2018

Annual Report

The New York Independent System Operator

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Message from Board Chair and President & CEO

NYISO Board Chair,
Ave M. Bie

NYISO President & CEO,
Richard J. Dewey

We are at a unique and exciting point in the history of the electric grid in New York State. At the New York Independent System Operator (NYISO), where we are responsible for reliably operating the bulk electric system and administering the wholesale electricity markets, we are taking action to help New York meet its clean energy goals.

The recently adopted Climate Leadership and Community Protection Act (CLCPA), seeks to achieve 70% of electric grid generation from renewables by 2030, and a 100% "zero-carbon" grid by 2040. To that end, the state seeks 9,000 megawatts in offshore wind, 6,000 megawatts of solar power, and 3,000 megawatts of battery storage. The NYISO expects regulatory policy initiatives to continue driving the shift to lower-emitting and renewable resources.

The NYISO views electricity markets as an essential, effective platform for achieving public policy. The 2020-2024 NYISO Strategic Plan highlights opportunities to adapt our market structure and prepare for a future grid that is less centralized, more resilient, and cleaner. As we transition to new technologies such as energy storage, distributed energy resources and renewable energy, the NYISO is hard at work implementing changes necessary to manage a future grid increasingly comprised of intermittent resources while maintaining reliability and cost effective service for consumers.

For instance, the NYISO continues to develop a portfolio of market enhancements that will position the NYISO markets as an industry leading platform to allow New York to drive towards a cleaner and more technologically advanced grid. Included in that strategy is a plan for adding carbon pricing to the wholesale electricity market. A social cost of carbon dioxide emissions, established by the state and reflected in wholesale electricity markets administered by the NYISO, would leverage the efficiency of wholesale markets and provide energy suppliers the incentive to invest in cleaner energy technologies. Carbon pricing would promote clean energy technologies by dovetailing wholesale markets with state efforts to promote cleaner energy technologies.

The NYISO remains committed to maintaining the highest level of reliability for the electric grid, recognizing that reliability is vital to New York's economy and society. Providing the high degree of reliability that New Yorkers demand will be increasingly challenging as we transition to a more distributed and intermittent fleet of resources. The NYISO is committed to dedicating our Planning and Operations resources to meet the needs of our customers.

We embrace the challenges and opportunities before us. We look forward to working collaboratively with our stakeholders, policymakers, and regulators on the changes necessary to develop the grid and markets of the future. It is our privilege to reliably serve New York's energy needs.

In this annual report you will find more details and additional discussion of other important items the NYISO was engaged in throughout 2018. The NYISO's mission stands upon four pillars: reliability from expert system operations; open, transparent, and innovative energy markets that promote efficiency and enable new investment; effective system planning to support the needs of the grid today and tomorrow; and independent, expert and authoritative information. Working together with stakeholders, regulators, and policymakers, the NYISO is proud of the value that wholesale energy markets have brought to New York.

