2023
Distributed System Implementation Plan

New York State Electric & Gas
and Rochester Gas and Electric

June 30, 2023

CONTENTS

ACRONYMS

AC	Alternative Current
ADMS	Advanced Distribution Management System
AGR	Automated Grid Recovery/Restoration
AMI	Advanced Metering Infrastructure
ANM	Active Network Management
API	Application Programming Interface
ASHPs	Air Source Heat Pumps
ATWG	Advanced Technologies Working Group
BCA	Benefit Cost Analysis
BESS	Battery Energy Storage System
BSS	Battery Storage System
BTM	Behind-the-Meter
CCA	Community Choice Aggregation
CCS	Customer Care System
CDG	Community Distributed Generation
CESIR	Coordinated Electric System Interconnection Review
CGPP	Coordinated Grid Planning Process
CSS	Customer Service System
CLCPA	Climate Leadership and Community Protection Act
CRM&B	Customer Relationship Management and Billing
DAC	Disadvantaged Communities
DAF	Data Access Framework
DC	Direct Current
DCFC	DC Fast Charging
DER	Distributed Energy Resource(s)
DERMS	Distributed Energy Resource Management System
DG	Distributed Generation
DG/DQ	Data Governance / Data Quality
DMP	Data Management System
DPS	New York Department of Public Service
DR	Demand Response
DRC	Data Ready Certification
DRMS	Demand Response Management Systems
DRV	Demand Reduction Value
DSASP	Demand Side Ancillary Services Program
DSIP	Distributed System Implementation Plan
DSO	Distribution System Operator
DSPP	Distributed System Platform Provider

ECC	Energy Control Center
EE	Energy Efficiency
EMS	Energy Management System
EPPAC	Energy Policy Planning Advisory Council
EPRI	Electric Power Research Institute
EPS	Electric Power System
ESC	Energy Smart Community
ESCO	Energy Service Company
ESP	Electronic Security Perimeter
ESS	Energy Storage System
ETIP	Energy Efficiency Transition Implementation Plan
EV	Electric Vehicle(s)
EVSE	Electric Vehicle Supply Equipment
FERC	Federal Energy Regulatory Commission
FICS	Flexible Interconnect Capacity Solution
FLISR	Fault Location, Isolation, and Service Restoration
FPA	Federal Power Act
FTE	Full-time Equivalent
GBC	Green Button Connect
GHG	Greenhouse Gas
GIS	Geographic Information System
GMEP	Grid Model Enhancement Project
GSHPs	Ground Source Heat Pumps
HC	Hosting Capacity
HP	Heat Pump
HPWHs	Heat Pump Water Heaters
IEEE	Institute of Electrical and Electronics Engineers
IEDR	Integrated Energy Data Resource
IOAP	Interconnection Online Application Portal
IPV	Initial Public Version
IPWG	Interconnection Policy Working Group
ISP	Integrated System Planning
ITWG	Interconnection Technical Working Group
JMC	Joint Management Committee
LMI	Low- to and Moderate-Income
LSRV	Locational System Relief Value
LTC	Load Tap-Changers
M&C	Monitor and Control
M&CWG	Monitor and Control Working Group

M&V	Measurement and Verification
MCOS	Marginal Cost of Service
MDIWG	Market Design and Integration Working Group
MDMS	Meter Data Management System
MGMS	Microgrid Management System
NEM	Net Energy Metering
NYPA	New York Power Authority
NWA	Non-Wires Alternative(s)
NYISO	New York Independent System Operator
NYS	New York State
NYSEG	New York State Electric & Gas Corporation
NYSERDA	New York State Energy Research and Development Authority
NYSDEC	New York State Department of Environmental Conservation
O&M	Operations and Maintenance
OATT	Open Access Transmission Tariff
OMS	Outage Management System
OSG	Operational Smart Grid
PC	Point of Common Coupling
PCIP	Participating Contractor and Industry Partner
PII	Personally Identifiable Information
PSP	Physical Security Perimeter
PSC	Public Service Commission
PSC	Public Service Commission
PV	Photovoltaic
REV	Reforming the Energy Vision
RFP	Request for Proposal
RG&E	Rochester Gas and Electric Corporation
RNM	Reference Network Model
RTU	Remote Terminal Unit
SAP	Asset Inventory System
SCADA	Supervisory Control and Data Acquisition
SEEPs	System Energy Efficiency Plans
SDLC	Software Development Life Cycle
SFTP	Secure File Transfer Protocol
SIR	Standardized Interconnection Requirements
SIWG	Smart Inverter Working Group
T&D	Transmission and Distribution
TOs	Transmission Owners
UCC	Utility Coordination Group
UDR	Utility Data Requirements

VAR	Volt-Amps Reactive
VDER	Value of Distributed Energy
VVO	Volt/VAR Optimization
WDS	Wholesale Distribution Service
WVS	Wholesale Value Stack
ZEV	Zero Emissions Vehicle

Defined Terms

PUC or Commission	New York Public Service Commission
Companies	NYSEG and RG&E, collectively
Con Edison	Consolidated Edison Company of New York
Joint Utilities	New York's investor-owned electric utilities, collectively
DPS Staff	Staff of the New York Department of Public Service

I. Introduction

I.   Introduction

Background

New York State Electric & Gas Corporation ("NYSEG") and Rochester Gas and Electric Corporation ("RG&E") (collectively, the "Companies") and their parent, AVANGRID, embrace New York State's Climate Leadership and Community Protection Act ("CLCPA") goals and advancing clean energy solutions for our customers. The electric sector continues to grow as the energy backbone of the economy and faces ongoing challenges. Climate change is increasing the frequency and severity of weather events, making grid resiliency critical for maintaining safe, reliable electricity service for our customers and communities. Higher penetration of distributed energy resources ("DERs"), including customer-sited solar photovoltaic ("PV") systems, electricity storage, and electric vehicles, is changing the way we plan and operate the electric distribution system.

The requirements and expectations for the electric sector are also undergoing significant change. This change is accelerated by the availability and financial viability of renewable resources that generate and provide energy to the electric grid through non-fossil fuel resources, such as solar, hydro, and wind. These new types of generation require a change in the electric grid structure from one of centralized generation, in which power is distributed in one direction to power businesses and homes from a limited number of generation points, to one that is decentralized and provides power in many directions to the grid from multiple interconnection points.

The Companies will play a fundamental role in the clean energy transition by integrating renewable energy, electrifying transportation, industrial processes, and heating, increasing energy efficiency, and enabling access to electricity markets. As the Distribution System Operator (DSO) for our service territories, the Companies will leverage enhanced capabilities for planning and operating an advanced electric distribution system that provides greater value for our customers. NYSEG and R&E present our 2023 Distributed System Implementation Plan ("DSIP") that explains how integrated platform technologies will support enhanced capabilities of the DSO.

The DSO will support the State in achieving its policy goals, give our customers greater control over their energy usage, provide developers and other market participants with the information they need to make informed investment decisions and help us maintain reliable and resilient electric service. These investment efforts will continue to build on existing programs to enhance the system's operational performance, increase efficiency, and enhance situational awareness and grid visibility through data and analytics. We look to advance future planning of the system as we meet the challenges before us to accommodate higher levels of clean energy generation resources, prepare for electrification, and provide stability and flexibility as the grid continues to evolve.

Finally, the CLCPA sets the New York economy on a path to achieve "net zero" greenhouse gas ("GHG") emissions. It establishes interim target reductions relative to 1990 levels of 40 percent by 2030 and 85 percent by 2050. The CLCPA also establishes several targets for the electricity sector, including targets for solar energy, energy storage, energy efficiency, and electric vehicles. We expect our role as the DSO and the DSIP to enable an efficient implementation of the CLCPA. We are building a robust roadmap with a foundation of technologies, future capabilities, and data that will allow us to track and adjust to CLCPA and future policy developments.

Evolving the Distributed System Platform ("DSP") functions

While our vision for the DSP has remained the same since the 2020 DSIP, a heightened focus on decarbonization at the state and federal level influences how we develop, enhance, and perform core future planning, operational, customer, and market functions. Starting with Reforming the Energy Vision ("REV") and through subsequent state policy developments, such as the CLCPA, the Commission has been advancing an evolving set of goals for New York's energy future that include enhancements to system efficiency, reliability, and resilience, market animation, utility business models, customer empowerment, and GHG emissions reduction. We have continually strived to maintain a complementary vision for our role as DSP and look to evolve those functions into a DSO role.

That vision includes facilitating the development of DERs through DSP functions. Ongoing investments in grid technologies such as advanced metering, advanced integrated system planning, grid operations through grid automation and management, information sharing and analytics, and market and customer innovations will help empower our communities and customers to actively manage their energy needs, participate in the evolving clean energy and decarbonization marketplace.

Exhibit I-1 highlights our 2023 DSIP objectives and priorities over the next five years.

Exhibit I-1

2023 DSIP Objectives and Priorities.

2023 DSIP objectives

✓ Present the Companies' vision for serving as the DSO.

✓ Describe our approach to building the technology platform required to serve as the DSO.

✓ Provide an update on the progress we have made since our 2020 DSIP and describe our future implementation plans.

✓ Describe actions that we are taking to promote clean energy and achieve New York's clean energy goals.

Priorities for the next five years

1. Implement Advanced Metering to measure power at the grid edge and help customers make informed energy decisions with innovative electricity pricing and programs.

2. Make significant progress implementing our long-term Grid Automation program, including the deployment of grid devices[1] needed to support DER integration, beneficial electrification, and grid resiliency.

3. Enhance the accuracy and integrity of data and network models that correctly represent our distribution system assets and all connected DERs and electrification loads - information that is required to plan and operate the grid and deploy IEDR use cases.

4. Improve our integrated planning methodologies and the data and insights we share with developers, including identification of projects to fulfill coordinated grid requirements.

5. Enable the deployment of energy storage, clean DERs, electric vehicle charging stations, and beneficial electrification to make progress toward New York's clean energy goals.

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[1] Grid devices to be installed over the next five years include sensors, relays, switches, reclosers, and smart meters.

(6) Implement an Advanced Distribution Management System ("ADMS") and design
and build other control systems that will be needed to optimize our grid and DERs.
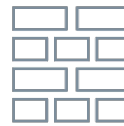
Each of the six near-term priorities is foundational to achieving our long-term (2028 and beyond) vision to plan our system for the clean energy transition, optimize grid, DER, customer, and market resources, and optimize value to our stakeholders.

Exhibit I-2

We are developing our near-term priorities in three stages.

	Design	Build	Optimize
Activities	– Identify DSO capabilities – Develop Platform Technology Roadmap – Deploy Energy Smart Community and other innovation projects – Establish an Enterprise Analytics function – Install grid devices to enable Grid Automation	– Complete deployment of advanced metering infrastructure ("AMI") – Continue Grid Automation – Validate Network model of System Assets and DERs – Build Integrated Planning Tools that use granular AMI and system data – Deploy ADMS and Grid Operations control systems – Collaborate with the DPS Staff, the Joint Utilities, and New York Independent System Operator ("NYISO") on Market Design initiatives – Develop secure information-sharing capabilities to share energy customer and system data with stakeholders	– Optimize system assets and DERs through Integrated Planning and Grid Operations – Enable Customer and DER value from integrated Distribution and NYISO markets – Offer Market Services that support Climate Leadership and Community Protection Act ("CLCPA") goals
Timeframe	2016 to 2020	2021 to 2028+	2029 and beyond

Our 2016 and 2018 DSIPs reported on our aspirations for the DSO and its design. Our 2020 DSIP detailed the technologies, capabilities, and other design elements we tested through the Energy Smart Community ("ESC") and other innovation projects. Since then, we began our AMI and grid automation deployments that will enable monitoring and control of assets on our system.

We are now focused on "building" the platform to enable the DSO. This phase continues our multi-year investment in Grid Automation supplemented with our foundational AMI investment. These investments

are required to enable monitoring and control of system assets, DERs, and electric vehicle ("EV") charging stations.[2]

We are also building a validated network model of system assets, connected DERs, and EV fast chargers to support Integrated System Planning and grid operators. With these foundational investments and capabilities in place, we will be able to apply advanced control systems (the ADMS) to optimize utility and third-party DER assets.

The Companies continue to address design and implementation issues through a formal collaboration with New York's investor-owned utilities (the "Joint Utilities of New York" or "Joint Utilities"[3] for short). The topics being addressed by the Joint Utilities include coordinated grid planning, advanced forecasting, hosting capacity, interconnection[4] and integration of DERs, the IEDR Program, enablement of a statewide EV charging network, solicitations to acquire energy storage, energy efficiency programs, and heat pump implementation plans. Staff of the New York Department of Public Service ("DPS") along with the New York State Energy Research and Development Authority ("NYSERDA"), DER developers and other key stakeholders contribute to these collaborative efforts.

Exhibit I-3

This 2023 DSIP Report is presented in four sections.

I. Introduction	DSIP objectives and Joint Utilities' vision
II. DSO Vision	NYSEG and RG&E's vision and how our vision, approach, and State policy objectives determine platform requirements and enabling capabilities
III. Building the Platform	The progress that we have made since our 2020 DSIP filing, and plans for the next five years, 2024-2028, including platform technology investments and support for clean energy resources connected to our distribution system
IV. Roadmap	An overview of how we will build the platform over the next five years

Our 2023 DSIP submission includes the following appendices along with this report:

- Appendix A: DSIP Guidance Topics
    - A.1-A.13: Our current progress and future implementation plans for thirteen topical areas
    - A.14: Our DSIP governance implementation
    - A.15: Link to the Marginal Cost of Service Study

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[2] This DSIP focuses on platform technologies and operations required to operate as the DSO. The need for, and approach to, "controlling" DERs will evolve as DER smart inverter technology is adopted, and DERs can act to maintain grid conditions based on parameters established by the DSO.

