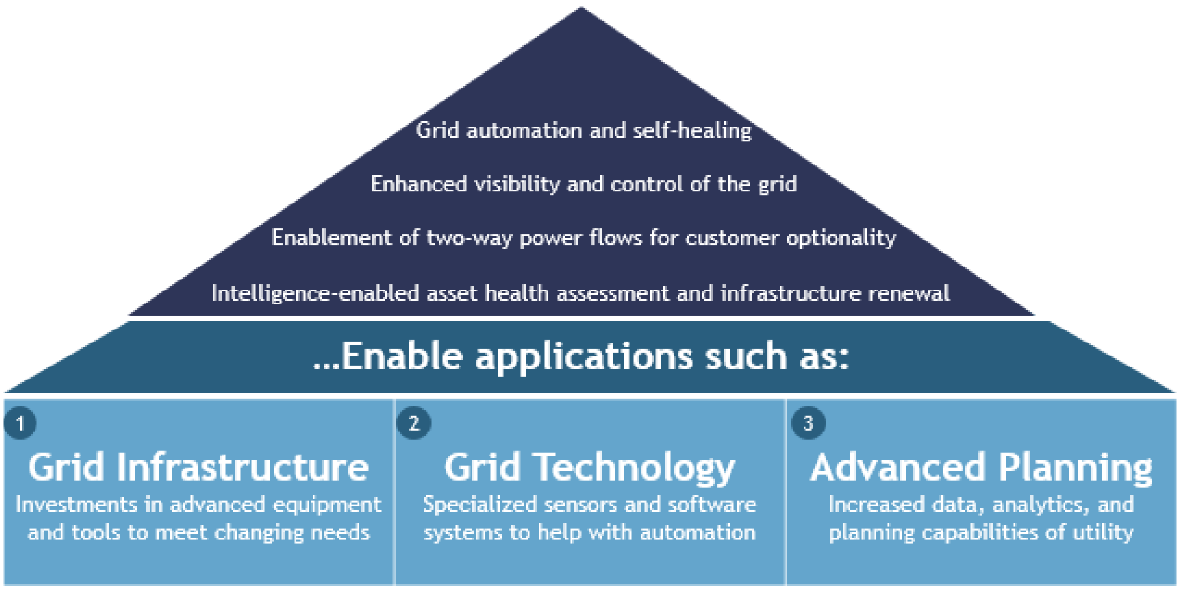


Figure 1: Grid Modernization supported by three pillars that enable application to cities

1) **Grid Infrastructure**: This category includes upgrading existing infrastructure with newer assets to improve the resiliency and reliability of the distribution system, and support technologically-advanced options for meeting customers' changing needs. This category includes changes to equipment to enable the grid to support more and newly evolving forms of DERs with bi-directional power flow, so that increased levels of energy from distributed generation ("DG") can be fully supported in the future. For example, modernizing grid infrastructure would enable optimization of technologies like microprocessor-controlled devices, solar photovoltaic ("PV") systems, battery storage, microgrids[2], and electric vehicle infrastructure in the future.

[2] A **Microgrid** is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid can connect and disconnect from the grid to enable it to operate in both grid-connected or island-mode.

2) **Grid Technology**: Grid technology represents the specialized sensors, collectors and associated software systems that collect, analyze, and deliver information for real-time decision-making and automation. Many of these technologies build on the capabilities to be developed through ENO's current investment in and deployment of AMI infrastructure. Examples include: smart grid sensors,[3] distribution automation ("DA"),[4] and data analytics software.[5]

3) **Advanced Planning**: The combination of increased data, new analytics, and evolving planning criteria will enable ENO to better meet evolving customer demands for interconnection of renewable resources, other new technologies and improving the distribution system for added reliability and resiliency. Today, because of the limited data available from the facilities and meters currently in service, distribution planning is studied at system peak time periods, which typically represents only a few hours over the course of the year. Advanced distribution planning will leverage the additional data captured from AMI and DA to perform more robust analysis during multiple time periods and under different load scenarios. Advanced planning can also provide additional benefits for customers to proactively address power quality and outage concerns as part of a more robust and flexible grid.

Investment in grid infrastructure, grid technology, and advanced planning serve as the backbone of Grid Modernization efforts for ENO and can enable the application of technological improvements including, but not limited to:

[3] **Smart Grid Sensors** are small, lightweight nodes that serve as detection stations in a sensor network. Smart grid sensors enable the remote monitoring of equipment such as transformers and power lines and the demand-side management of resources on the grid. Smart grid sensors can be used to monitor weather conditions and power line temperature, which can then be used to calculate the line's carrying capacity. This process is called dynamic line rating and can enable increased power flow of existing distribution lines.