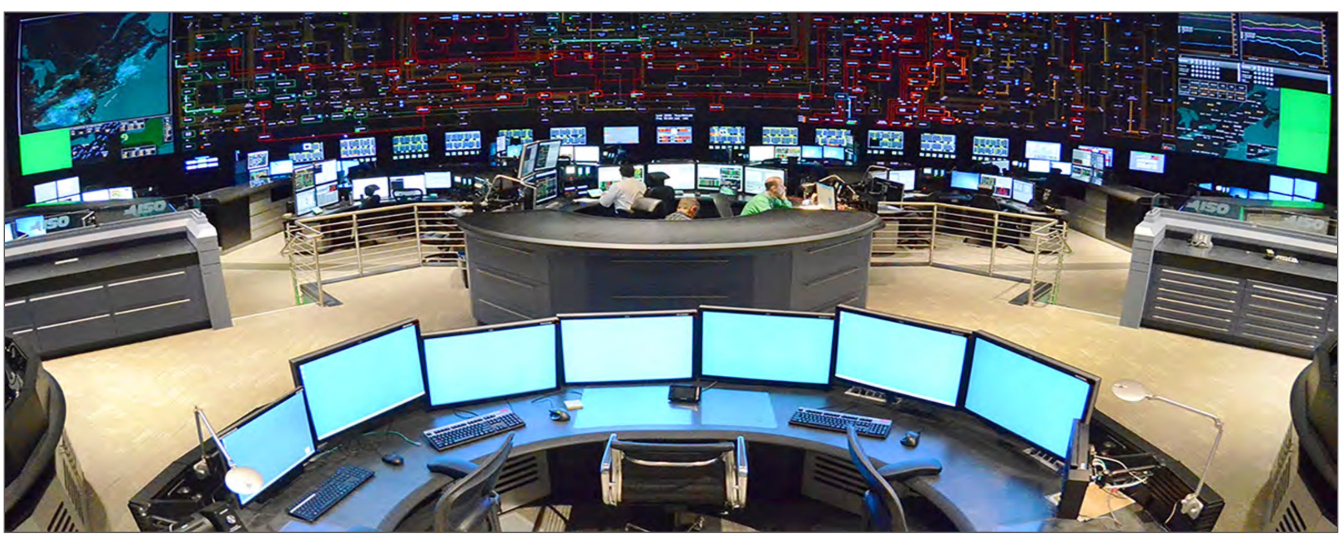
Key Accomplishments

The past year was distinguished by several important accomplishments. In addition to maintaining expected system reliability, the NYISO added new critical infrastructure and continued to support New York State policies regarding the development and reliable integration of new renewable resources and distributed energy resources (DER). Accomplishments include:

- Published a five-year **Master Plan** providing a cohesive strategic vison for future market design efforts
- Continued implementation of the **DER Roadmap**
  - Developed market rules to accommodate DER integration into the wholesale markets
  - Launched a Pilot Program and selected three DER Pilot Projects to demonstrate DER capabilities and options for wholesale market integration
- Released **The State of Storage** plan for developing a market participation model designed to maximize economic and societal benefits of Energy Storage Resources
  - Developed market rules to accommodate storage integration into the wholesale markets
- Published the **Power Trends** report highlighting how technology, economic forces and public policy are shaping a more dynamic power grid, and the implications for the state's wholesale markets
- Participated in the **FERC resilience** proceeding, which detailed NYISO efforts to assess and maintain grid resilience and how the wholesale markets already recognize and compensate for resilience-related attributes and services
- Selection of transmission upgrades through the **Public Policy Transmission Planning Process** to address needs for new transmission in Western New York and continued work toward finalizing the selection of projects in response to the identified AC transmission needs for incremental transfer capability across the Central East and Upstate New York/Southeast New York (UPNY-SENY) interfaces
- Development of a proposal for implementation of **Carbon Pricing** in the NYISO wholesale markets
- Implemented the **Salesforce Customer Relationship Management** tool providing advanced features for improved customer experience and enhanced communication functionality
- As part of the **Solar Forecasting** initiative, developed behind-the-meter and grid-scale forecasting capability to produce PV forecasts for use in the day-ahead and real-time markets

- Developed market rules for an alternative methodology to determine **Locational Minimum Installed Capacity Requirements** (**LCRs**) that minimizes total New York Control Area (NYCA) capacity cost while maintaining minimum reliability criteria
- Continued evolution of the **NYISO IT Strategy**
    - Cloud Computing Infrastructure adopted for targeted solutions
    - Employed test automation and agile development methodology for software modifications
- Continued implementation of the **NYISO Cybersecurity and Enterprise Security** strategies
    - Cybersecurity Operations Center established to strengthen security operations for all enterprise information systems
    - Strengthened physical security through implementation of Receiving Transfer Facility
- Released the **Report of the Consumer Interest Liaison** analyzing the effects of changes to the wholesale electricity market on consumer costs, system reliability, the environment, and transparency of NYISO operations
- Issued the **2018 Reliability Needs Assessment** including a scenario developed in close coordination with transmission owners to proactively assess potential impacts to electric system reliability related to implementation of the Department of Environmental Conservation's proposed "peaker" rule
- Implemented the **Modeling of Certain 115 kV Constraints** in market solutions to better reflect the impacts and value of maintaining transmission system reliability into market prices for such facilities

These key accomplishments built upon the organization's ongoing commitment to lower grid management costs, improved compliance with applicable reliability standards, and facilitated industry compliance with, and achievement of state policies, and lowered the cost of electricity to consumers across New York.



The state-of-the-art, 64,000 square foot, NYISO Control Center.