[3] The Joint Utilities of New York are comprised of Consolidated Edison Company of New York, Inc. ("Con Edison"), Orange and Rockland Utilities, Inc., Central Hudson Gas & Electric Corporation, Niagara Mohawk Power Corporation d/b/a National Grid, New York State Electric & Gas Corporation, and Rochester Gas and Electric Corporation.

[4] "Interconnection" is the first of many steps required to fully "integrate" DERs into future utility functions.

- o A.16: Link to the current Benefit Cost Analysis ("BCA") Handbook filing and BCA Calculations, consistent with 2023 Guidance provided by DPS Staff

- Appendix B: Web Links to NYSEG/RG&E Data provides web links to several NYSEG and RG&E tools that provide developers with the information they need to target their marketing efforts and connect to our network

- Appendix C: Glossary of Industry Terms

# II.	DSO Vision, Approach, and Key Initiatives

II. Our Vision as the DSO

New York and its utilities are navigating dramatic changes enabled by innovation and advances in clean energy, electric power delivery, and information technologies. As part of New York's clean energy transition, it is our vision to serve as a DSO.[5] The DSO is an organization that assumes roles and responsibilities consistent with the DSP initially contemplated by the REV proceeding. The Companies have explored DSO concepts through active participation in regulatory proceedings in New York and in consultation with SP Energy Networks, based on DSO activities in Great Britain.[6]

DSO Roles and Responsibilities

-   Plan and develop the electric distribution system to accommodate clean DERs and beneficial electrification.

-   Operate the electric distribution system safely, reliably, and efficiently, while utilizing the capabilities of DERs.

-   Enable customer access to energy services and markets to increase the value of investments of an integrated electricity infrastructure.

The DSO is a functional entity of an electric utility and retains the traditional responsibilities of providing safe, reliable electric service for customers. However, the DSO functions within an energy system that integrates numerous DERs and intelligent loads connected throughout the network. The DSO helps the utility serve an increasingly diverse customer group, including energy consumers, producers, and aggregators.

Our DSO vision includes six elements that provide additional detail for necessary future capabilities. These capabilities help us organize the Platform Technology initiatives explained later.

Advanced Integrated Planning Processes: Distribution system planning is quickly changing to incorporate granular forecasts for loads and DERs. Distribution system models and tools must support faster analysis for customer interconnection requests and non-wires solutions and eventually provide near-real-time analysis for grid operators. Finally, the transmission and distribution planning studies that utilities have done separately in the past are coming together as part of the Coordinated Grid Planning Process ("CGPP") in New York.

DER Management and Clean Energy Deployment: The DSO should facilitate faster, flexible interconnection of DERs and beneficial electrification. This can help make the process easier for

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[5]   Past DSIPs presented a vision of a "Smart Integrator." The core capabilities supported by the DSIP for the Smart Integrator and the DSO are the same.

[6]   NYSEG and RG&E participate in the Market Design and Integration Working Group in New York. SP Energy Networks is an affiliate Distribution and Transmission Network Operator serving customers in the United Kingdom, developing and implementing DSO concepts as part of the Open Networks program.

customers and reduce overall costs. Long-term benefits include better visibility into DER penetration and benefits, supporting New York's clean energy plans.

Grid Optimization: Strive toward real-time operations supported by centralized visibility and control of DERs with distribution devices. A DSO can facilitate coordination at the interface between distribution and transmission systems to integrate more renewable energy, reduce grid constraints, and improve efficiency. Grid optimization can involve infrastructure investments and operational decisions.

Grid Resiliency and Reliability: Grid resiliency is critical for maintaining safe, reliable electricity service for our customers and communities in response to growing risks from climate change. The DSO coordinates planning, operations, and flexibility from DERs to reduce the disruption caused by more frequent and intense storms, as well as increased demands for electricity from higher temperatures and beneficial electrification.

Secure Data Transfer and Customer Empowerment: The complex coordination performed by the DSO requires accurate and timely data from numerous sources and systems. Our customers also use the distribution system and market information to make energy-related decisions. Ensuring that this information is secure is critical to our operations and customer privacy.

Market Services Facilitation: The customer marketplace concept has matured. The DSO facilitates customer participation in grid products and services for consumers and producers connected to the distribution system. Early opportunities will include participation in DER aggregation, and flexibility markets.[7]

The DSO and Our Customers

The advanced capabilities of DERs, electric vehicles, and intelligent appliances are transforming the way our customers use electricity to power their homes and businesses. It is essential that the roles, responsibilities, and infrastructure managed by the DSO meet the evolving needs of customers. In addition to customers consuming and producing electricity, we envision groups of customers that may participate differently with energy products and services. The DSO must be able to support the needs of all customers.

Passive consumers: Customers that want to purchase electricity simply and easily as they do today.

Passive participants: Customers that are interested in managing their energy costs by utilizing energy technologies and pricing structures that are simple to use and require minimal effort to manage.

Active participants: Customers that are interested in maximizing the value of their energy usage by using technology, pricing programs, and market products and services provided by third parties.

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[7] For the 12-month period ending July 2022, network companies in Great Britain tendered a total of 3.7 GW of flexibility services and contracted 1.9 GW. Source: Energy Networks Association.

Service providers: Customers that provide energy services to homes and businesses using combinations of resources, programs, and market products. Service providers may also be involved in developing DERs and electrification infrastructure.

Our customers want safe, reliable, resilient service. They want us to operate efficiently and be easy to do business with. In the longer-term, we anticipate our customers, developers, aggregators, and competitive suppliers will use an available market platform to transact efficiently with each other.[8] The potential structure of a distribution market, the products and services it may transact, and its coordination with wholesale markets operated by the NYISO is currently being addressed by the Market Design and Integration Working Group ("MDIWG") stakeholder process that is being led by DPS Staff.[9] [10] As described in Section III, we are not waiting for resolution of the future market design to test promising market concepts.

Technology Initiatives for Platform Infrastructure

The distribution network must become significantly more "intelligent" to accommodate a more dynamic grid. The DSO requires a platform that can perform advanced grid planning and operations. The design of platform technologies is an integrated solution that supports the five DSP desired outcomes:

1) **Customer driven:** The DSP must provide customers with the information and services they desire to manage their energy usage and bills, including products and services offered by third parties.

2) **Safe, reliable, and resilient:** The network must be planned and operated, including DER and EV charging station interconnections, to ensure safety, reliability, and resiliency.

3) **Secure:** Information and data regarding critical infrastructure and system operations, as well as the privacy and security of customer information must be protected.

4) **Efficient and affordable:** The transition to the cleaner and more sustainable grid must be done in an efficient and affordable way.

5) **Clean and sustainable:** The DSP has a critical role to serve in meeting CLCPA and other clean energy targets that are established by policy makers.

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[8]   This longer-term vision may include an organized distribution market that executes transactions among buyers and sellers.

[9]   This topic was introduced in Chapter III of our 2018 DSIP, "Joint Utilities of New York Long-Term Vision for the DSP." The Joint Utilities presented an initial phase of market development, DSP 1.0, as well as a longer-term market vision, DSP 2.0.

[10] The coordination of the wholesale and distribution markets will also be informed by policy actions taken by the FERC. The FERC issued Order 841 in February 2018 (reaffirmed in May 2019) addressing the integration of storage. However, the FERC has not yet issued an order in Docket No. RM18-9 that addresses DER aggregation and how DERs (defined to include electric storage, distribution generation ("DG"), thermal storage, electric vehicles and electric vehicle charging station) will be able to access value in wholesale markets. On January 23, 2020, the FERC issued an order accepting the NYISO's proposed Aggregation Participation Model (Docket No. ER-2276), scheduled to take effect in January 2022.

For planning purposes, we organize the infrastructure deployment into six "technology initiatives." Implementation consists of specific investments or "projects" that advance an initiative.[11]

Exhibit II-1

The DSIP is organized around six technology initiatives.

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Advanced Metering Infrastructure ➢ Customer data and billing ➢ Analytics ➢ Outage notification ➢ Grid automation	Advanced meters plus communications infrastructure provide granular customer consumption data that (a) can be used to develop granular load profiles and forecasts, (b) help customers manage their energy usage, and (c) provide grid operators with grid-edge visibility and advanced operational capabilities.
Grid Automation and Management ➢ Control center systems and grid optimization ➢ Grid automation ➢ DER management	Automated grid devices and management technologies that provide the Energy Control Center ("ECC") with visibility and decision support to make adjustments to the distribution system to support resiliency, reliability, power quality, DER integration, and other outcomes and, with the implementation of an ADMS, optimize grid assets and DERs.
Integrated System Planning ➢ Advanced forecasting ➢ Non-wires alternatives (NWAs) and beneficial locations ➢ Hosting capacity ➢ Interconnections	A holistic and inclusive planning process that reduces cost, improves efficiency, and achieves societal clean energy targets.
Data and Analytics ➢ Integrated Energy Data Resource (IEDR) ➢ Grid Model Enhancement Project (GMEP)	(a) Internal integrated network system models of grid assets and connected DERs for sharing externally, (b) mechanisms to securely share system and customer data to external platforms, (c) advanced analytics use cases to improve system operations and preemptively address infrastructure issues, and (d) analytics that improve our customer experience.
Clean Energy and Decarbonization ➢ Electric vehicles ➢ Energy storage ➢ Clean heat and building electrification ➢ Energy efficiency ➢ Smart inverters	Investing in grid infrastructure that will increase deployment of renewables, clean DERs, and beneficial electrification to meet state clean energy and decarbonization goals.
Market Services and Innovative Customer Offerings ➢ Billing system automation and compensation ➢ DER aggregation for market access ➢ Rate design	Connect customers to pricing options and programs, as well as to products and services offered by competitive suppliers; implementing incentive programs that support market transformation.

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[11] Specific projects are reported in our annual Five-Year Capital Expenditure Forecast filings, with funding approvals provided in rate cases.
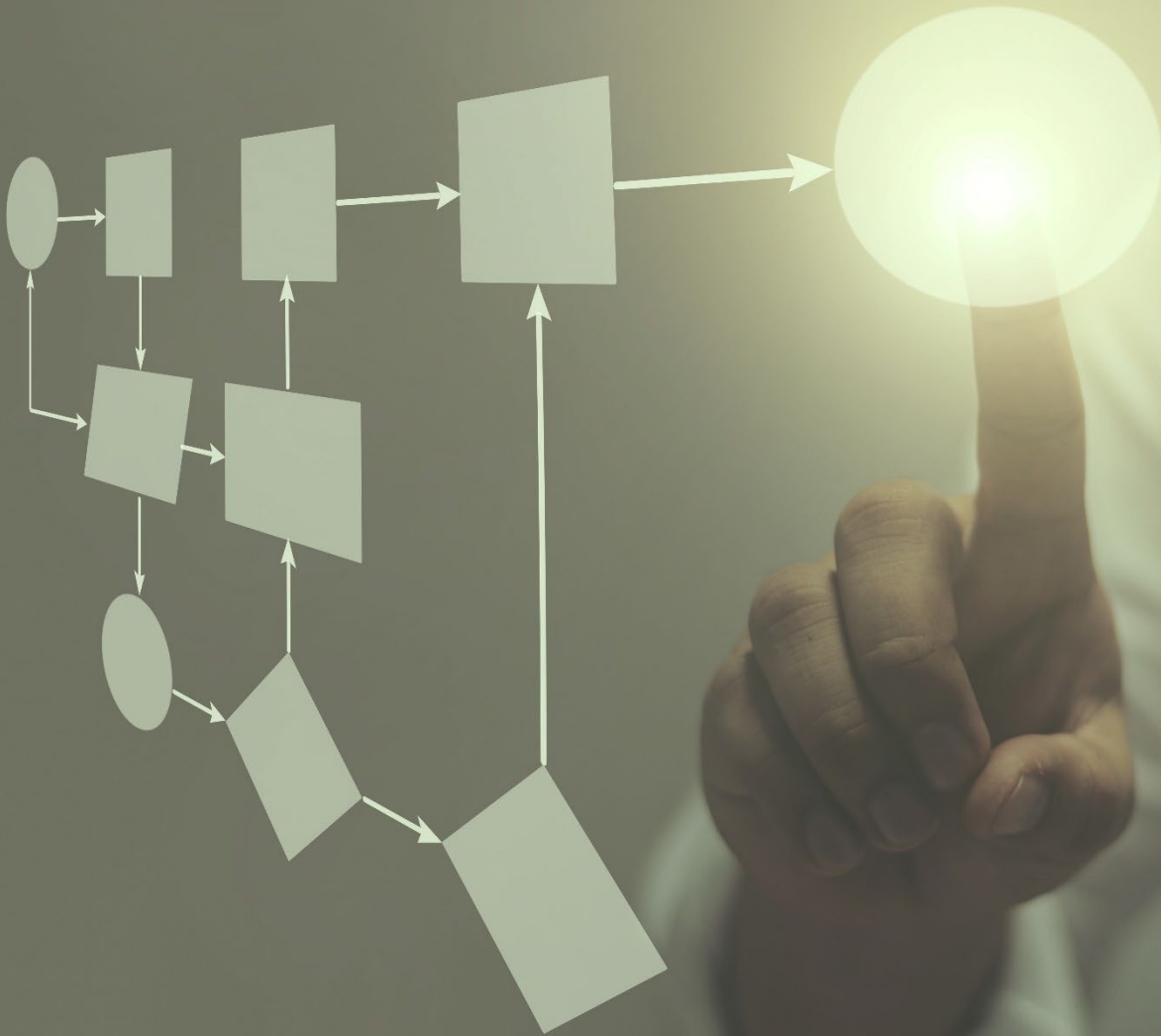
III. Building the Platform

III. Building the Platform

This section reviews our progress to date and future implementation plans as we build the platform to support the DSO, which includes our platform technology investments and highlights our efforts to support clean resources connected to our distribution system.

The Companies are working to develop a dynamic and intelligent grid. Platform technologies are designed as an integrated solution to support DSO grid planning and operations. These initiatives, as summarized in Exhibit II-1 above, are discussed in more detail below.