[4] **Distribution Automation ("DA")** is the integration of distribution grid devices such as reclosers, regulators, and capacitors with smart controls talking over the AMI communication network to utility software solutions to perform real-time sensing and reconfiguration of the distribution system. These devices will also enable the distribution grid along with the Distribution Management System ("DMS") to behave as a Self-Healing Networks (defined further below), improving restoration times and minimizing customer impacts from any outage conditions. The collection of operational data allows for enhanced engineering analysis and proactive decision-making for future distribution projects. Additional examples of DA-enabled devices include electronic sectionalizers, transformer health monitors, network protectors, vault monitors, fault circuit indicators, field switches, power quality monitors, feeder breakers, tie breakers/switches, and distributed generation control systems.

[5] ENO will continue to work with the Council to ensure that best practices and protocols regarding cyber security are applied and enforced for any devices and software systems added to the distribution infrastructure network and systems.

- Grid automation and self-healing networks[6] (*e.g.*, detection and isolation of faults to minimize customer impact and improve system reliability)
- Enhanced visibility and control of the grid
- Enables of two-way power flows for customer optionality
- Intelligence-enabled asset health assessment and infrastructure renewal

Potential Customer Benefits of Grid Modernization

In addition to serving as the necessary foundation of Smart Cities technologies, Grid Modernization projects can produce many benefits for electric utility customers, including:

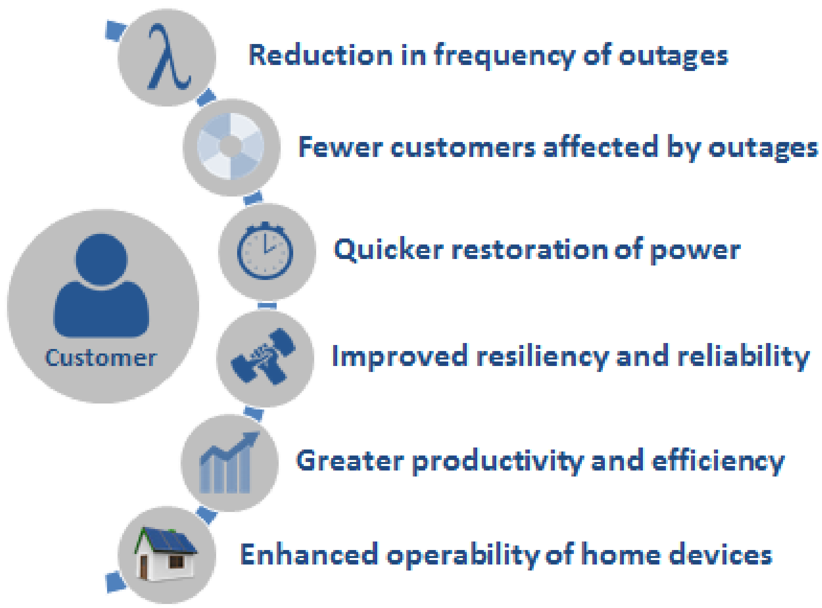
- Reducing the frequency and duration of outages with automated load transfer systems;
- Reducing the number of customers affected during outages by sectionalizing distribution circuits into smaller segments;
- Accommodating increased adoption of electric vehicles ("EVs")[7] by investing in charging infrastructure and related offerings to support public and private EV charging;
- Enhancing customers' ability to take greater advantage of their mobile devices and smart home appliances;
- Improving the utility's situational awareness and outage response times through real-time monitoring and remote control of DA and smart devices;
- Improving resiliency and performance;

[6] **Self-Healing Networks** utilize automated load transfer systems ("ALTs"), which are enabled by capacity of the grid infrastructure, technology, and advanced planning components described above. ALTs monitor the distribution system for any outage conditions and automatically reconfigure the source of power to isolate the outage and restore power to all other unaffected customers in the surrounding area. ALTs are comprised of reclosers and a network of communication devices. Reclosers monitor the distribution system for outage conditions or abnormal events and interrupt or open circuits to stop the outage events. Within ALTs, reclosers utilize communication networks to exchange information within seconds in order to reconfigure the distribution system and minimize customer exposure for any outage scenario. Reclosers also provide visibility to system operators through the OMS/DMS system to allow for dispatch of first responders to the location of the outage thereby enabling faster restoration. These components working together provide a more informative, robust, dynamic, and responsive grid for the customer.