The NYISO

The NYISO, which began operating in 1999, is a not-for-profit corporation primarily regulated by the Federal Energy Regulatory Commission (FERC). The governance, structure and mission of the NYISO comply with the guiding principles in the FERC's open access regulations — Order Nos. 888 and 2000. The NYISO is governed jointly by an independent Board of Directors and market participants (transmission owners, generation owners, other electric power suppliers, end-use consumers, public power and environmental sectors). In accordance with a rigorous code of conduct, NYISO board members and staff are required to be independent from the interests of market participants.

The NYISO is responsible for operating New York's bulk electric system, administering wholesale electricity markets, and conducting system planning. The creation of the NYISO has resulted in reliability and economic benefits for New Yorkers while contributing to unprecedented environmental gains. For the past 20 years, the NYISO's markets have worked to improve system efficiency, supporting a shift toward cleaner sources of generation, while upholding the nation's most stringent reliability rules.

Core Values and Mission

The Core Values and Mission of the NYISO establish the foundation from which all of our responsibilities are delivered. Together, they provide the basis for the NYISO's Strategic Objectives, as well as a reference point to guide decision making and actions at all levels of the organization.

Core Values

The core values of the NYISO serve as the foundation from which we fulfill our mission every day in everything we do.

Integrity
Commitment to honest, ethical, and transparent actions

Innovation
Pursuing creative and sound solutions

Enthusiasm
Having a passion for our work and our interaction with our customers, stakeholders and policymakers

Teamwork
Working together, succeeding together, respecting each other

Customer Focus
Understanding the customer perspective

Operational Excellence
Commitment to excellence in all our processes, systems and products

Accountability
Taking responsibility to do what needs to be done

Mission

The mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefit to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policymakers, stakeholders and investors in the power system

Reliable Operations

The NYISO manages the flow of electricity across more than 11,000 miles of high-voltage transmission lines serving New York on a minute-to-minute basis, balancing supply and demand throughout the state in accordance with the federal policy of open and non-discriminatory access to the grid. Working with transmission owners, generators, the New York State Reliability Council (NYSRC), the Northeast Power Coordinating Council (NPCC), and the North American Electric Reliability Corporation (NERC), the NYISO adheres to the nation's strictest set of reliability standards, which include nearly 1,000 requirements designed to promote reliability for New York consumers. To provide the lowest-cost power available to reliably meet consumer needs, the NYISO conducts and monitors competitive auctions of wholesale electricity every five minutes, every day of the year.

The NYISO's primary power control center, opened in 2014, is among the most technologically sophisticated facilities of its kind in the world. The control center enables improved operator visibility of wide-area and local grid conditions, enhanced integration of new technologies, and provides many of the situational awareness displays and other tools needed to meet strict requirements for the monitoring and control of the bulk electric system.

Efficient Markets

The NYISO conducts a continuous series of auctions, in which load serving entities bid to purchase electric energy offered for sale by suppliers. Similarly the NYISO administers markets to purchase balancing requirements and various ancillary services needed to maintain system reliability. The NYISO also operates markets that allow market participants to purchase the installed capacity needed to meet resource adequacy requirements established by the NYSRC. Energy service companies and end-use consumers can provide demand response resources and compete with other suppliers in several of these markets.

Pursuant to its tariff, the NYISO maintains credit requirements that seek to ensure that all market participants entering into transactions provide reasonable assurance to protect the market from the potential for payment defaults. The NYISO's independent market monitor and internal market mitigation and analysis group continually surveil the markets for attempts at manipulation, identify potential market improvements..

Comprehensive Planning

The NYISO's Comprehensive System Planning Process (CSPP) is a unique, "all source" planning process that evaluates transmission, generation and demand response on a comparable basis. It is the primary tool for the NYISO to inform transmission expansion and electric infrastructure investment decisions in the New York Control Area (NYCA). Developed through its stakeholder governance process, the CSPP establishes a process for identifying reliability and economic needs, as well as transmission needs driven by public policy requirements. This process also establishes the procedures whereby solutions are proposed, evaluated and implemented in order to maintain the reliability of the bulk electric system, reduce system congestion, and respond to identified transmission needs driven by public policy.