Advanced Metering Infrastructure

Advanced meters plus communications infrastructure provide granular customer consumption data that (a) can be used to develop granular load profiles and forecasts, (b) help customers manage their energy usage, and (c) provide grid operators with grid-edge visibility and advanced operational capabilities.

Objectives

Advanced meters provide monitoring and visibility at the grid edge. In addition to measuring electricity consumption at 15-minute intervals, the advanced meters will provide operational information including power outages, voltage, and detection of tampering. Advanced meters will help customers manage their energy usage, and support time-varying pricing and innovative rate structures. The granular data collected by the multitude of advanced meters will help the Companies build dynamic load models and improve forecasts, thereby contributing to more precise distribution planning. Our AMI meters include two-way functionality to support DERs to help meet the State's clean energy goals, and allows grid operators to remotely turn meters on and off, eliminating the need for truck rolls. The AMI deployment also involves an upgrade to our customer billing system to support time-varying rates.

The AMI initiative supports four critical capabilities.

> **AMI Benefits and/or Outcomes**
> 1. Reduce customer service costs
> 2. Reduce distribution capital costs
> 3. Reduce the length of customer outages
> 4. Reduce electricity consumption with conservation voltage reduction
> 5. Reduce power restoration costs
> 6. Reduce electricity costs during peak periods with time-variable rates
> 7. Improved cash flow company savings
> 8. Improved processes and planning capabilities for the operation of the distribution network
> 9. Improve safety with temperature and micro-arcing sensing
> 10. Provide better information for the IEDR
> 11. Increase DER hosting capacity

1. Customer Data and Billing

   Our AMI deployment includes an upgrade of our billing systems to enable smart meter functionality. Customer information will be integrated into customer-facing applications, enabling customers to better manage their electricity and gas usage and energy bills through a web portal.

2. Analytics

Our analytics functions take granular energy consumption and grid performance data and leverage the IEDR platform and grid edge computing to plan and operate the distribution grid more efficiently.

3. Outage Notification

Real-time power outage and restoration notifications will support a more reliable and resilient distribution grid. AMI- Outage Management System ("OMS") integration will reduce the average outage duration for certain outages through faster outage identification and quicker determination of the specific location of an open device by analyzing received power-off messages. Better visibility at the grid edge will result in more effective outage restoration.

4. Grid Automation

Grid automation functions such as Volt-VAR Optimization and Fault Location, Isolation, and Service Restoration will enable operational efficiencies and cost savings for our customers. The Companies will integrate AMI communications into the grid automation network, contributing to Volt/VAR optimization ("VVO") and fault location, isolation, and service restoration ("FLISR") capabilities. AMI data will support VVO, which will manage voltage levels to reduce energy losses on the system, and FLISR will also contribute to faster outage identification and restoration.

Progress and Future Implementation

Our AMI deployment is underway and will support four critical capabilities detailed below.

Customer Data and Billing: The AMI deployment includes advanced meters, a communications network, a head-end system—previously demonstrated as part of the Energy Smart Community—and a meter data management system ("MDMS").[12] The Companies' onsite internal MDMS is in production. Further integration of the MDMS into processes will allow the Companies to access meter data in real time to perform various functions, including analytics, and provides the data needed to develop customer load shapes for advanced forecasting and planning. The meter system upgrade throughout the New York service territories is a major undertaking, which began in third quarter 2022, and is expected to complete in 2025. Through 2023, the Companies target deployment of approximately 450,000 electric and gas meters (24%) throughout the service territories. The Companies completed a new customer relationship management and billing ("CRM&B") system refresh, which went live in 2022, and integrated the billing system with IT services to more effectively support AMI integration. Over the near term, the Companies will develop additional energy usage control options and customer segmentation programs for rate design. The Companies are also testing EV charging pilot billing programs. Longer-term, the Companies will deploy time-varying rates, including for EV charging programs.

Analytics: The Companies plan to install software that will enable edge computing capability at all AMI devices. Over the long term, the AMI data will be combined with other business systems (billing, geographic information system ("GIS"), and supervisory control and data acquisition ("SCADA") data to support the DSO. The Companies expect to complete hardware deployment for grid edge computing in

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[12]   The head-end system consists of hardware and software that receives meter data, stores interval load data to support customer billing, and communicates meter data to other corporate systems.

2025. Integration of supporting software, hardware, and connectivity is expected to be complete in 2023. Grid edge computing can be used for reporting voltage and tracking system data to grid operators. The Companies are also testing Distributed Intelligence, a suite of solutions downloaded to meters with analytics capabilities. The application provides the ability to determine which phase the meter is installed on along with aggregating, which meters are supplied from the same transformer. Currently, the Companies expect to have location awareness capabilities at 450,000 end points by the end of 2023. We will conduct a small pilot in 2023 to determine the value of locational awareness. During 2024, the pilot will be expanded to test new functionalities more focused on the improvement of the reliability of the grid. Interval data is being provided in the production AMI application. The Distributed Intelligence platform will test location awareness capabilities, with testing and deployment to production meters expected in 2023. Additional applications ("apps") will require a business case to justify implementation. Once implemented, results will be reported as part of our pilot project in 2024.

Outage Notification: Full AMI deployment and integration with the Companies' OMS will reduce outage duration and customer outage costs over the entire service territory. The integration of AMI with OMS (targeted to be complete in 2023) will reduce the average outage duration for a subset of outage types due to the ability to detect outages more quickly and through more effective management of outage restoration due to greater visibility into outage locations. Shorter average outage duration will reduce customer outage costs. Outage and restoration notification will be available for all customers after expected completion of the AMI meter deployment in 2025.

Grid Automation: Over the long term (2026 and beyond), AMI communications will be integrated into the grid automation network, and support VVO, FLISR, and other ADMS applications.

Exhibit III-1

Major Advanced Metering Projects and/or Activities

Project or Activity	Expected Completion
Complete deployment of advanced meters and communications	2025

➡️ For more information, see Appendix A, Topic 12 (Advanced Metering Infrastructure).

Grid Automation and Management

Automated grid devices and management technologies that provide the ECC with visibility and decision support to make adjustments to the distribution system to support resiliency, reliability, power quality, DER integration, and other outcomes and, with the implementation of an ADMS, optimize grid assets, and DERs.

Objectives

The grid automation and management initiative focuses on developing grid operations capabilities to manage, maintain, and operate the electric power system to deliver system stability, power quality, and reliability. Our main objective is to improve the reliability and quality of service for our customers. We are developing the ability to integrate large numbers of DERs into grid operations.

Over the long term (beyond 2028), this initiative facilitates visibility and control of all DERs connected to the distribution grid, regardless of size, for voltage and Volt-Amps Reactive ("VAR") support for system efficiency, reliability, and safety. This will require that grid operators and the DSO be aware of all DERs in the system, their grid connection, potential grid contributions, control capabilities (e.g., direct control or through third-party providers, and telecommunication protocols), and market program incentives or constraints that may impact the ability to control the resources.

Grid Automation and Management Benefits and/or Outcomes

1. Maintain full situational awareness of the distribution system and all connected loads and DERs.

2. Utilize accurate short-term forecasts for electricity consumption and production by our customers.

3. Maintain grid connections to loads and DERs while keeping voltage and equipment loading within limits.

4. Locate and isolate power interruptions when they occur and restore power safely and quickly.

5. Coordinate grid operations with DER operations.

6. Optimize the reliability, efficiency, and cost of the distribution network with NWAs, loads, and DERs.

7. Support whole-system optimization at the Transmission and Distribution ("T&D") interface.

Grid automation and management will rely on:

1. An up-to-date detailed inventory of all DERs and an accurate connectivity model of the distribution system including all distribution equipment and their characteristics

2. Near real-time data regarding customer usage and power flows throughout the distribution grid

3. Load and generation forecasting technology to enable grid operators to plan for future grid needs on multiple time scales (hour ahead, day ahead, or week ahead)

4. Systems and technology that respond automatically to mitigate potential issues and support grid operators in resolving operational issues

The Companies' grid automation and management initiative supports three critical capabilities.

1. Control Center Systems and Grid Optimization

    Control systems are software and supporting hardware that process data and information to provide situational awareness, evaluate control options, and regulate the operation of grid devices. Our ECC will continue to be responsible for grid operations under constantly changing network conditions, utilizing grid-side, supply-side, and demand-side resources. The Companies are developing a platform technology architecture that utilizes centralized control based on an ADMS. The ADMS consolidates distribution SCADA, outage management, and advanced distribution applications onto a "single pane of glass" for distribution operators and engineers. The ADMS will be the core system for monitoring, control, and management of the distribution network to achieve reliability, efficiency, and cost-effective integration of DERs. We envision the ADMS will provide decision support to assist operators in the ECC and help them coordinate the safe and efficient work of field operating personnel. The ADMS will also manage the operation of switching equipment through FLISR and voltage control equipment through VVO on the distribution network. Over time the ADMS will leverage an expanding network of grid devices and advanced software applications to support feeder optimization. In the future, ADMS will interact with other systems to enable active network management ("ANM"), which, among other capabilities, will enable higher total hosting capacity and more efficient integration of DERs on the distribution system.

2. Grid Automation

    Grid automation devices measure, monitor, and adjust electric power parameters on the distribution system. These devices can be found on poles, pads, and in substations. They may also be installed at a customer's premise, or as part of a DER installation or EV charging station. Examples include sensors, smart meters, relays, switches, reclosers, capacitors and voltage regulators. Grid automation devices, supported by an electronic communications infrastructure to deliver data between grid devices and central control systems, will improve the quality of service to customers, grid reliability and resiliency, and grid efficiency. The Companies are focused on grid automation at two levels:

    SCADA/Automation Program: The goal of this program is to install a remote terminal unit ("RTU") in all substations that do not currently have an RTU, and to integrate all the bays into the SCADA system of those stations where there is an RTU already in service. This program covers the replacement of electromechanical relays with digital relays to digitize the bays. The addition of SCADA in the substations in conjunction with the installation of digital relays will allow for improved visibility and remote control, proper system protection coordination, and outage assessment, which in turn will result in quicker response and improved reliability metrics. Remote control capabilities will contribute to an increase in the safety of workers operating the switchgear, preventing them from performing manual commands.

    Line Automation: Line automation refers to the automation of grid devices throughout the grid (between the substations and grid edge). These technologies provide operators with visibility, decision support, and the ability to make physical adjustments to distribution system infrastructure from their desks in the ECC. Automation of reclosers and switches makes it possible to isolate power outages so fewer customers are impacted. Applying electronic controls to capacitor banks and voltage regulators supports coordinated voltage and reactive power control that can improve distribution voltage profiles to decrease energy losses, improve power quality, and accommodate more variable DERs.

3. DER Management

Coordination and control of DERs ensure network reliability and facilitates full participation of owners, operators, and aggregators. A DER Management System ("DERMS") will provide situational awareness and coordination capabilities for DERs. The DERMS will enable the DSO to forecast, coordinate, and optimize DER operations. The system will interface with third-party DER systems, including at the site level with smart inverters, battery management systems, and site controllers and at the aggregation level with demand response management systems ("DRMS"), EV charging infrastructure network management systems, and other DER asset or program management systems. The Companies have tested monitoring and control of larger DERs (larger than 500 kW) as part of their Flexible Interconnection Capacity Solution ("FICS") REV Demo. This demonstration accommodates additional DER capacity that would normally have to pay for expensive system upgrades by enabling the DSO to control DER output to avoid thermal and voltage violations on the distribution system. Flexible Interconnection effectively increases hosting capacity and makes it possible to interconnect more DER capacity on distribution feeders. This capability benefits DER developers and ratepayers by reducing the cost of upgrades associated with interconnections.

Progress and Future Implementation

Our grid automation and management deployments are underway, as detailed below.

Control Center Systems and Grid Optimization: The ADMS pilot project successfully tested concepts in the ESC and has current functionality to perform Automated Grid Recovery/Restoration ("AGR") (also referred to as FLISR) in a few network substations including: Langner Road and Silver Creek in the Lancaster Division as well as Tom Miller Road in the Plattsburgh Division. Since then, the Companies have begun the systemwide ADMS deployment, after which, the Companies will integrate advanced applications (e.g., AGR). Note that while the ADMS software deployment will be complete during the DSIP period, the full ADMS capabilities and advanced applications will not be available through the entire service territory until all substations are fully digitized and the GMEP is complete (see Data and Analytics section below for more details).

> **Lessons Learned from the ESC ADMS Pilot**
>
> An ADMS has the potential to positively impact all aspects of the distribution network and ultimately our customers, especially as a fundamental tool for managing the rapidly increasing integration of DERs. Successful ADMS deployment depends on data accuracy and governance, as well as program oversight and prioritization at the executive level leading to a thorough project/vendor management and change management plan. If these procedures are in place and the major challenges related to data including enhancing the data model in the GIS system, accessing and loading the data, and creating a robust data governance process are mitigated, it is recommended to scale the ADMS network-wide wide to increase operational flexibility, increase system efficiency, increase resiliency, and to integrate increased DERs.

Grid Automation: This initiative refers to the automation of grid devices, which allows grid operators to control devices and maintain visibility in real time. Grid automation refers to SCADA/Automation

(automating grid devices within substations) and line automation (automating devices throughout the electric grid).

SCADA/Automation Program: Since the earlier DSIPs, the Companies have modified the program to a more targeted approach, focusing on the most populous substations that have the most constraints, installing a range of SCADA and digital equipment, such as circuit breakers with digital relays, RTUs, and SCADA controlled line automation devices, such as switches, reclosers, and circuit ties with sufficient capacity to back-up circuits. This more recent expanded approach facilitates advanced grid management, such as AGR to better address outages.