[7] The Council has recently expressed its support for encouraging the adoption of electric vehicle use and has undertaken its own efforts to foster such increased adoption. *See, e.g.*, Resolution No. R-18-100, adopted April 5, 2018, at pg. 2 ("the Council agrees that the use of electric vehicles is in the public interest and is consistent with Council Resolution Nos. R-17-428 (Resolution Regarding Climate Action for a Resilient New Orleans Strategy) and R-17-303 (resolution supporting the Paris Agreement) and should therefore be encouraged."); City Ordinance No. 27545, adopted September 28, 2017 and returned by the Mayor October 11, 2017.

- Increasing interoperability for DERs interconnection and integration, and transportation and other forms of electrification;
- Improving productivity and cost efficiency through automated tools and increased situational awareness for system operators; and
- Accommodating increased levels of DERs without increasing the operational risk of the distribution system.

Figure 2: Representation of a Subset of Potential Grid Modernization Benefits



Many of the reliability-related benefits of Grid Modernization investments can be observed immediately upon deployment of the component technologies. However, to fully realize certain other potential benefits of such investments, Grid Modernization efforts should be strategically coordinated with deployment of foundational technologies such as AMI and Outage and Distribution Management Systems ("OMS/DMS").[8] Given the Council's recent approval of

[8] **Outage Management and Distribution Management System ("OMS/DMS")** is a software system that integrates real-time networked field devices and AMI data with a geospatial information system ("GIS"). This system provides more efficient and intelligent energy grid operations and improves situational awareness for operators. Networked field devices include: automated feeder switches, reclosers, capacitors, and voltage regulators. This technology has the ability to manage and shift load, identify faults, and improve response time, thereby shortening the overall duration of outages.

ENO's investment in and deployment of AMI and OMS/DMS technologies over the very near term,[9] ENO is well-positioned to begin providing reliability-related benefits to customers immediately upon deployment of Grid Modernization component technologies and also to begin enabling a broader scope of applications upon completion of AMI deployment.

III. Grid Modernization in New Orleans – What to Expect from ENO

Approach to Project Development

Adoption and incorporation of Grid Modernization technologies (particularly investment in grid infrastructure and technology), as seen with ENO's current work related to AMI, can require significant capital expenditures and time to complete. There are a number of recent examples of the investments proposed by other utilities and the associated capital and temporal requirements of those projects (see below).

Figure 3: Grid Modernization investment capital requirements[10]

Utility	Proposed Estimated Investment	Proposed Estimated Duration
Eversource (MA)	$400M	5 years
National Grid (MA)	$1,275M	10 years
Toronto Hydro	$3,811M	10 years
Xcel Energy (MN)	$154M	10 years
Xcel Energy (CO)	$612M	8 years
Commonwealth Edison (ComEd)	$2,600M	10 years
Detroit Edison (DTE)	$4,200M	5 years
Consumers Energy	$3,000M	5 years
Duke Energy (IN)	$1,400M	7 years
Duke Energy (NC)	$13,000M	10 years
Vectren	$450M	7 years
First Energy	$4,200-5,800M	5 years
Southern California Edison (SCE)	$14,600M	4 years

[9] *See* Council Docket No. UD-16-04, Council Resolution No. R-18-37.

[10] Source information for the data concerning these proposals is provided in Figure 4 is located in Appendix A.

While Grid Modernization investments can and often will provide significant and immediate benefits to customers and enable long-term improvements in infrastructure, such as providing a platform for Smart Cities technologies, the capital-intensive and long-term nature of the investments requires a strategic, thoughtful approach.

To formulate a strategic approach to Grid Modernization, ENO and the other Entergy Operating Companies recently engaged a third party to conduct a Grid Modernization Study. This Study was an asset-specific engineering study that evaluated approximately 467 circuits[11] across the Entergy Operating Companies' respective distribution systems. The Study employed a holistic distribution planning process and considered several criteria such as voltage compliance, asset health and risk, reliability, storm resiliency, and the potential for distribution automation. Using the following criteria, the Study developed a number of potential projects designed to enhance the flexibility of the distribution system to enhance reliability and resiliency.

Figure 4: Grid Modernization planning criteria

Compliance	Compliance	Customer Exposure
Is conductor loading within safe operating limits defined by the planning standards?	Can the circuit support expected load growth and DER penetration?	Are there a maximum of 1500 customers per feeder and/or 500 customers per segment?
Are all laterals or large customer segments protected by reclosers?	Can the circuit support load growth from electrification?	Is the circuit backbone less than 60 miles?
		Are overhead segments less than 3 miles?
Equipment Automation	**Self Healing Networks**	**Targeted Asset Health**
Is all 3-phase equipment communication ready?	Does the circuit have the ability to transfer with another adjacent circuit?	Do projects remove small copper conductor and rated equivalents?
Are Fault Current Indicators (FCI) locations adequate and communications ready?	Does the circuit have automated switches at all the tie points between circuits?	Has circuit condition assessment been performed?
Are existing reclosers communications ready?	Are smart air break switches implemented?	Do projects reduce asset age across the circuit?
Are substation remote terminal units (RTUs) compatible with DA line devices?	Does the project resolve transformer contingency for expected load growth?	Is the new or existing right of way (ROW) ideal for ongoing maintenance and vegetation avoidance?
	Can circuit continue to support switching and load transfer with projected load growth?	Is all equipment and poles sized appropriately for new configuration?