Governance

Under the NYISO's shared governance process, a broad cross-section of market participants, including representatives from public power and environmental parties, consumers, transmission owners, generation owners, and other suppliers, engage with the NYISO to develop rules and processes designed to support the reliability, planning, and market performance of the NYISO's wholesale energy markets. The shared governance process offers a transparent forum for collaboration and consensus building on proposals that, with stakeholder approval, are considered by the NYISO's Board of Directors for submittal to FERC for final regulatory approval.

The governance structure includes three standing committees — the Management Committee, the Business Issues Committee, and the Operating Committee. Each committee oversees its own set of working groups, subcommittees and task forces. The NYISO's achievement of its objectives depends on the active involvement of participants in the shared governance process.

Responding to the Changing Grid

Historically, electric power flowed from generators across a vast network of transmission and distribution lines before reaching consumers. Energy usage and peak demand grew incrementally, year by year, and growing demand

for energy was met through physical expansion of the grid to increase its generating and delivery capacity.

While demand on the grid may no longer be growing at historical levels, planning and operating the grid has grown more complex. Technology, economic forces, and public policy are shaping a more dynamic grid. We are moving away from historical patterns of supply and demand, and towards emerging trends that reflect advances in how electricity is generated and consumed. Public policies are expediting this transformation.

This means historical, predictable demand patterns that characterized infrastructure planning over much of the last century are shifting. Consumers, increasingly empowered with intelligent digital technologies and advanced communications tools, are becoming active participants on the grid — adjusting their energy use patterns to reflect grid conditions, and tailoring their energy use to meet their own needs for economic and clean power.

This dynamic introduces new variables that the NYISO is uniquely poised to meet through competitive wholesale electricity markets. In collaboration with policymakers, regulators and market participants, the NYISO will continue to leverage our expertise in operating New York's power grid through advanced market design and open, transparent system planning in order to reliably and efficiently respond to the energy needs of all New Yorkers.

Reliability New Yorkers Can Count On

The New York Independent System Operator (NYISO) delivers electricity across New York in exactly the right amount, at exactly the right time. The NYISO conducts and monitors auctions of wholesale electricity every five minutes, every day of the year, to provide the lowest-cost power available and to encourage competition that drives innovation and efficiency to meet consumers' needs.

The NYISO performs comprehensive planning studies for New York's energy future, and provides independent, authoritative information to public policymakers and private investors with the common goal of meeting future electricity needs while sustaining the reliable supply of electricity for years to come.

2018 Accomplishments

Public Policy Transmission Planning Process

In 2018, the NYISO was engaged with the PSC and stakeholders on two transmission expansion efforts brought about by the need for additional transfer capability on the bulk power system from upstate to downstate. The Western New York and AC Public Policy Transmission projects will improve the flow of clean energy from renewable generation in the western and northern regions of the state to the state's largest region of energy demand in the lower Hudson Valley and New York City.

Following a competitive selection process that culminated in the NYISO Board of Directors' October 2017 selection of NextEra to address the public policy need for new transmission in Western New York, NextEra applied to the PSC for siting approval of its transmission facilities under Article VII of the Public Service Law in August 2018. The Western New York project represents the first selection of a transmission project by the NYISO using the Public Policy Transmission Planning Process approved by FERC under Order No. 1000. The NYISO entered into an agreement with NextEra for the development of the transmission project, including a schedule for siting, permitting, interconnection and construction. NextEra and the NYISO will also enter into an operating agreement for the new facility, which is expected to enter into service by June 2022.

The identified AC Public Policy Transmission Need, for which the PSC sought to relieve congestion from central New York, through the Capital Region to the lower Hudson Valley, resulted in 16 project proposals. Throughout early 2018, NYISO staff worked to evaluate and rank each proposal, culminating in a recommendation to the Board in June 2018. The Board offered interested parties the opportunity to submit comments prior to its taking action on the recommendations. Based on this input, the Board directed NYISO staff to conduct certain additional studies and analyses, which was done throughout the remainder of 2018.

The NYISO initiated a third cycle of the public policy planning process on August 1, 2018 by inviting stakeholders and interested parties to submit proposed transmission needs that they believe are being driven by public policy requirements. Informing this process was a transmission study conducted by the NYISO that identified constraints in four regions that limit the ability for the state as a whole to receive energy from new renewable energy investments in those regions. Fifteen entities representing a broad spectrum of interests, from utilities to developers to public interest groups, identified the Clean Energy Standard as a public policy requirement driving transmission needs, and many of the submissions encouraged the PSC to act to expand transmission system capability as soon as possible in order to meet the state's renewable energy goals. The NYISO submitted the proposed transmission needs it received to the PSC in October 2018.