Full ADMS deployment, as well as the AGR program, depends on substation automation. Thus, full ADMS functionality is not feasible until the SCADA/Automation Program is completed over the next 10-15 years. Over the short term, the Companies developed a *Line Sensors Program*, deployed between 2022 and 2027, to install over 3,000 devices on over 1,000 circuits within the New York territories at the feeder head. This project is a circuit-level program to install devices on overhead wires at the beginning of circuits that currently do not have SCADA. This project is a short-term solution to provide the Companies with circuit and substation data until the full SCADA/Automation Program is complete. The project will enable a partial ADMS and AGR deployment until the full SCADA/Automation Program is complete. The Line Sensors Program data will also be used to create load shapes for load forecasting and scenario analysis.

Line Automation: Line automation refers to the automation of grid devices throughout the grid (between the substations and grid edge). These technologies provide operators with visibility, decision support, and the ability to make physical adjustments to distribution system infrastructure from the desks in the ECCs. Automation of reclosers and switches make it possible to isolate power outages so fewer customers are impacted. Applying electronic controls to capacitor banks and voltage regulators supports coordinated voltage and reactive power control that can improve distribution voltage profiles to decrease energy losses, improve power quality, and accommodate more variable DERs.

The exhibit below shows the substation and line automation progress expected over the 2023 DSIP period.

Exhibit III-2

Grid Automation Completion Rates by Company.
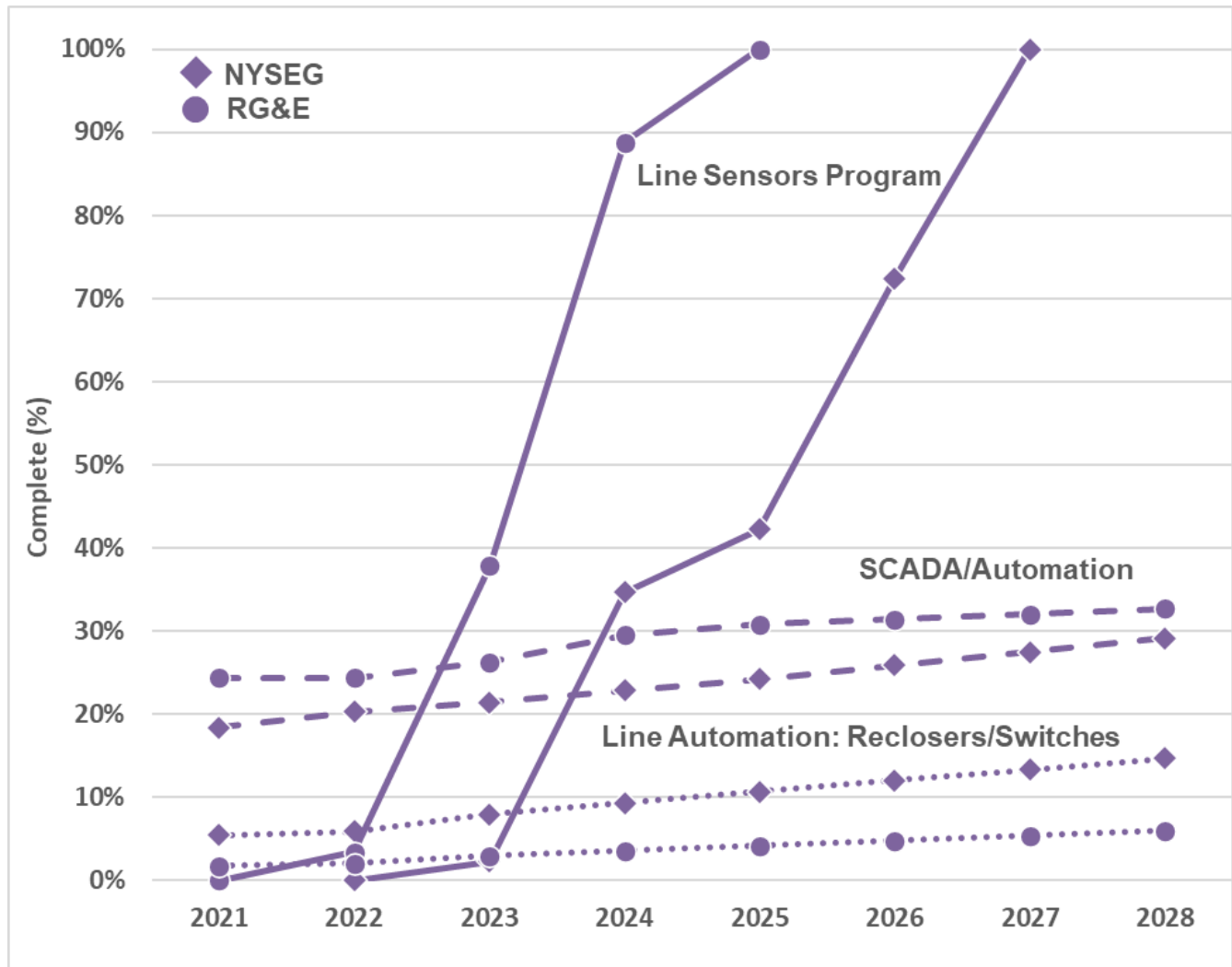
* The substation SCADA and Digital Equipment counts in the figure refer to substations with full SCADA equipment and digital protection and control relays. In addition, NYSEG and RG&E also have 249 substations with partial SCADA or digital capabilities (defined as having SCADA controls with remote capabilities and/or some digital protection and control relays).

DER Management: A centralized enterprise-level DERMS will interface at the site level with smart inverters, battery management systems, and local controllers and at the aggregation level with a DRMS, EV charging infrastructure network management systems, and other DER asset or program management systems owned and operated by the Companies and/or by third parties. A centralized DERMS will provide grid operators with the ability to analyze and manage DER assets, as well as provide situational awareness and DER coordination capabilities. Through 2024, the Companies are developing a standalone hybrid control model using the flexible interconnect model already tested. The flexible interconnection model refers to incorporating fast-acting, autonomous control methods to limit the needs for costly grid upgrades when interconnecting DERs. The Companies continue to pursue flexible interconnection agreements that enable DERs to avoid certain system reinforcements through the use of an operational technology called ANM. In addition, the Companies have begun to expand the

functionality of their ANM technology to allow it to be leveraged to enable DER management as part of a non-wires alternative ("NWA"). Over the medium term, between 2025-2026, the Companies will develop a centralized ADMS control model utilizing built-in power flow functionality and begin to incorporate forecasting into the management of DERs. Beginning around 2027 the Companies will expand DERMS capabilities to enable the dynamic use of DERs to provide grid services.

Exhibit III-3

Major Grid Automation and Management Projects and/or Activities.

Project or Activity	Expected Completion
Continue implementing control center application (ADMS)	2027
Continue implementing grid automation programs (grid devices)	Beyond 2028
Implement DERMS	Beyond 2028

<div style="display:flex">➤ For more information, check out Appendix A, Topic 3 (Grid Operations)</div>

Integrated System Planning ("ISP")

A holistic and inclusive planning process that reduces cost, improves efficiency, and achieves societal clean energy targets.

Objectives

The clean energy paradigm, technology advancement, and the need for increased stakeholder involvement are rapidly changing utility planning requirements. To meet these changing requirements the Companies are focused on expanding planning processes and capabilities and adopting a more integrated approach to planning. The ISP initiative aims to incorporate processes and technologies to ensure reliable, safe, and efficient planning and design of the distribution network, while providing customers and third parties ease of connection. We are integrating DERs into our long-term planning processes, optimizing the contribution of DERs together with our more traditional investments that we make to improve the reliability and resiliency of the grid. The ISP initiative aims to address processes and technologies needed through stakeholder engagement, development of advanced forecasting and advanced system modeling, and identification of T&D solutions.

> **Integrated System Planning Benefits and/or Outcomes**
>
> 1. Maintain a safe, reliable, resilient network by making investments in distribution facilities and/or connecting new DERs.
>
> 2. Deliver value to customers over the long term by sharing data that enables efficient investment decisions by the Companies and DER developers.
>
> 3. Accommodate high levels of DER penetration by investing in grid automation and management capabilities, maximizing the contribution to customer value for any given amount, type, and location of DERs.
>
> 4. Provide system information and insights to other functions to support their respective DSO responsibilities.

The Companies' ISP initiative capabilities include:

1. ### Advanced Forecasting

   Advanced forecasting refers to the capability to produce load and DER forecasts by location and hour of the year. Advanced forecasting will support integrated system planning and grid operations and will enable DER developers to make informed investment decisions. The granular forecasts will provide system planners with long-term forecasts of load and DERs by location and time. The forecasts will also reflect electrification trends and state policy goals. Forecasts must be sufficiently granular with respect to location (*e.g.*, by feeder) and hour of the year to support the integration and optimization of connected DERs. These forecasts also will support the evaluation of utility programs and tariffs intended to incent efficient investment and electricity usage decisions. The Companies are also developing short-term forecasts for operational planning purposes to support ANM, resource curtailments, and potential probabilistic use case scenarios.

2. ### Non-Wires Alternatives (NWAs) and Beneficial Locations

   NWAs and beneficial locations refer to the process of identifying locations with potential for localized DER deployment to address projected system growth or capacity needs, and procuring NWAs intended to make lower-cost investments in grid infrastructure by deferring or avoiding traditional infrastructure investments in "wires" solutions. NWAs benefit the Companies

and customers, as NWAs replace or defer traditional "wires" projects with DERs and other market-based solutions, provide cost savings, and deliver environmental benefits, while maintaining system reliability and resiliency.

3. Hosting Capacity

Hosting capacity provides an estimate of the amount of DERs that can be accommodated without compromising the power grid. New York's investor-owned electric utilities publish maps that show the estimated amount of hosting capacity along each distribution circuit. DER developers are able to use these maps to efficiently target their marketing efforts to areas where DERs are likely to require minimal investment. The Companies' hosting capacity advances focus on streamlining incoming data from the field to enable more accurate information, supported through rapid data refreshes and accurate data and process automation to reduce the required manual processes. Longer term, the Companies' hosting capacity maps may also reflect the impact of severe weather or other hazards on DERs and the resulting influence on hosting capacity to include contingency plans, DER service level agreements, reliability metrics, and assessment of DER value to support grid reliability and resiliency.

4. Interconnections

Interconnection refers to managing the requests to interconnect DERs and EV charging stations to the Companies' distribution system in a safe, efficient, secure, and reliable manner. The interconnections upgrades are intended to leverage and adapt our resources and analytical capabilities, increasing flexibility and efficiency, improving responsiveness, and adapting quickly to changing market changes and customer demands. This includes processing applications, technical screening, managing NWA contracts, and engineering flexible solutions to process requests efficiently and deliver results in a timely manner. The Companies are focused on automating interconnections processes to interconnect resources in a timely manner, process requests efficiently, leverage and adapt our resources and analytical capabilities, meet market and customer demand for DERs and EVs, and adapt quickly to changing market conditions.

The 2020 DSIP, reflecting recommendations in an Electric Power Research Institute ("EPRI") report[13], specified a three-phase roadmap for increasing automation of the DER interconnection process:

Phase 1 – Automate Application Management (completed);

Phase 2 – Automate Standardized Interconnection Requirements ("SIR") Technical Screening (underway as a short-term initiative); and

Phase 3 – Full Automation of All Processes (a long-term initiative).

Progress and Future Implementation

Our current focus is to build a strong foundation to integrate large quantities of DERs into our ISP and Grid Operations functions, as well as developing the capabilities to automate processes and provide data accuracy to reflect real-time grid conditions. Both our Integrated Planning and Grid Operations

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[13]   EPRI, New York Interconnection Online Application Portal Functional Requirements, September 2016 ("IOAP Report"), available at: https://dps.ny.gov/system/files/documents/2022/11/epri-task-1-memo-report_final-9-9-16.pdf

functions require the ability to collect, update, maintain, manage, and access granular data. This capability depends, in turn, on infrastructure investments that collect data on customer loads at meter points (AMI) and power flows and attributes (e.g., voltage) throughout the network (sensors and other intelligent grid devices). We are also focused on building capabilities that will leverage more granular data while sharing the results of these enhanced analyses with DER developers to support their marketing, project development, and interconnection efforts.

Each ISP capability is discussed in more detail below.

Advanced Forecasting: The Companies continue to focus on transitioning from the "top-down" DER forecast methodology that produces a system-wide forecast of DERs and apportions it among NYSEG and RG&E substations to a reliable "bottom-up" forecasts of DERs by type (e.g., solar photovoltaic ("PV"), other DG, energy efficiency, and storage). DER forecasting is likely to continue to evolve over the next several years. In an effort to advance the Companies' forecasting capabilities, the Companies are involved in the NYSERDA Future Grid Challenge, which includes two projects. Each project includes performing granular forecasting and a system impact assessment. The Binghamton pilot includes Prosumer Grid and involves EV, heat pump ("HP"), and solar PV forecasting and demonstrating the Grid+DER Planning Studio software solution to assess the system in terms of thermal and voltage violations. The second project, the Ithaca pilot, includes Siemens PTI and Cornell University, and involves EV, HP, and PV forecasting utilizing advanced building energy modeling developed by Cornell, and using CYME[14] to assess the distribution network. These pilots are expected to be completed in 2023-2024. In conjunction with these pilots, the Companies are completing the GMEP, and the Line Sensors Program, which includes the installation of devices at the beginning of circuits that will allow planners to develop granular load shapes. Over the long term, the Companies will provide granular load and DER forecasts by load and time, based on real-time system data. Execution of advanced forecasting capabilities, however, are dependent upon data derived from a number of other projects, including (1) AMI deployment throughout the service territories (including internal MDMS) for customer usage and to assess DER and EV potential, (2) GMEP to identify all assets on the system, and (3) SCADA/Automation needed to develop load shapes. These projects are underway, and in the meantime, the Companies continue to evaluate potential forecasting software. The Companies have explored various DER forecasting options, including a DER analysis of 12,000 customers using purchased load shapes to identify and assess areas of high potential for DER deployment.