[11] The Entergy Operating Companies' Customer Service leadership selected the circuits that were evaluated based on several factors including legacy design basis, past reliability performance, potential for operational benefits, and specific customer profiles. These selections were then verified with analytics to ensure that the final sample of 467 circuits would provide a representative set to extrapolate a comprehensive estimate for modernization across the Entergy Operating Companies' respective distribution systems. Thus, although the Study included just over 10% of approximately 3,500 circuits, the results informed the planning process by providing a realistic cost estimate and overview of expected performance improvement enabled by that level of investment.

Using the above criteria as a general guideline,[12] ENO sought to identify optimal areas where the application of new technologies can improve system performance and reliability without requiring significant system rebuild. In developing potential projects, ENO targeted areas of the system with higher concentrations of assets exhibiting more frequent customer interruptions and/or an increased risk of overload based on load growth projections. This approach focused on developing projects that can provide measureable grid performance gains, while managing costs effectively.

Overview of Projects Currently Underway for New Orleans

Based on the results of the Study, ENO is engineering five Grid Modernization projects that are expected to provide immediate customer benefits in the area of increased reliability (improved System Average Interruption Frequency Index ("SAIFI") and System Average Interruption Duration Index ("SAIDI")), less frequent outages, fewer customers interrupted, and faster restoration times. The engineering of these projects is currently underway with construction on the first project (Curran) targeted to begin in May 2018 and be complete by the end of March 2019. On the following page, Figure 5 provides a map of the areas of the City being targeted for these initial projects and Figure 6 provides high level information related to estimated costs,[13] expected system performance improvements, and other aspects of the projects.

[12] While the above criteria helped, and will help, to guide ENO's approach to project development, the final design of any given project may not fulfill each element of the criteria. Evaluations of whether the costs of meeting a particular element of the criteria would be justified by the corresponding expected benefits are undertaken on a case-by-case basis. For example, it may be very costly to reduce a circuit from 1600 to 1500 customers; however, the projected benefits of compliance with that element of the criteria may not justify the costs in a given situation.

[13] Cost estimates contained in Figure 6 are based on Class 3 estimates (as defined by the American Association of Cost Engineering, Inc.'s Cost Estimate Classification System) created as part of the Grid Modernization Study described above. ENO anticipates that upon completion of the Curran project, information gained during that project will enable ENO to revise these estimates. Completion of the engineering and design of the projects may also result in revisions to the initial estimates provided below.