Energy Storage Resources

The NYISO filed a comprehensive set of rules with FERC that will allow the expansion of wholesale market participation for Energy Storage Resources (ESRs). ESRs have unique capabilities that can help grid operators handle peak demand, manage the variability of intermittent resources, and potentially defer transmission upgrades in some instances. Their unique ability to withdraw from, and inject energy into the grid can provide resource flexibility and grid resilience. Additionally, energy storage can help improve the cost effectiveness of the system by charging during periods of low demand and low prices, and supplying energy to the grid during periods of high demand when prices typically rise.

The NYISO's ESR participation model will allow storage resources to either self-manage their energy levels or to use the NYISO's energy level monitoring capabilities. The option of relying on the NYISO's capabilities to monitor and manage energy storage levels will optimize storage resource availability for periods when they can best support bulk power system reliability. Longer-term goals for the NYISO include exploring market rules to facilitate participation from intermittent renewable resources that also integrate energy storage capabilities.

DER Integration

Throughout 2018 the NYISO was engaged in a multi-year effort that, at its completion, will open New York's wholesale Energy, Ancillary Services, and Capacity Markets to DER technologies. In December 2017, the NYISO released its DER Market Design Concept Proposal, representing the second step in the overall market design process. The proposal builds on the ideas outlined in NYISO's February 2017 DER Roadmap and subsequent stakeholder discussions. In 2018, the NYISO initiated a pilot project program to test innovative technology and assist with potential further refinement of the DER participation model. The pilot framework allows developers and the NYISO to gain knowledge about the technology's capabilities, and will support the PSC's REV demonstration efforts. Pilot projects will help guide the NYISO's continued development of market rules to appropriately incorporate new technology capabilities and meet bulk power system needs. The pilot framework provides the opportunity to test new capabilities and operating paradigms that DERs present.

Carbon Pricing

The NYISO has been developing a proposal with stakeholders and policymakers to incorporate the societal costs associated with carbon dioxide emissions into its energy markets to better reflect the state's policy of reducing emissions. Throughout 2018, the NYISO coordinated the efforts of the Integrating Public Policy Task Force (IPPTF), consisting of many traditional NYISO stakeholders as well as other interested parties. The IPPTF concluded its work in December 2018, producing a carbon pricing proposal to be subjected to further analysis and study within the NYISO stakeholder process.

Similar to how competitive markets created incentives for generators to improve efficiency, a carbon pricing in the energy market would create stronger incentives for those types of efficiency improvements, as well as stronger incentives for developing zero-emitting resources like wind and solar in locations where they will have the greatest effect on emissions. This carbon pricing proposal would further promote economic competition among suppliers in the NYISO's markets by directly pricing a key environmental attribute in the markets. The NYISO believes carbon pricing can help the state more efficiently attain its clean energy goals.

Comprehensive Reliability Planning

The NYISO's 2018 Reliability Needs Assessment (RNA) evaluated expected supply resources, demand levels, and transmission capability of New York's bulk power system for the study period 2019 through 2028. The NYISO develops the RNA in conjunction with market participants as the first step in the NYISO's 2018-2019 Reliability Planning Process. The RNA is conducted every two years and serves as the foundational study used in the development of the NYISO 2019-2028 Comprehensive Reliability Plan (CRP).

The 2019-2028 CRP is a critical first step to effectively plan for the DEC's peaker rule, which is expected to require approximately 3,300 MW of peaking unit capacity to file compliance plans outlining how they intend to meet the more stringent emissions requirements. The 2019-2028 CRP includes an assessment of the impacts to system reliability from the potential deactivation of all generators impacted by the new rule. The scenario was designed to be informative rather than to identify specific reliability needs associated with the deactivation of certain peakers that must be resolved. Any such reliability needs can only be identified when compliance plans are known.

Fuel and Energy Security Study

The confluence of technological advancements, environmental and economic considerations, and public policies are driving significant changes to the portfolio of supply resources in New York. These conditions highlight the potential for future challenges to arise in meeting electric system demands under certain stressed conditions such as prolonged cold weather events and/or natural gas supply or transportation availability constraints or disruptions.