NWAs and Beneficial Locations: The Companies procure NWAs through a competitive solicitation process and identify locations on the grid where DERs could help address constraints and potentially defer grid investments or where other electrification load can be accommodated. After applying lessons learned from earlier NWA development and contract negotiations, the Companies developed a standard NWA contract to streamline the advancement of future NWA opportunities. The Companies have also implemented monitoring and verification processes and continue to apply marginal cost of service ("MCOS") and value of distributed energy resources ("VDER") methodologies. In 2023, NYSEG deployed its first NWA project in the Village of Stillwater, with the Java microgrid backup supply power project schedule under review. The Java peak shaving project was put on hold due to lower loading levels resulting from circuit conversions/transfers to neighboring circuits. To further scale NWA solicitations and project implementation, the Companies have taken steps to align internal processes (e.g., ISP processes) to identify NWA opportunities earlier on in planning process, with a focus on

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[14] CYME International T&D is a Power Engineering Software provider, which offers CYME software solutions used to analyze distribution power flows.

projects that fulfill CLCPA targets including providing consideration to disadvantaged communities ("DAC"). Over the near term, the Companies will continue to refine monitoring and verification protocols and make iterative improvements to the NWA contract administration and incorporate granular AMI and system data into NWA analyses. The Companies will also administer the Stillwater contract and leverage lessons learned from the Stillwater and Java microgrid projects to inform future projects and establish requirements for NYSEG-ownership and operation of DER assets.

Hosting Capacity: Since 2020, the Companies developed hosting capacity maps with three layers: (1) DG maps, which takes into account the minimum and maximum loads on feeders to determine hosting capacity ("HC"); (2) EV supply equipment ("EVSE") maps; and (3) energy storage, which can increase hosting capacity on a circuit when coupled with DERs. These updates were completed as part of Stage 3.5 of Joint Utilities' Hosting Capacity roadmap. The hosting capacity maps began with feeder-level data. PV HC maps have been upgraded to provide section-level data since the last DSIP while upgrading storage maps to section-level data is underway. Section-level data looks at the max of each attribute (defined by the Joint Utilities) and selects the min of the max attributes.   The PV HC map currently does not include queued DER assets. However, it mentions how much DG is queued on each feeder and substation. The detailed list of all queued DERs is available on NYSEG and RG&E's interconnections website.[15,16] The Companies also made CYME upgrades to interface with various systems. The Joint Utilities are currently in discussions to update both PV and battery energy storage system ("BESS") maps on yearly basis at the same time. The Joint Utilities are now in Stage 4.0 of the Hosting Capacity roadmap, beginning implementation of advanced scenarios and increasing data granularity. Through that process, the Companies continue to collaborate with the Joint Utilities in automating processes to improve refresh rates and provide more granular data, which have been a constraint for the Joint Utilities.

Interconnections: The Companies have made progress making enhancements to the interconnection portal, such as implementing electronic pay of interconnection fees to provide ease of use for DER developers and real-time status updates on interconnection applications. The Companies have added a visual aid for DER developers to monitor progress being made on interconnections projects. Electronic payments are streamlined to generate an invoice for the developer and return an immediate confirmation of payment. All DER developers are able to retrieve invoicing history for interconnections projects via the web portal. Returning DER developers are able to easily retrieve payment information for future projects. In 2021, the Companies commissioned and continue to operate flexible interconnection solutions. The Companies have also made progress on addressing energy storage system ("ESS") and EV interconnection requests, including deployment of a web-based interconnection portal, an updated electronic payment option for DER developers, and an integrated load process to facilitate EV interconnections, as well as EV charging hosting capacity maps. In addition, the Companies identified potential ANM project alternatives to streamline interconnection requests. Over the next several years, the Companies will continue to refine measurement and verification ("M&V"), monitoring, control back-end processes, and integrate smart inverter functionality capabilities. The Companies will continue to make progress on Phase 2 automation over the near term and Phase 3

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[15] RG&E:
https://www.rge.com/documents/40137/2123513/RGE+Project+Queue+Order+by+Substation_03.15.23.pdf/3c323909-47c4-5755-ab4c-52cc44a24023?t=1678885923511

[16] NYSEG:
https://www.nyseg.com/documents/40132/5899056/NYSEG+Project+Queue+Order+by+Substation_03.15.23.pdf/16da38d5-f4ba-4bb6-d819-dc18c434ea53?t=1678886286162

automation over the long term. EV and public fast charging additions to the system require system studies to determine availability throughout the grid. As processes become more automated, more frequent system studies will streamline EV and public fast charging interconnection requests. The Companies will continue to examine opportunities for billing enhancements in the interconnection portal. This may include the ability to reconcile study prepayments against actual charges and initiating either a refund or invoice as appropriate, the ability to accept credit card payments, creating invoicing for construction payments, and providing additional invoice tracking information to Interconnection Administrative personnel.

Exhibit III-4

Major Integrated System Planning Projects and/or Activities

Project or Activity	Expected Completion
Continue developing ISP functionality with better hosting capacity maps, improved process automation, and streamlined data exchange with customers and third parties	Ongoing

➡ For more information, check out Appendix A, Topic 1 (Integrated Planning), Topic 2 (Advanced Forecasting), Topic 9 (Hosting Capacity), Topic 11 (DER Interconnections), and Topic 13 (Beneficial Locations for DERs and NWAs)

Data and Analytics

(a) Internal integrated network system models of grid assets and connected DERs for sharing externally, (b) mechanisms to securely share system and customer data to external platforms, and (c) advanced analytics use cases to improve system operations and preemptively address infrastructure issues.

Objectives

Data is at the heart of all system processes and technologies under development, with AMI providing grid edge data on customer usage, grid automation and management providing data on grid operations and DERs along the grid, while grid planners use this real-time data to develop long-term plans. This initiative refers to the platforms that turn "big data" into actionable insights for customers, DER developers, and the Companies.

The Companies' data and analytics initiative capabilities include:

1. External Data-Sharing Platform – Integrated Energy Data Resource (IEDR)

> **Data and Analytics Benefits and/or Outcomes**
>
> IEDR: The IEDR platform is intended to be a statewide platform where the New York utilities provide system and customer data to third parties to foster DER integration and support CLCPA goals.
>
> GMEP: The AVANGRID internal project will provide accurate asset data to business groups, automate a number of manual data entry processes across business groups, and update asset records across the Companies' systems.

The NY Public Service Commission ("PSC") has mandated the creation and implementation of the IEDR platform.[17] The creation of an IEDR platform will provide New York's energy stakeholders with a platform that enables effective access and use of such integrated energy customer data and energy system data. The IEDR aims to collect, integrate, and make useful a large and diverse set of energy related information on one statewide data platform. The IEDR will perform use cases to activate data into actionable insights. The IEDR will provide customer and system data to external third parties, including DER developers on a NYSERDA-based platform. Along with the IEDR, the PSC issued an order to establish a DAF to govern the methods to access information on the IEDR.[18] The IEDR implementation includes two phases:

Phase 1: Development of an initial IEDR platform and development of five high priority use cases (expected to be complete in 2023).

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[17] Case 20-M-0082, Proceeding on Motion of the Commission Regarding Strategic Use of Energy Related Data, Order implementing an integrated Energy Data Resource, issued and effective February 11, 2021. https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={3CDC0522-7F50-49E1-A053-EA236B3DED10}

[18] Case 20-M-0082, Proceeding on Motion of the Commission Regarding Strategic Use of Energy Related Data, Order Adopting a Data Access Framework and Establishing Further Process, April 15, 2021. https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A228D385-3E0E-41BC-A433-8ABD62F8A6E4}

Phase 2: Expansion of additional use cases and buildout of the IEDR platform with additional data sets (expected to be complete in 2026).

2. Grid Model Enhancement Project (GMEP)

The GMEP is a cornerstone of the Companies' grid modernization efforts, enhancing data models to better analyze, monitor, control, plan, and forecast distribution operations and enhance DER integration. The GMEP will provide more granular data to business groups, automating, or streamlining, various data entry processes across a number of groups. GMEP enhances the accuracy of the physical and the electric data represented in SAP and the GIS. GMEP defines and captures data needed for modeling each distribution circuit within selected planning models, such as CYME.

Progress and Future Implementation

The value of data resides in its availability and accuracy. The Companies recently commenced a holistic assessment of their data governance processes to ensure, and improve as needed, data availability and data quality. Currently, the assessment is still in its infancy, and additional actions and recommendations will be defined depending on its outcomes. The Companies continue to make progress on data and analytics, as detailed below:

External Data-Sharing Platform – IEDR: The IEDR will provide customer and system data to external third parties, including DER developers on a NYSERDA-based platform. Since 2020, the Companies have moved from development of an internal Enterprise Analytics platform to a statewide IEDR platform, which includes customer and system data, as well as analytics capabilities. The IEDR progress has capitalized on the progress completed earlier, including detailed information and downloadable data related to:

- Installed DERs;
- Queued DERs; and
- Current and maximum hosting capacity.

The IEDR Phase 1 use cases are expected to be finalized in 2023, with three use cases already implemented and available on the IEDR website. Phase 2 use cases and the final buildouts and datasets for the IEDR platform are expected to be operational in 2026.

Grid Model Enhancement Project: NYSEG/RG&E's GMEP is crucial for identifying the location and targeted characteristics of each distribution asset on the system, resulting in an accurate inventory and reliable circuit mapping, and providing data governance and processes for ongoing field-to-system integrity.[19] GMEP has completed pilot projects and has initiated work with stakeholders to outline current process gaps that will lead to processes updated for future operations and governance. This work is essential for addressing field-to-system mismatches that will arise following the field survey effort, and for addressing any mismatches identified during the field survey The Companies anticipate completing the survey efforts and data validation of most critical data elements in GIS (i.e., asset georeferenced location) and Asset Inventory System ("SAP") (i.e., asset characteristics) on the distribution system in 2025.

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[19] GMEP covers distribution assets 34 kV and below between substation transformers and customer sites.

Exhibit III-5

Key Data and Analytics Projects and/or Activities

Project or Activity	Expected Completion
Complete the Grid Model Enhancement Project (GMEP)	2025
Develop use cases and provide data to the Integrated Energy Data Resource (IEDR) platform	2026

For more information, check out Appendix A, Topic 8 (Data Sharing)

Clean Energy and Decarbonization

Investing in grid infrastructure that will increase deployment of renewables, clean DERs, and beneficial electrification to meet state clean energy and decarbonization goals.

Objectives

The Companies have been working with the Joint Utilities to implement policy guidance and make progress toward targets established in several Commission orders. The CLCPA codifies many of these targets and establishes an overall target to reduce GHG emissions relative to 1990 levels of 40 percent by 2030 and 85 percent by 2050. The Act includes several electricity sector targets, including a target of 70 percent reliance on renewable energy by 2030 and 100 percent clean energy by 2040. Our ability to connect large numbers of DERs and integrate electrification

> **Statewide Clean Energy Outcomes**
>
> - Electric Vehicles: 850,000 zero emission vehicles ("ZEVs") by 2025.
>
> - Energy Storage: 6,000 MW by 2030.
>
> - Clean Heat: 4 trillion BTU in energy savings through high-efficiency heat pumps by 2025.
>
> - Energy Efficiency: 185 trillion BTU reduction by 2025.
>
> - Solar Energy: 6,000 MW by 2025.

loads contributes substantially to realizing New York's clean energy targets. This section focuses on our efforts in EVs, energy storage (including energy storage integrated with solar generation), energy efficiency, clean heat and building electrification, and smart inverters. As discussed below, our efforts to build DSO capabilities and invest in platform technologies puts the Companies in a position to support New York's clean energy goals.

The Companies' clean energy and decarbonization initiative capabilities include:

1. Electric Vehicles

   NYSEG and RG&E support electrification of the transportation sector as a major contributor to GHG reductions and a clean economy. Through a multi-state memorandum of understanding, New York has first committed to a target of 850,000 ZEVs by 2025 in 2013, and later committed to have 100% zero emission light-duty vehicle in state sales by 2035 and 100% zero emission medium-and heavy-duty vehicle in state sales by 2045.[20] [21] The Commission addressed EV related issues and opportunities in Case 18-E-0138. The Commission has defined the precise role of utilities in Case 18-E-0138. Since that time, there have been a number of Commission and State EV developments that the Companies continue to support. The Companies' vision for electrification of the transportation sector is to be an industry leader in developing and integrating infrastructure and technology that enables market growth and supports the decarbonization of the economy. The Companies have worked closely with the Joint Utilities in developing statewide EV programs. The Companies organize their EV activity in following four

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[20] October 24, 2013. "State Zero-Emission Vehicle Programs: Memorandum of Understanding." Parties include Governors of California, Connecticut, Maryland, Massachusetts, New York, Oregon, Rhode Island, and Vermont. Memorandum of understanding includes agreement to coordinate and collaborate to promote effective and efficient implementation of ZEV regulations.

[21] NY State Assembly Bill A4302 (nysenate.gov)

categories with high level goals established in support of NYSEG and RG&E's vision for electrification of the transportation sector.

Exhibit III-6

EV Categories

Category	Goal
Electric Vehicle Supply Equipment	To be a regional leader for EV charging infrastructure development enabling the charging needed to reach state targets
Electric Vehicle Readiness	Leverage market intelligence, system planning, and analytics to develop programs, and forecast required system and charging infrastructure investments
Intelligent Integration	Improve system efficiency as EV adoption increases
Company Use & Employees	Lead by example with fleet adoption and encouraging employee adoption of EVs

2. Energy Storage

Energy storage, whether connected to the grid or located on customer premises, smooths out demand profiles, lowers energy costs, and contributes to clean energy goals.[22] Energy storage also provides a multitude of grid operational services, such as supporting load and maintaining optimal voltage. A battery's ability to store and shift the use of renewable generation means that energy storage can also help meet New York's clean energy goals more economically and efficiently, particularly if intentionally paired (i.e., planned and operated) along with a renewable energy source. The degree to which an energy storage system can be considered a clean resource depends on the net impact of its operations on fossil fuel generation in New York. The Companies are incorporating energy storage into our integrated system planning functions, NWA procurements, interconnection processes, and grid operations. Our objective is to proactively support the identification and development of energy storage projects that benefit our customers and the grid. We, along with the Joint Utilities and the rest of the industry, are still in the early stages of determining business models that are most likely to maximize the benefits of energy storage and take advantage of downward trending technology costs. The following five high level goals support the Companies' vision for energy storage:

- Utilize available NWA framework to optimize locational value of storage
- Develop and complete demonstration projects to learn how to integrate storage, test market partnerships and business models
- Proposed utility-owned energy storage projects to demonstrate the benefits of non-market utility ownership

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[22] As specified by New York law, a qualified energy storage system is a "commercially available technology that is capable of absorbing energy, storing it for a period of time, and thereafter dispatching the energy using mechanical, chemical, or thermal processes to store energy that was generated at one time for use at a later time". PSL 74.