Figure 5: Location of Grid Modernization projects being engineered by ENO

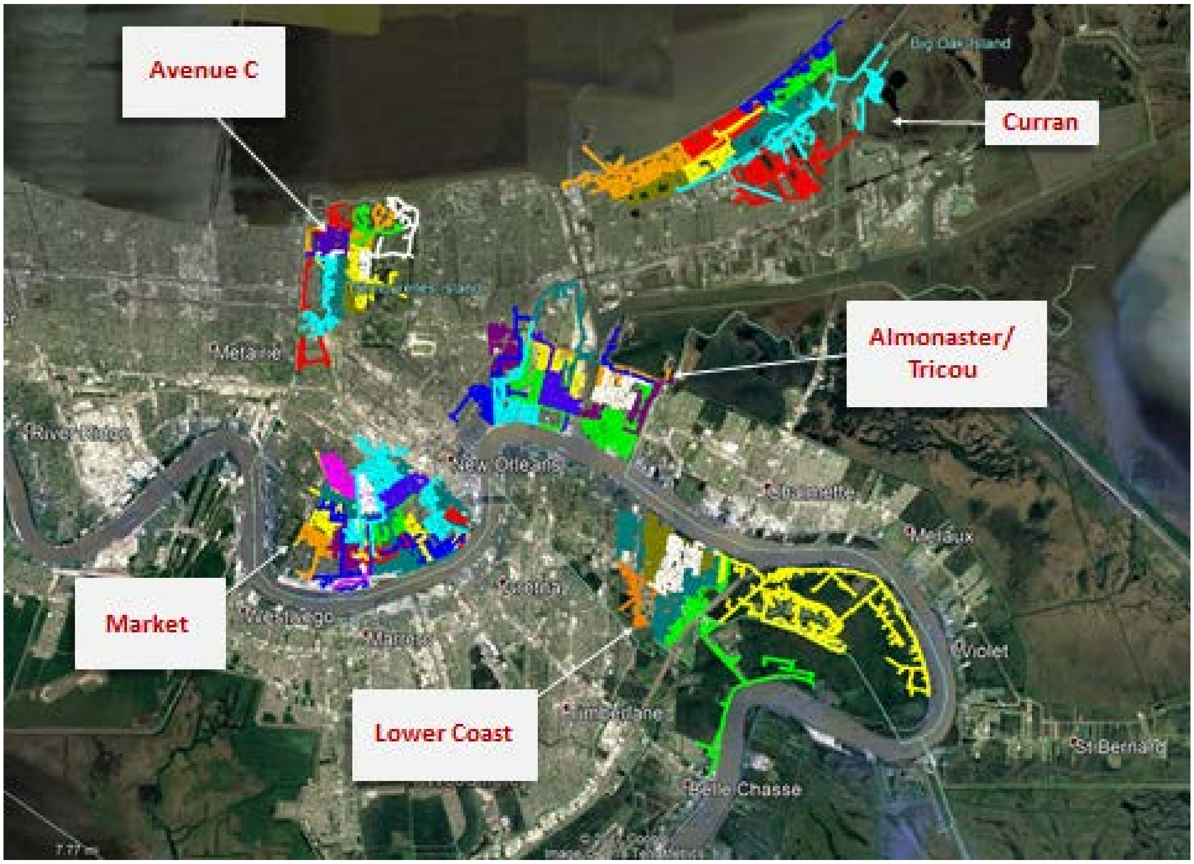


Figure 6: Summary of key project information for first wave of Grid Modernization

Project Name	Est. Cost	Customers Served	Smart Devices Deployed	CIs[14] Avoided Annually	SAIDI / SAIFI % Reduction
Curran	$4.3M	14,791	56	19,732	34% / 53%
Market	$17.5M	32,833	201	10,527	74% / 42%
Lower Coast	$9.8M	12,761	108	6,955	41% / 46%
Almonaster	$14.4M	15,862	96	5,567	56% / 53%
Avenue C	$5.6M	6,453	76	2,821	64% / 59 %

[14] "CIs" refers to Customer Interruptions.

Overall, these five projects are projected to improve reliability by reducing the number of customer interruptions by more than 45,000 per year and lowering the number of customer minutes of experienced outages by approximately 6 million per year. To achieve these reliability gains, it is contemplated that the five projects will add, in aggregate, 537 smart devices and 42 Self-Healing Networks to the ENO distribution grid.

The performance gains attributable to ENO's first planned wave of Grid Modernization projects will not only translate to better service and increased customer satisfaction, but will also provide opportunities for future operational cost savings by enabling more pre-planned, proactive reliability-related efforts. Examples of such future proactive efforts, enabled by the initially contemplated technology deployments, could include identifying and replacing distribution transformers before they fail with the added information from AMI and DA devices. Other examples include being able to identify portions of the distribution system that have abnormal information being reported and being able to take proactive engineering analyses to prevent outages in these areas.

As noted above, the first of these projects to begin construction is the Curran project in New Orleans East. This project will involve eight circuits fed from Curran substation and two circuits fed from the Sherwood Forest substation. The project is expected to improve service to nearly 14,800 customers in New Orleans East and successfully prepare the area to incorporate additional future technologies.

The planned improvements for the Curran project will also involve creating Self-Healing Networks inside the 10 circuit area. To create these self-healing networks, ENO will install 12 reclosers to interrupt outages, as well as up to 44 additional smart devices[15] that will provide increased visibility into real-time system conditions.[16] Together, these improvements will enable faster decision-making related to rerouting power delivery, help minimize customer exposure to outages, and keep the lights on until repairs can be made after a disruptive event. The Curran area will also receive over 5.5 miles of newly constructed conductor.