In response, the NYISO is conducting a forward-looking Fuel & Energy Security Initiative to assess the ability of the electric system to meet system needs during stressed operating conditions, such as prolonged cold weather events. This effort is intended to provide key information about the types and magnitude of risks that may be faced by the bulk power system. The Fuel & Energy Security Initiative will help to inform discussions on potential market and operational enhancements to best prepare the system for the evolving resource mix and operational challenges it may face in the near future.

Cybersecurity

At the national level, the NYISO is engaged with FERC, NERC, the Electricity Information Sharing and Analysis Center, Cybersecurity Risk Information Sharing Program (CRISP), Department of Energy, Department of Homeland Security, and the Federal Bureau of Investigation. The NYISO actively participates in the cyber and physical security policy and standard development activities undertaken by these entities, and is fully engaged in collaborative relationships with these entities for classified briefings and real-time cybersecurity information sharing and threat detection.

In October 2018, FERC approved new mandatory reliability standards designed to enhance supply chain risk management protections for the nation's bulk electric system. These standards are designed to mitigate threats to power grid operations by threat actors seeking to circumvent the strong security programs of electric sector organizations. The NYISO has implemented these supply chain security standards to ensure vendors and other external partners employ strong security practices.

Market Participants

3M Company
Abest Power & Gas, LLC
ABN Energy, LLC
Accent Energy Midwest II LLC dba IGS Energy
ACT Commodities Inc.
ADG Group Inc.
Aesir Power, LLC
Agera Energy, LLC
Aggressive Energy, LLC
Agway Energy Services, LLC
Albany Energy LLC
All American Power and Gas, LLC
All Choice Energy, LLC
Alpha Gas and Electric, LLC
Alphataraxia Nickel LLC
Ambit New York, LLC
American Power & Gas, LLC
AP Gas & Electric (NY), LLC dba APG&E
AP Gas & Electric (TX), LLC
Appian Way Energy Partners East, LLC
Approved Energy II LLC
ARC Private Capital Inc.
Ardor Energy Limited Liability Company
Arkwright Summit Wind Farm LLC
ASC Energy Services Inc.
Astoria Energy II, LLC
Astoria Energy LLC
Astoria Generating Company L.P.
Astral Energy LLC
Atlantic Energy, LLC
Atlantic Power and Gas LLC
ATNV Energy, LP
Avangrid Renewables, LLC
Axon Energy, LLC
Axpo U.S. LLC
Barclays Services Corporation
Bayonne Energy Center, LLC
Big Bend Trading, LLC
BioUrja Power, LLC
BJ Energy LLC
Black River Hydroelectric, LLC
Boralex Hydro Operations Inc
Boston Energy Trading and Marketing LLC
BP Energy Company
Brookfield Energy Marketing LP
Brookfield Renewable Energy Marketing US LLC
Brookfield Renewable Trading and Marketing LP
Broome Energy Resources, LLC
Brown's Energy Services LLC
Bruce Power Inc.
Buy Energy Direct, LLC
Calpine Energy Services LP
Calpine Energy Solutions, LLC
Canandaigua Power Partners, LLC
Canastota Windpower LLC
Carr Street Generating Station LP
Castleton Commodities Merchant Trading L.P.
Castleton Power, LLC
Cayuga Operating Company, LLC
CECONY-LSE
Censtar Energy Corp
Central Hudson Gas & Electric Corp.
Centre Lane Trading Ltd.
Champion Energy Services, LLC
CHI Power Marketing, Inc
Chief Energy Power, LLC
Citigroup Energy Inc.
Citizens Choice Energy, LLC dba AmeriChoice Energy
City of Niagara Falls
City Power & Gas, LLC
CleanChoice Energy, Inc. dba Ethical Electric
Clearview Electric, Inc.
Columbia Utilities Power, LLC
Con Edison Solutions, Inc.
ConocoPhillips Company
Consolidated Edison Co. of New York, Inc.
Consolidated Edison Energy, Inc.
Consolidated Hydro New York, Inc.
Consolidated Power Co., LLC
Constellation NewEnergy, Inc.
Convergent Energy and Power LP
County of Erie NY
County of Niagara NY
Covanta Niagara, LP
CPV Valley, LLC
Credit Suisse (USA), Inc.
Cricket Valley Energy Center, LLC
Cubit Power One Inc.
Cummins Inc
Cutone & Company Consultants, LLC
CWP Energy Inc.
Danskammer Energy, LLC
Darby Energy, LLLP
DC Energy LLC
DC Energy New York, LLC
Direct Energy Business Marketing, LLC
Direct Energy Business, LLC
Direct Energy Marketing Inc
Direct Energy Services, LLC
Drift Marketplace, Inc.