- Develop and integrate storage in utility planning and operations to gain DSO operational experience
- Align with the State's Storage Roadmap 2.0 goals

3. Clean Heat and Building Electrification

The building sector is the largest emissions source in the State, accounting for 32 percent of emissions.[23] The New York State ("NYS") Clean Heat Program is an initiative developed in partnership by NYSERDA and the New York Utilities to meet the State's low-carbon goals. The program makes heat pumps more affordable and accessible to utility customers. Heat pumps are an emissions-free energy source for building heating and cooling and provide stable energy bills and provide easy maintenance compared to alternatives. Per the 2022 Clean Heat Implementation Plan, NYSEG and RG&E expect to target annual energy savings of 992,737 and 119,223 MMBtu through 2025.[24]

There are three main technologies that are eligible for incentives offered by the Utilities:

1. Air-Source Heat Pumps ("ASHPs") for space heating applications;
2. Ground Source Heat Pumps ("GSHPs") for space and water heating applications; and
3. Heat Pump Water Heaters ("HPWHs") for domestic and commercial water heating applications.

The Companies also developed a separate building electrification initiative, the Electric Heat Make-Ready Program, to address the costly retrofits (such as electric panel upgrades) that are often required when customers switch to heat pump technologies. The rebate program intends to support customer adoption of electric heating systems, providing incentives toward the cost of electrical upgrades required to accommodate full heating load heat pump installations.

4. Energy Efficiency

The CLCPA energy efficiency goal represents nearly one-third of the total GHG emission reductions needed to achieve the statewide 40 x 30 target.[25] The Companies recognize that energy efficiency ("EE") programs will play a key role in achieving the State's clean energy goals and have a comprehensive set of energy efficiency programs in place to provide customers with energy savings programs. The Companies are committed to offering Energy Efficiency and Demand Response ("DR") programs that prioritize carbon reduction, provide clean heating alternatives, support low-to-moderate income ("LMI") customers and communities, and help customers manage their energy usage. Our energy efficiency programs are supported by investments in platform technologies. Once fully deployed, advanced meter data will provide more granularity around the impacts of energy efficiency on usage and provide additional rigor to measurement and verification of energy efficiency actions. Over time, this will allow us to design and implement better and more cost-effective programs.

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[23] New York State Department of Environmental Conservation ("NYSDEC"), 2021 Statewide GHG Emissions Report.

[24] Joint Utilities Clean Heat Implementation Plan at 7 (December 14, 2022).

[25] The 2015 New York State Energy Plan established a goal of 40% emissions reductions from all sources by 2030.

5. Smart Inverters

The environmental contribution of solar energy is well understood. Solar energy encompasses community distributed generation ("CDG") and other large solar facilities connected either to our distribution facilities or to transmission facilities operated by the NYISO. Solar Energy also includes smaller rooftop solar facilities on homes, commercial buildings, or municipal facilities, as well as "solar+storage" facilities of varying sizes.

We securely share hosting capacity information with DER developers that helps them identify areas of our system where they may be able to interconnect solar facilities without incurring significant costs. Our interconnection process is designed to efficiently manage interconnections in compliance with the New York State Standardized Interconnection Requirements (SIR). In the future, we expect that smart inverter technology will further support the integration of solar energy into our network.

We support the integration of solar facilities and in the future, we expect that "smart inverter" technology will further support the integration of solar energy on our network. The Companies believe that it is appropriate to reflect the potential role served by DER smart inverters in our plan to build the DSO. The vast majority of grid-connected DERs produce electricity using inverters that convert direct current ("DC") to alternating current ("AC"). Modern inverters include power electronics, control systems and software that can modify the electrical output of the inverter according to changes on the generator side (e.g., PV panel shading or battery charge level) or in response to changes on the grid side (e.g., voltage fluctuations). Combined with two-way communications, these "smart inverters" can enable coordinated DER operation and provision of grid services for utilities and their customers, such as regulating voltage. Although not utility-owned equipment, smart inverters have the potential to enable more efficient integration of clean DERs (especially solar energy and storage) and enable DERs to provide local grid support services including voltage regulation and frequency control. We will close this section with a discussion of our efforts to leverage the potential benefits of smart inverters as we integrate DERs.

Progress and Future Implementation

The Companies continue to make progress on the clean energy and decarbonization initiative, as detailed below.

Electric Vehicles: The Companies have made progress on scaling EV capabilities that enable increased transportation electrification, participating actively in the Joint Utilities' EV working group and finalizing the AVANGRID-wide EV roadmap. In 2022, the New York PSC approved the Companies' Managed Charging Program as part of the EV Make Ready Program, which will provide incentives for charging off peak and prepare for future capabilities that provide the electric grid with charging flexibility. The Companies continue to implement other Make-Ready Program investments, including fleet assessments to identify requirements and analyze costs and benefits of EV for fleet operators and in 2023 is actively engaging in the mid-point review process. We also proposed a Medium and Heavy-Duty Make-Ready Program in the 2022 rate case and prepare for additional and impending state-wide Medium Heavy Duty Make Ready Dockets. The Companies expect to complete EV Make-Ready investments, including DC Fast Charging incentives, in 2025. In the most recent rate case, the Companies also proposed an EV Hub in the rate case that would include a single large scale corridor fast charging location with dedicated utility infrastructure to meet the needs of both light duty and

medium/heavy duty potentially up to 20 MW and also proposed a Municipal Curbside Charging Pilot to support additional on-street parking customers in transitioning to EV. In 2021, the Companies also completed the OptimizEV pilot program, which tested various customer energy usage controls to optimize vehicle charging based on price signaling. The Companies also established EV rate pilots to encourage customers to charge EVs during off-peak hours, helping to minimize the impact of EV charging on peak demand. Specifically, the Joint Utilities filed time-of-use rates to encourage residential customers to charge during off-peak hours. Subsequent orders provided a replacement for the Direct Current Fast Charging ("DCFC") per-plug incentive program in a Demand Charge Rebate and subsequent EV Phase-in Rate and Commercial Managed Charging program.[26] As part of our communications and marketing efforts to potential EV customers, we continue to develop EV web content (such as a rate calculator) to incentivize customers. The Companies also continues to expand company use of EVs through EV company programs and incentives.

Energy Storage: Since 2020, the Companies have made progress deploying energy storage projects and completing an AVANRID-wide energy storage roadmap. The PSC has begun to consider the benefits of utility-owned energy storage as part of meeting the 6 GW storage goals by 2030.[27] Since that time, the PSC issued its Storage Roadmap 2.0, which gives support for utility-owned storage as an effective pathway, and "can be additive and provides complementary benefits to private sector procurements."[28] The Joint Utilities continue to evaluate both developer-owned and utility-owned energy storage opportunities. The Companies actively participate in the Joint Utilities' Energy Storage Working Group and a separate Advanced Technologies Working Group ("ATWG") sub-group focused on storage as a resource to provide reliability and/or T&D capabilities. Through these groups, the Joint Utilities established a set of utility-owned use cases for further exploration through a NYSERDA-funded study on utility-owned storage opportunities, as well as seek pathways to integrate storage as ISP solutions. The Companies continue to take an active role in the working groups, while also continuing to deploy energy storage business models and work with third parties on storage deployment. Since the 2020 DSIP, the Companies proposed three new energy storage projects and issued energy storage bulk solicitations to enable a minimum of 29 MW of new energy (equivalent to approximately 47 percent increase to existing installed storage capacity within its New York service territories), in addition to its ongoing pilots, as discussed below.

The exhibit below includes current and proposed energy storage projects, including:

- Bulk storage solicitations
- NWA framework projects
- Demonstration projects
- Proposed utility-owned storage

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[26] See Case 18-E-0138, Order Establishing Framework for Direct Current Fast Charging Infrastructure Program (issued February 7, 2019), Errata Notice (issued February 21, 2019); see also Case 18-E-0138, Order Modifying Incentive Program and Granting, in Part, Petition for Rehearing (issued July 12, 2019); see also Case 18-E-0138, Order Providing Clarification and Modifying Direct Current Fast Charging Incentive Program (issued March 19, 2020).

[27] New York State of the State 2022, p. 146. Available at https://www.governor.ny.gov/sites/default/files/2022-01/2022StateoftheStateBook.pdf

[28] Energy Storage Proceeding, New York's 6 GW Energy Storage Roadmap: Policy Options for Continued Growth in Energy Storage (filed December 28, 2022) (2022 Storage Roadmap or Roadmap), pp. 47-48. Available at: https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={7D4753BA-916B-483E-9E35-6749B20384A6}

Together, these projects total a minimum of 37.6 MW in potential storage capacity.

Exhibit III-7

Energy Storage Projects

Project	Status
Bulk Storage Projects	
Bulk Storage Solicitations	Developed Request for Proposal ("RFP") to procure at least 10 MW of bulk-connected storage each for both NYSEG and RG&E to be in service by December 31, 2028[29]; completed first competitive procurement for bulk storage in July 2020 with no viable project awards; completed a second RFP for each utility in 2022 with no viable project awards; currently developing a third round of competitive solicitations with an expected RFP release date of July 10, 2023.
NWA Framework Projects	
Java Storage Project	NYSEG owned and operated 4MW / 35 MWh microgrid project designed to establish redundancy necessary to address potential risk of loss of existing single incoming sub-transmission line and/or failure of existing transformer bank at the Java substation. The project will allow NYSEG to defer portions of traditional wires solution alternatives. NYSEG issued an equipment RFP in 2022. The project schedule is currently under review.
Stillwater Storage Project	NYSEG 1MW / 2.9MWh NWA project to address substation overload and low voltage power quality issues through developer-installed storage system located 1.8 miles from the Stillwater substation. NYSEG has been meeting regularly with the develop to review interconnection details, and the project is expected to be in service in 2023.
Demo Projects	
Aggregated Behind the Meter ("BTM") Energy Storage	The Companies partnered with a third-party market partner to install six storage facilities of varying sizes on commercial and industrial customer sites in the ESC footprint. NYSEG installed a total of 765 kW / 3,080 kWh energy storage.[30] We tested three use cases: customer energy demand management, aggregated demand response market participation, and circuit and system peak reduction. Two battery systems were installed by the end of 2018, and we installed another three by the end of the first quarter in 2020. The sixth and final site was completed in late 2020. Data collection and lessons learned from this demonstration project is still ongoing. NYSEG filed a white paper in its current rate case highlighting each use case and project lessons learned through mid-2022.
Integrated EV Charging and BSS	RG&E installed the 150 kW / 600 kWh energy storage system in December of 2018 at our Scottsville Road Operations Center in Rochester. The purpose of this project is to demonstrate how battery storage can be integrated with EV charging to improve project economics, minimize the impact of EV charging on the grid, and derive value from market services by pairing an ESS with two EV DC fast chargers and five level II chargers. We tested three use cases: building /circuit demand reduction, building load factor improvement, and demand response. By addressing the building load and DC fast charger load through battery optimization, we are relieving the circuit demand Data collection and lessons learned from this demonstration project is ongoing. RG&E filed a white paper in its current rate case highlighting each use case and project lessons learned through mid-2022.

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[29] Energy Storage Proceeding, Order Directing Further Modifications to Energy Storage Solicitations (issued March 16, 2023).

[30] NYSEG signed up eight customers for a total of 1.060 MW (4.2 MWh), but secured only six customer sites for a total of 0.765 MW (3.08 MWh).

Project	Status
Peak Shaving Pilot Project	RG&E installed a 2.2MW / 8.8 MWh battery storage system at its Substation 127 in Farmington in December of 2018. We tested three use cases: substation peak demand reduction, ability to reduce customer power quality issues, and O&M cost reduction. Data collection and lessons learned from this pilot is ongoing. RG&E filed a white paper in its current rate case highlighting each use case and project lessons learned through mid-2022.
Distribution Circuit Deployed BESS	NYSEG installed a 477 kW / 1,890 kWh energy storage system on an ESC circuit in 2018. We are testing three use cases: daily circuit peak reduction and load shaping, our ability to maintain circuit loading within the hypothetical rating, and voltage regulation. Data collection and lessons learned from this pilot is ongoing. NYSEG filed a white paper in its current rate case highlighting each use case and project lessons learned through mid-2022.
Utility-Owned Projects	
Stephentown Substation BESS	Proposed utility-owned 1MW, 4MWh BESS located at NYSEG's Stephentown substation that will reduce substation transformer overload for up to 10 years and enhance the substation's ability to host additional DERs. The substation's current summer peak load is 97%. NYSEG awaits PSC project approval.
Wales Center Substation BESS	Proposed utility-owned 1 MW, 4 MWh BESS located at the Wales Center substation in NYSEG's service territory, with an average summer peak load of 92% and 2.3MW of intermittent DERs interconnected and an additional 2.5MW of DERs in the interconnection queue. The project will reduce transformer overload, address potential supply quality issues, and increase DER hosting capacity. NYSEG awaits PSC project approval.
Station 125 BESS	Proposed utility-owned 7 MW, 35 MWh, BESS in RG&E's service territory to reduce transformer overload and increase transformer loading efficiency. Station 125 has an average loading of 89% of capacity over the past 5 years, reaching 94% in 2020, and expected to exceed nameplate rating in 2023, in addition to 0.853MW of interconnected residential and commercial DERs. RG&E awaits PSC project approval.