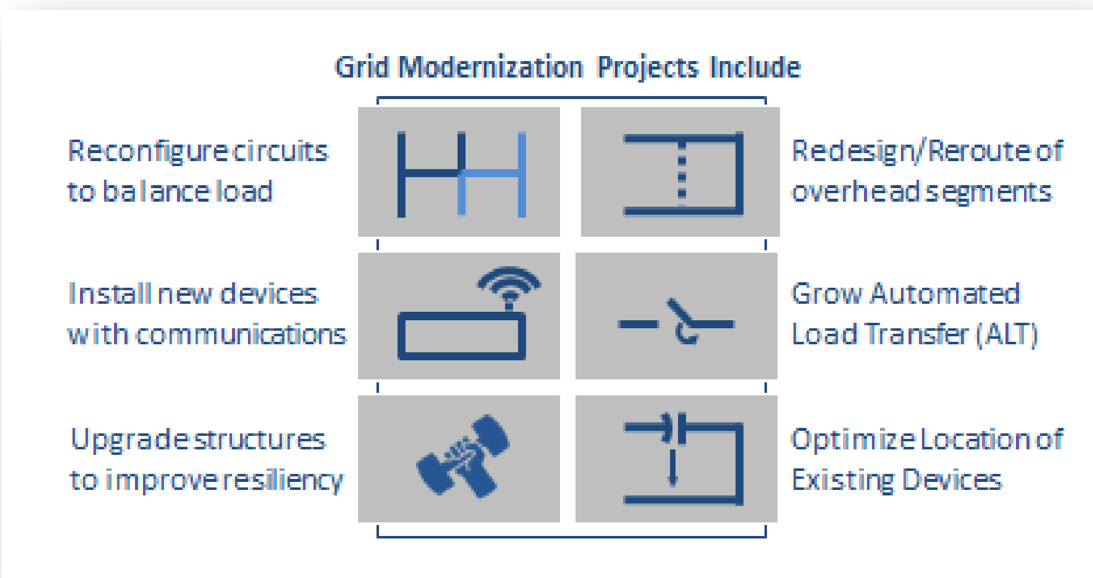
[15] These devices are regulators and capacitors. Regulators are devices that regulate voltage in real-time to maintain voltage limits for all customers on a distribution feeder. Capacitor banks are used to maintain the ratio between reactive and real power. Maintaining this ratio ensures that losses for the system are minimized.

[16] In addition to reliability benefits, the real-time system condition monitoring will also provide greater insight into power flows from customer-owned DERs than currently exists.

In addition to self-healing networks, the work being performed for these five projects will include:

- The reconfiguration of circuits to optimize distribution of customers and/or load segment or to sectionalize the circuit, thereby minimizing the number of customers exposed to outage events on any portion of the distribution circuit;
- Redesign of overhead circuit segments pursuant to Grid Modernization planning criteria;
- Addition of DA load transfer technologies to increase load delivery flexibility and isolate faults to a minimum number of customers;
- Installation of new/upgraded DA and smart grid protection devices, such as breakers, reclosers, fault current indicators, and motor-operated switches, which will communicate via the AMI network and/or will be monitored and controlled via the OMS/DMS interface;
- Installation of upgraded structures to improve resiliency; and
- Optimization of location and sizing of capacitor banks and voltage regulators to improve voltage and loading compliance.

Figure 7: Summary of typical Grid Modernization improvements



Ongoing Grid Modernization Work Beyond Initial Projects

During the engineering and construction of ENO's first wave of planned Grid Modernization projects, ENO also anticipates performing Grid Modernization analyses, similar to those outlined above, on the remainder of the circuits in ENO's service area. The additional analyses, which are under way and expected to be completed by the 1st Quarter of 2019, are expected to result in the identification and potential development of additional Grid Modernization projects for ENO's service area. ENO will continue to keep the Council apprised of further developments in both the execution of the five projects discussed above and the development of future potential projects.

IV. Grid Modernization Facilitates Smart Cities Applications

In addition to the immediate reliability benefits ENO's Grid Modernization efforts are expected to provide customers, the work ENO is currently performing can serve as an important foundation of the Council's Smart Cities initiative. The robust electricity, communications, and data analysis infrastructure provided by ENO's Grid Modernization efforts can also help to facilitate the deployment and functionality of various Smart Cities technologies. However, Smart Cities go far beyond Grid Modernization in the sense that they apply to a wide range of industries and have practical applications within each of them.

Figure 8: Industry segments where Smart Cities applications are being implemented today

Smart Cities are defined by their ability to use data to drive connected coordination. A Smart City "connect[s] the physical infrastructure, the IT infrastructure, the social infrastructure, and the business infrastructure to leverage the collective intelligence of the city."[17] Today, various Smart Cities seek to deliver social, economic, and ecological benefits and improvements in the nine major industry segments depicted above, with the potential for more to come in future. These benefits come as the result of enabling new services and solutions for residents.

A common thread across Smart Cities use cases is that the majority require a similar set of components to deliver value. These components include:

- Sensors and controllers for data collection and storage, as well as remote control of assets
- Communication and network infrastructure to transfer data
- Storage platforms to allow access to data
- Analytics platforms and applications for development of insights
- Product and service offerings based on insights to deliver value for residents

While the sensors and controllers required for various applications tend to be unique to each application, the communication and network infrastructure is both common and foundational to transmission of data for storage, analysis and insight development. This, in turn, is what drives the valuable products and services that are commonly associated with Smart Cities.

Grid Modernization can put in place a critical piece of infrastructure – the communication network – upon which the City of New Orleans can build and innovate on Smart Cities applications outside of those solely related to energy delivery, usage, and management.

V. Smart Cities Test Sites – Dwyer Road and Possible Expansion to Poydras Corridor

ENO is currently working to install Smart Cities technologies for testing and evaluation at its New Orleans East Service Center location on Dwyer Road with an option to expand the scope of this work to the New Orleans Solar Power Plant ("NOSPP") at ENO's Paterson facility. The first phase of work at Dwyer Road will include the installation of a communication network to support the upgrade of the Service Center's lights to LEDs and the installation of smart

[17] Foundations for Smart Cities, IBM Journal of Research and Development, 54 (4).

photocell controllers, which allow remote operation of the lights, pro-active fault detection, and real-time measurement of energy usage.

The second phase of work will involve installation of advanced sensor technology that is capable of facilitating parking space management, monitoring of vehicle and pedestrian traffic flow, and providing other enhanced public safety features. ENO will also install sensors capable of coordinating street lighting with real-time pedestrian traffic flow, which can thereby enhance safety for pedestrians and residents using public transportation. Additional functionality under consideration for the optional NOSPP implementation includes meter reading sensors for water and gas services, as well as water level sensors. The expansion of this work to the area surrounding NOSPP to test various advanced sensor capabilities of additional vendors will be evaluated as the project progresses. ENO is willing to explore a framework for sharing insights gained from this work with the Council and Advisors in order to better inform the Council's Smart Cities initiative.

ENO also has explored the idea of expanding the concepts and technologies being tested at its facilities to an area of the City that may provide more valuable insight to the Council. To that end, ENO would welcome the opportunity to partner with the Council and the City to install a Smart Cities test project in an area bounded by a portion of Canal Street, Convention Center Boulevard, Poydras Street, and Claiborne Avenue. The data and experience generated from such a project could prove useful to the Council in developing a broader Smart Cities strategy.

VI. Smart Cities – ENO's View of Policy Goals and Collaborative Roles

ENO looks forward to being a key partner in advancing the Council's vision of Smart Cities and the many benefits such efforts will bring to citizens. To that end, ENO fully supports the view articulated in a recent Navigant study, and outlined below, of the role of the utility can play for Smart Cities success, and stands ready to work with the Council, its Advisors, and stakeholders that have an interest in developing the Smart Cities initiative.

Figure 9: Key success factors to support the Smart Cities initiative[18]

Success factors		Role of the utility
Strong leadership from government and city leaders is vital to coherent and sustainable strategy	▶	The utility should be an active player in the Smart Cities initiative leadership teams and stakeholder groups
Building on existing assets to develop a distinct Smart Cities vision aligned with local needs and goals	▶	The utility is ready to help the city define its future energy roadmap to meet its ambitions
Work with local communities in all aspects—from initial strategy to project design, deployment, and data collection	▶	Existing and new community energy projects should be included in all programs that are a part of the Smart Cities initiative – emphasize that energy innovations should benefit all
Bring together public sector agencies, the private sector, and academia to form a network of partnerships	▶	Utilities should be part of Smart Cities networks – and catalysts for new types of collaboration
Focus on innovative uses of data for policy development and the creation of new services	▶	Utilities can be proactive players in shaping new data markets by providing valuable energy data, while protecting the privacy of individual customers

ENO believes it is important to begin providing input to the Council on objectives and goals for the Smart Cities initiative to facilitate effective collaboration. Similar to what the Council outlined in the Resolution, ENO views Smart Cities as the integration of various technologies into a strategic approach that enables the achievement of goals such as: (a) greater reliability and resiliency, (b) improved environmental sustainability, (c) increased economic advancement, and (d) improved public safety. ENO provides further discussion of these goals below.

Goal A: Reliability and Resiliency

The foundation for a Smart Cities initiative in New Orleans begins with further modernizing electricity and communications infrastructure within the City and adding improved data analysis capabilities to support effective operational decision-making. ENO has begun this journey with the support of the Council through and the recently-approved AMI project. ENO

[18] *See*, Woods, et al., *Navigating the Urban Energy Transformation: Building Smart and Sustainable Future Cities*, Q4 2017, Navigant Consulting, Inc.

looks forward to working with the Council on additional projects that reconfigure and improve electrical infrastructure while incorporating innovative grid technologies. Indeed, the five projects described above are expected to deliver immediate reliability benefits to customers and enable more advanced operations to enhance the resiliency of portions of ENO's electric system going forward.