Clean Heat and Building Electrification: As a supplement to the Companies' energy efficiency programs, NYSERDA and the Joint Utilities developed a Statewide Heat Pump Program Implementation Plan[31] as one element of the State's clean energy pathway that will help customers make the transition to energy-efficient electrified space and water heating technologies. The plan provides contractors and other heat pump solution providers with a consistent experience and business environment throughout New York. The initiative is a key program for transitioning the State's customers to energy-efficient electrified space and water heating to support clean energy pathways. In meeting the program's goals, the New York Utilities developed five principles, including:

1. Drive market scale to produce cost reductions.
2. Provide a clear and stable market signal.
3. Ensure incentive structure is simple and workable from the customer perspective.
4. Pursue uniformity and flexibility across Utilities.
5. Strive for a gradual transition from existing programs.

The NYSEG and RG&E proposal also incorporates two other principles:

1. Seek solutions that allow LMI customers to benefit from heat pumps.

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[31]   Filed on April 30, 2020 in Case 18-M-0084.

2. Encourage synchronized building envelope upgrades and heat pump installations.

Through its market efforts and direct promotion, the Companies have made progress in meeting the State's energy savings targets through heat pump incentives, as shown below.

Exhibit III-8

Clean Heat Program Energy Savings Targets by Year.
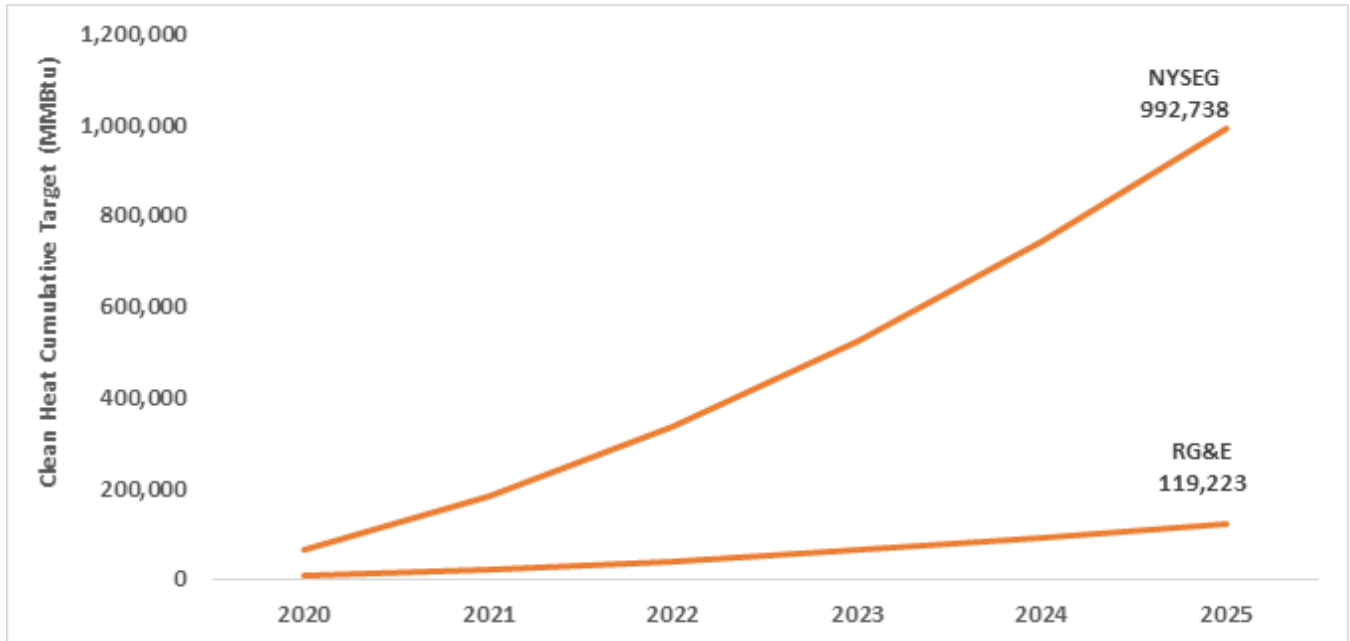
The Companies' separate Electric Heat Make-Ready Program intends to support heating electrification for at least 8,400 homes, representing a 300 percent increase in the service territories.

Energy Efficiency: The Companies offer a portfolio of energy efficiency programs that use financial incentives (such as rebates), marketing, and behavioral analysis to encourage adoption of various energy efficient products. The Companies' programs have resulted in annual energy savings of over 190,000 MWh. NYSEG and RG&E each offer a diverse portfolio of electric EE programs targeted to all commercial and industrial, residential, and multi-family customer segments, including programs that target LMI customers. Current programs include:

- Residential Programs: Retail Products Program (instant rebates at retail), Residential Rebates (online rebate application for efficient products), Appliance Recycling Program, Behavioral program (provides customized home energy reports with energy reduction recommendations), Smart Solutions (online store with energy efficient products) and home insulation and weather sealing offerings.

- LMI distributions- distribution of education and efficient products through local schools, community centers, foodbanks and low-income rate reduction recipients.

- Multi-Family Programs: free energy assessment and direct installation of energy-savings measures in both common areas and dwelling units.

- <u>Commercial and Industrial Programs</u>: Small business direct install rebates on energy efficient equipment upgrades, small business customer choice offerings on energy efficient products, energy efficiency rebates.

- <u>Statewide Initiatives</u>: NY Clean Heat Program; LMI 1-4 family home program providing outreach and efficiency upgrades, Affordable Multi-family Energy Efficiency Program to encourage retrofit installation of high efficiency products through rebates and customer incentives.

- <u>Demand Response</u>: Smart savings reward offering residential and small business customers with smart thermostat discounts, commercial system relief program to reduce peak consumption.

In addition to its existing programs, the Companies intend to deploy additional programs, including a new Midstream Commercial program (aims to increase energy efficient products through the supply chain) and a Commercial Behavioral program to boost energy savings opportunities in the commercial sector through leveraging AMI data and analytics. The Companies also propose an energy education program targeting elementary schools in low-income communities. The Retail Outreach Program will partner with qualified retailers to offer instant discounts on various efficient products and will target retailers in low-income neighborhoods.

The Companies have deployed a behavioral program for a select set of residential customers to encourage them to save energy through targeted energy-saving tips and to promote the Companies' traditional energy efficiency programs. The Behavioral Program offers customized home energy reports and an associated web portal for program participants to access and track their energy usage, encouraging customers to save energy with targeted tips and referrals to traditional EE programs.

AMI-enabled data analytics could help to refine specialized outreach to each consumers' unique needs and interests. For example, the higher usage customers located in low-income areas could be targeted for weatherization or be offered some of our low-income specific program offerings. Detail on high electric usage by the days and hours may give us increased visibility to the ideal candidates to transition to a heat pump program.

Exhibit III-9

Energy Efficiency Program Energy Savings Targets by Year.
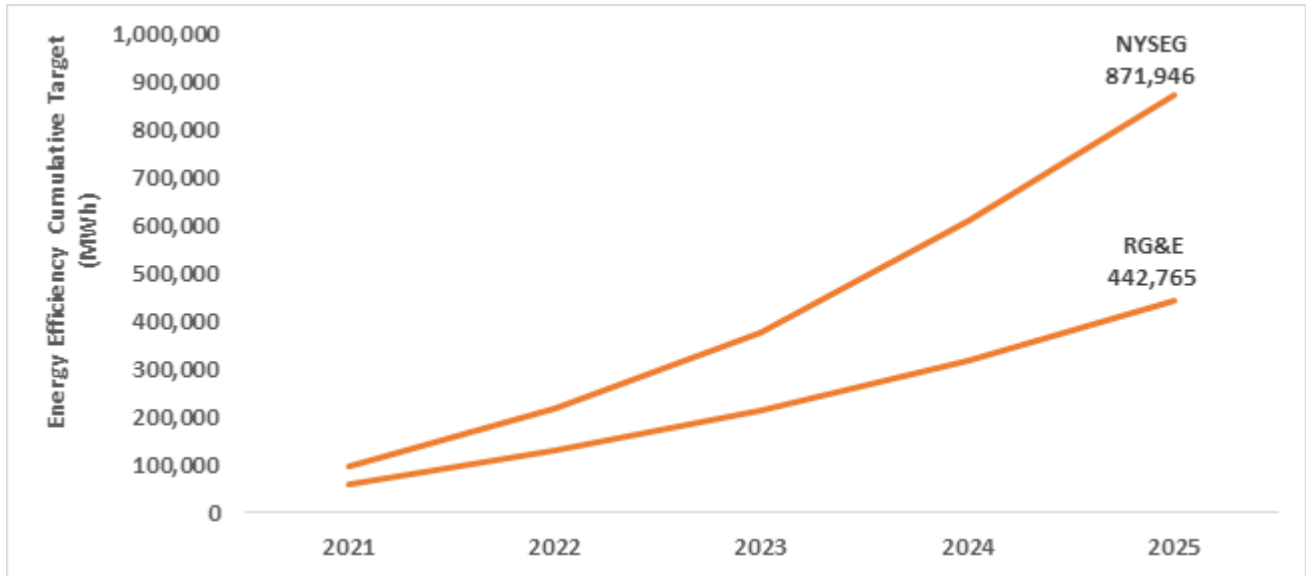
Smart Inverters: Smart inverters have the potential to enable more efficient integration of clean DERs, particularly solar+storage, and enable DERs to provide bulk power system ride-thru capability, local grid support services, such as improving power quality and increasing hosting capacity. In July 2019 the Joint Utilities initiated a smart inverter working group ("SIWG") to develop a proposal for the potential adoption of interactive, communicative and grid support ("smart") inverters in New York. The SIWG has worked with New York stakeholders and leading industry and technical groups outside of New York to develop recommendations for smart inverters in New York. These include:

- Establishing requirements for high priority Smart Inverter Autonomous Functions that specify how smart inverters will operate to ensure grid reliability and safety.

- Establishing requirements for communications links and back-office systems and software that monitor and utilize key DER data.

- Establishing requirements for Smart Inverter Advanced/Interactive Functions that will enable tighter DER integration and provision of grid services in the future.

- The Joint Utilities' recommendations have been implemented in four phases, which began in the second half of 2020. The Companies continue to actively participate in the Joint Utilities Smart Inverters Working Group. As of January 1, 2023, the Joint Utilities required all new inverter-based DER applications to comply with Institute of Electrical and Electronics Engineers ("IEEE") Standard 1547-2018 and implemented new smart inverter settings for voltage and frequency ride-through, Volt-VAR functionality as well as other advanced autonomous smart inverter capabilities.

- The Interconnection Technical Working Group ("ITWG") is expected to finalize recommendations on standard minimum communications and control requirements in 2023. The working group is expected to finalize interactive smart inverter settings recommendations in 2025.

Exhibit III-10

The Joint Utilities smart inverter recommendations is proposed to be implemented in four phases over five years.
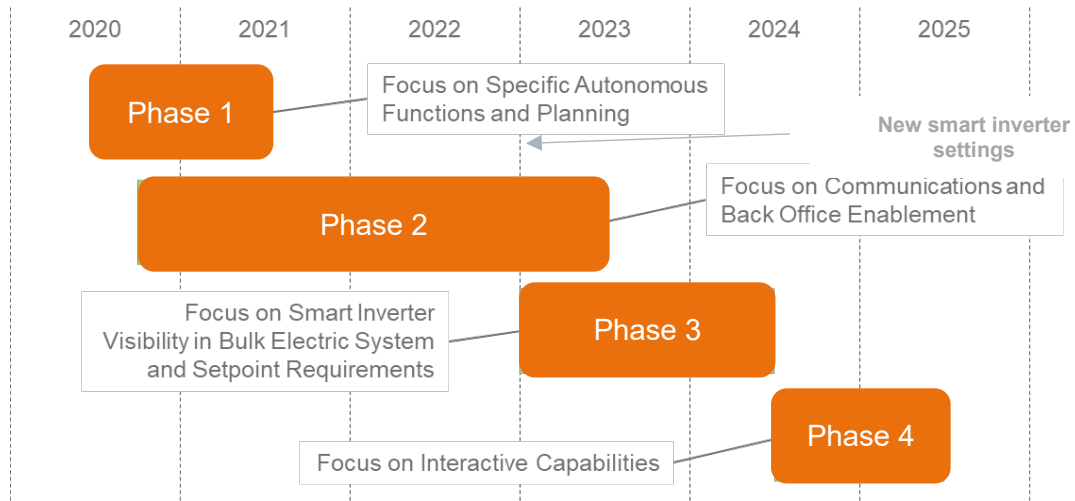

Exhibit III-11

Major Clean Energy and Decarbonization Projects and/or Activities

Project or Activity	Expected Completion
Identify energy storage opportunities for T&D applications, complete EV make ready investments, and complete NY-required clean energy targets	Ongoing

➡ For more information, check out Appendix A, Topic 4 (Energy Storage Integration), Topic 5 (Electric Vehicle Integration), Topic 6 (Clean Heat Integration), and Topic 7 (Energy Efficiency Integration and Innovation)

Market Services and Innovative Customer Offerings

Objectives

Market services connect our customers to innovative pricing options and programs, as well as to products and services offered by competitive suppliers. This function empowers our customers to make better energy management decisions by providing them and their potential suppliers with access to energy usage and other relevant information consistent with data privacy requirements. Potential suppliers can use customer-specific information (shared securely and only with customer authorization) to tailor their offerings to different customers. The

> **Market Services and Innovative Customer Offerings Outcomes**
>
> - Empower customers that have easy and secure access to their own detailed energy usage data and the ability to securely share their usage data with third parties, with authorization.
>
> - Provide insights and tools that help customers manage their energy usage.
>
> - Develop an expanded products and services platform that is easy for customers to navigate with the ability to self-select program, service, and pricing options from NYSEG, RG&E, or products and services from a third-party supplier.
>
> - Ensure security and privacy of customer data that resides within the Companies or is provided to a third party, with authorization.
>
> - Animate markets by supporting third-party aggregation.

Companies can anonymize aggregated customer data for a DER developer to design a market campaign for a CDG project. Our customers will be able to use our online products and services platform to choose among NYSEG and RG&E time-of-use and other pricing options, enroll in energy efficiency or demand response programs, and purchase products and services from competitive suppliers. Our customers will be able to participate in NYSEG and RG&E tariff options that reduce energy usage during periods of high demand, thus reducing their energy costs. This initiative also includes efforts by the Companies to engage customers in clean energy options, including energy efficiency, solar energy, energy storage, and electric vehicles.

The Companies' market services and innovative customer offerings initiatives support three critical capabilities.

1. Billing System Automation and Compensation

   On July 17, 2015, the Commission authorized CDG, enabling customers for whom rooftop solar was not an option to participate in renewable energy programs.[32] The CDG participants receive credits on their utility bills and in return, pay the CDG sponsor a monthly subscription fee, which are designed to be less than the value of the credits.

   Subsequently, on March 9, 2017, the Commission directed an immediate transition away from net-energy metering to a VDER Phase One tariff, which included two components[33]:

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[32] Case 15-E-0082, *Proceeding on a Motion of the Commission as to the Policies, Requirements and Conditions for Implementing a Community Net Metering Program,* Order Establishing a Community Distributed Generation Program and Making Other Findings (issued July 17, 2015) (CDG Order).

[33] Cases 15-E-0751 *et all., In the Matter of the Value of Distributed Energy Resources* (VDER Proceeding), Order on Net Energy Metering Transition, Phase One of Value of Distributed Energy Resources, and Related Matters (issued March 9, 2017).

1. Implementing a new DER program similar to net energy metering ("NEM") with a 20-year compensation term limit;
2. and the Value Stack tariff implementing a new, more comprehensive DER program based on monetary crediting for net hourly injections.

Since that time, the Commission approved the net-crediting model for CDG consolidated billing to allow CDG subscription fees to be included in customers' utility bills.[34] Recognizing that timely billing and compensation are crucial to the success of energy programs, such as CDG and VDER, the Commission required that the utilities include anticipated timelines for implementation of net crediting, cost estimates, estimates of costs that are incremental to current rate recoveries, as well as an accounting plan for deferral of incremental revenue requirements. The CDG Program has been evolving, and rules have been changing, which has necessitated updates to billing automation processes. Progress on billing automation and compensation continues, improving the accuracy and timeliness of our expanding energy programs.

2. DER Aggregation for Market Access

The NYISO operates the wholesale market and performs planning and operation of the bulk power system. Increasing DER penetration will require greater coordination and communication between the DSO and the NYISO. In the future, the DSO will coordinate with the NYISO to optimize transmission and distribution network operations. This will include data requirements, communications, grid operations, activation of DERs, and mechanisms for DER aggregation. The ADMS and DERMS will enable the integration of DERs into grid operations.

3. Rate Design

New platform technologies deployment will support innovative rate designs that will better value DERs and beneficial electrification technologies. Rate design potential is highly dependent first upon the AMI rollout, which will provide grid edge visibility into customer usage and behavior.

Progress and Future Implementation

The Companies continue to make progress on the market services and innovative customer offerings initiative, as detailed below:

Billing Automation and Compensation: The billing systems team develops IT cyber security systems for our Customer Information Systems, particularly billing processes. The advanced functionality we are testing requires a new CRM&B system that was implemented with interfaces to the Companies' existing SAP Customer Care System ("CCS") that has been in place since 2006. CRM&B involves more customer engagement through more comprehensive billing options and outage management improvements. Since filing its CDG Net Crediting Program Implementation Plan on February 4, 2020, NYSEG and RG&E have completed the CRM&B upgrade, which went into effect in September 2022.[35] The Companies continue to test the system's advanced functionality, as the CRM&B involves more customer engagement through

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[34] Case 19-M-0463, *In the Matter of Consolidated Billing for Distributed Generation* (CDG Proceeding)*,* Order Regarding Consolidated Billing for Community Distributed Generation (issued December 12, 2019) (CDG Order).

[35] CDG Proceeding, NYSEG and RG&E Community Distribute Generation Net Crediting Program Implementation Plan (filed February 4, 2020).

more comprehensive billing options and outage management improvements and will support time-varying rates after the AMI deployment is complete. The Joint Utilities are also now involved in the CDG billing and crediting negative revenue adjustment stakeholder conference process, initiated by the September 15, 2022 Commission Order, and will continue to address outcomes as needed.[36] In addition, the Value Stack CDG automation code was recently retrofitted with the upgraded billing system. Due to the complexity of the CDG Program, the Companies continue thorough and methodical testing. Additional steps are needed to achieve full Value Stack CDG billing and crediting automation. The expected go-live date for the full initial Value Stack CDG Automation is the second quarter of 2023. Future implementation efforts through the Joint Utilities are also underway for several programs. Wholesale market developments to address the FERC Order 2222,[37] the host community benefit program, grandfathered net energy metering crediting, and the new solar for all program will all be deployed by 2028.

DER Aggregation for Market Access: The Companies continue to make customer data available to third parties, including NYSERDA, CDG developers, and Community Choice Aggregation ("CCA") providers. Data shared includes:

1) Aggregated data;

2) Customer contact data; and

3) Customer account enrollment data provided through our secure portals.

The FERC issued Order No. 2222 in September 2020 in an effort to remove barriers preventing DERs from participating in the wholesale markets facilitated by the NYISO. The Companies continue to develop value-added market analyses and engage with aggregators. In the longer term, the Companies will map available AMI data and develop NYISO-level forecasts. As part of the Joint Utilities, the Companies have made progress on coordination with NYISO. The Joint Utilities also partnered with the NYISO to develop an integrated DER integration workflow and information set, covering resource registration and enrollment, operational coordination, and metering and settlement. The Joint Utilities also analyzed and identified tariff changes necessary to enable the NYISO's FERC 2222 and 841[38] compliance market. Going forward, the Joint Utilities will continue to coordinate with the NYISO in its 2023 DER market launch and the transition of Demand Side Ancillary Services Program ("DSASP") resources to the market between 2023-2024. The Joint Utilities will continue to work with NYISO through the 2026 FERC 2222 market implementation to animate DER markets.

Rate Design: As the AMI and grid automation programs complete, many of our pricing options and programs will be targeted to a specific DER integration objective (e.g., an EV time-of-use rate). Since the 2020 DSIP, the Companies developed a standby rate in compliance with the Commission's March 16, 2022 Order adopting a new cost allocation methodology for buyback service and standby rates. The rate is intended to improve the value proposition of DERs, such as EVs and storage. The rates are intended to better align with individual customers' system cost contributions. In its 2022 rate case, the

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[36] CDG Proceeding, Order Establishing Process Regarding Community Distributed Generation Billing (issued September 15, 2022).

[37] FERC Order 2222, issued in September 2020, enables DERs to participate in regional wholesale power markets through aggregations alongside traditional resources, which will enhance competition and lower consumer costs and provide additional grid resiliency. More information is available here: https://www.ferc.gov/media/ferc-order-no-2222-fact-sheet

[38] FERC Order 841, issued February 15, 2018, directs regional grid operators to remove barriers to entry for energy storage resources in wholesale power markets. The Order is available here: https://www.ferc.gov/media/order-no-841

Companies also proposed an AMI rate to implement time-varying rate structures. The Companies also established EV rate pilots to encourage customers to charge EVs during off-peak hours, helping to minimize the impact of EV charging on peak demand, as well as a time-of-use rate for EVs to limit peak demand. Over the long-term, the Companies will develop EV, storage, and other innovative rates after completion of the AMI deployment in 2025.

Exhibit III-12

Major Market Services and Innovative Customer Offerings Projects and/or Activities

Project or Activity	Expected Completion
Continue coordination with NYISO on DER/market aggregation; support DER integration and beneficial electrification with time-varying rates	2026

➡ For more information, check out Appendix A, Topic 3 (Grid Operations) and Appendix A, Topic 10 (Billing Automation and Compensation)

IV. Roadmap

IV.   ROADMAP

We conclude with a summary roadmap of DSIP progress to date and our planned implementation over the next five years.

Exhibit IV-1 presents a high-level DSIP roadmap of platform technologies and capabilities that we are building in each of the six platform initiatives. We will continue to update the DSIP roadmap as policies and circumstances evolve and will update our report in 2025.

Exhibit IV-1

Our roadmap integrates activities across the six platform initiatives.
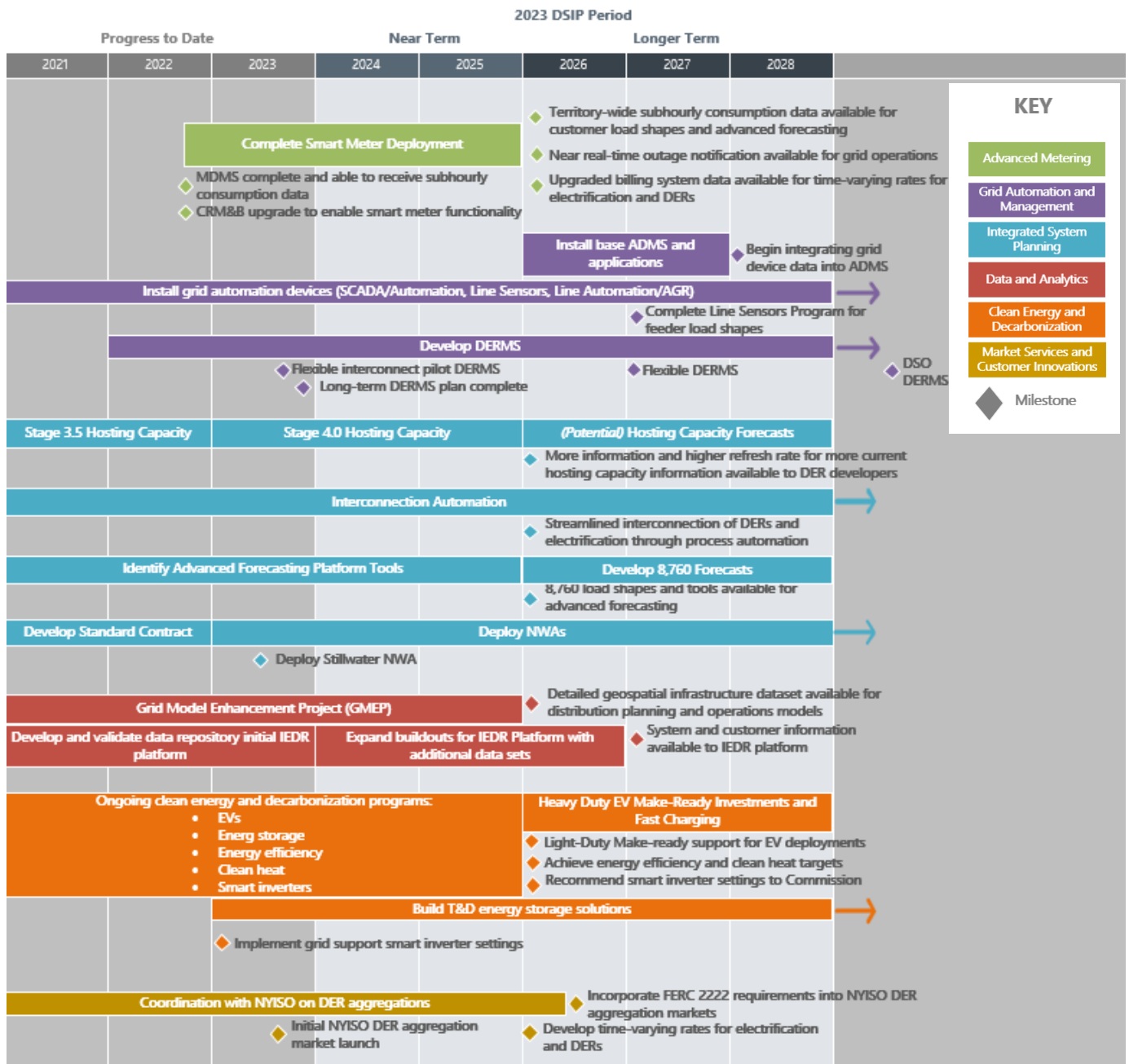
This integrated set of investments and actions will allow us to build a DSO that will be customer-driven, safe, secure, efficient, and clean.

Customer-Driven

The DSO places customers in the center. Customers make the decisions to engage with DERs that not only helps them meet their energy needs, but helps other customers and the environment. Our role is to empower customers, provide them with a products and services marketplace to securely transact, and to provide them with the information they need to make sound decisions.

Safe, Reliable, and Resilient

The DSO strengthens grid resiliency to maintain safe, reliable electricity service for our customers and communities in response to growing risks from climate change. The DSO coordinates planning, operations, and flexibility from DERs to reduce the disruption caused by more frequent and intense storms, as well as increased demands for electricity from higher temperatures and beneficial electrification.

Secure

The DSO will maintain accurate and timely data from numerous sources and systems. Our customers also use the distribution system and market information to make energy-related decisions. Ensuring that this information is secure is critical to our operations and customer privacy.

Efficient and Affordable

The DSO supports the transition to the cleaner and more sustainable grid. We are compiling and managing a common set of granular data that supports each of the DSO functions. We have historically been able to plan and operate the grid by geographic area. Now, we must plan and operate the grid and share information that is differentiated by geographic location and by time. Our ongoing investments in AMI, DER databases, and grid automation will provide us with the granular data we need as efficiently as possible.

Clean and Sustainable

We are actively engaged in delivering value to our customers and enabling New York State's policy objectives. We serve a proactive role in the proliferation of energy efficiency, clean distributed generation, energy storage, and electric vehicles where and when they provide appropriate value.