Goal B: Environmental Sustainability

In addition to the reliability and resiliency benefits described above, the first set of Grid Modernization projects identified will also enable and support the integration, interoperability, and security of new technologies – such as increased levels of solar PV generation, new battery storage installations, and greater number of electric vehicles on the road. ENO envisions a future where all of these technologies can be integrated, managed and optimized to help meet environmental sustainability goals. ENO's Grid Modernization Phase I study has identified changes in the design and configurations of ENO's infrastructure that will assist in accommodating integration of these technologies. The strengthening of the distribution system will help customers to achieve greater value from their DER investments while improving reliability. ENO is interested in partnering with the City, under the direction of the Council, to continue to evaluate and deploy DER technologies to meet Smart Cities and sustainability objectives for New Orleans.

ENO also agrees with the Council that a more heavily electrified transportation system is another way to improve environmental sustainability and quality of life in New Orleans. ENO looks forward to continuing its work with the Council to facilitate the greater adoption and use of EVs throughout New Orleans.

Goal C: Economic Advancement

Reliable low-cost power is a crucial component of an economically vibrant New Orleans. Emerging Smart Cities tools and technologies that build on the foundation laid by Grid Modernization infrastructure will provide enhanced capabilities to engage customers across New Orleans to more effectively meet their economic and lifestyle needs.

Goal D: Public Safety

As a major destination city, New Orleans must ensure the safety of both its residents and its guests from around the world. ENO is actively evaluating multiple technologies that can leverage the existing street lighting infrastructure to not only improve control of the lights but also provide additional capabilities to the City such as gunshot detection. As discussed above, ENO is installing multiple technologies at its Dwyer Road service centers for evaluation and is interested in working with the Council to develop opportunities for evaluation of these technologies in additional locations throughout New Orleans. The experience and data gained from such efforts could be used to further inform and develop the Council's vision for public safety and ENO desires to contribute to both the evaluation and installation of these technologies.

VII. Conclusion

ENO hopes that this Report will aid the Council in its ongoing evaluation and oversight of ENO's development and deployment of Grid Modernization initiatives for the City of New Orleans and its residents. ENO also looks forward to engaging with the Council, the Advisors, and numerous stakeholders as the Council's Smart Cities Initiative continues to develop.

Appendix A

Eversource Energy; D.P.U. 17-05; Petition of NSTAR Electric Company and Western Massachusetts Electric Company, each doing business as Eversource Energy, Pursuant to G.L. c. 164, § 94 and 220 CMR 5.00 et seq., for Approval of General Increases in Base Distribution Rates for Electric Service and a Performance Based Ratemaking Mechanism; Order filed November 30, 2017. Page 31.

National Grid; Docket No. 15-120; Petition of Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid, for Approval of its Grid Modernization Plan; Filed July 14, 2017. Page 5.

Toronto Hydro-Electric System Limited; Docket No. EB-2010-0142; 2011-2020 Electric Distribution Capital Plan; Filed June 2010. Page 6.

Xcel Energy (MN); Docket No. E002/M-17-776; In the Matter of Xcel Energy's 2017 Grid Modernization Report Under Minn. Stat. § 216B.2425, Sub. 2(e); 2017 Biennial Report – Distribution Grid Modernization; Application filed November 1, 2017.

Xcel Energy (CO); "PUC Approves Xcel advanced grid settlement, decoupling." Colorado Department of Regulatory Agencies. Colorado Public Utilities Commission. June 21, 2017.

ComEd; "ComEd Smart Grid Program Delivering on Promises; *ComEd;* April 5, 2017.

Detroit Edison (DTE Energy); Case No. U-18014; In the matter of the application of DTE ELECTRIC COMPANY for authority to increase its rates, amend its rate schedules and rules governing the distribution and supply of electric energy, and for accounting authority; Distribution Operations Five-Year (2018-2022) Investment and Maintenance Plan Final Report; Application filed January 31, 2018. Page 10.

Consumes Energy; Case U-17990; In the matter of the application of CONSUMERS ENERGY COMPANY for authority to increase its rates for the generation and distribution of electricity and for other relief. Application filed March 1, 2016. Page 3.

Duke Energy Indiana; "Indiana state utility regulators approve Duke Energy's plan to modernize its statewide energy grid;" *Duke Energy*; June 29, 2016.

Duke Energy Carolinas (NC); "Duke Energy emarks on a 10-year initiative to strengthen North Carolina's energy grid;" *Duke Energy*; April 12, 2017.

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