DTE Energy Trading Inc
Dynamis ETF, LLC
Dynasty Power Inc
Dynegy Marketing and Trade, LLC (DMT)
Eagle Creek Hydro Power, LLC
Eagle Power Authority, Inc.
Eagles Power, LLC
Eagle's View Partners Ltd.
East Coast Power and Gas, LLC
East Coast Power, LLC
Ecesis LLC
EDF Energy Services, LLC
EDF Trading North America, LLC
EDP Renewables North America LLC
Effinex, LLC
eKapital NY, LLC
Eligo Energy NY, LLC
Eligo Energy, LLC
Emera Energy Services Subsidiary No. 1, LLC
Emera Energy Services Subsidiary No. 15 LLC
Emera Energy Services Subsidiary No. 2 LLC
Emera Energy Services Subsidiary No. 3 LLC
Emera Energy Services, Inc
Emera Energy U.S. Subsidiary No. 1, Inc.
Emera Energy U.S. Subsidiary No. 2, Inc.
EMP Power, LLC
Empire Generating Co, LLC
Empire Natural Gas Corp.
Energy Conservation and Supply, Inc.
Energy Cooperative of America, Inc dbaEnCoop of NY
Energy Limited Inc
Energy Plus Holdings LLC
Energy Power Investment Company, LLC
Energy Services Providers, Inc dba NY Gas&Electric
Energy Spectrum Inc.
Energy Technology Savings, Inc
Energya VM Gestion de Energia S.L.U.
EnergyMark, LLC
EnerNOC, Inc.
Enerwise Global Technologies, Inc. dba Cpower
Engelhart CTP (US) LLC
ENGIE Energy Marketing NA, Inc.
ENGIE Resources LLC
ENGIE Retail, LLC
Entergy Nuclear IP-2 LLC
Entergy Nuclear IP3, LLC
Entergy Nuclear Power Marketing LLC
Entergy Solutions LLC
Entrust Energy East, Inc.
Erie Boulevard Hydropower LP
Erie Wind, LLC
ERY HYMCO LLC
ETC Endure Energy L.L.C.
ETS Emerald LLC
Everyday Energy, LLC
Exelon Generation Company LLC
Family Energy Inc
FC Energy Services Company, LLC
First Choice Energy, Inc.
First Commodities International Inc.
First Nest LLC
FiTran Fund LP
Flanders Energy LLC
Flat Rock Windpower II LLC
Flat Rock Windpower LLC
Franklin Power LLC
Freepoint Commodities LLC
Freepoint Energy Solutions LLC
Freeport Electric
Galaxy Energy, LLC
Galt Power Inc.
Gateway Energy Services Corporation
GBE Power Inc.
Gen IV Investment Opportunities, LLC
GenOn Energy Management, LLC
Gravity Renewables, Inc.
Green Island Power Authority
Green Mountain Energy Company
Green Mountain Power Corporation
Greenlight Energy Inc
GRG Energy LLC
Grid Power Direct, LLC
Griffiss Utility Services Corporation
Group628, LLC
Hardscrabble Wind Power LLC
Helix Ravenswood, LLC
HIKO Energy, LLC
Homer City Generation, L.P.
Horizon Energy of New York, LLC
Howard Wind LLC
HQ Energy Services (US)
Hudson Energy Services, LLC
IDT Energy, Inc
Indeck Energy Svs of Silver Springs
Indeck-Corinth LP
Indeck-Olean LP
Indeck-Oswego LP
Indeck-Yerkes LP
Independence Energy Group LLC dba Cirro Energy
Indus Valley Strategies LLC
Inertia Power V, LLC

INGENCO Wholesale Power, L.L.C.
Innovative Energy Systems, Inc.
Innoventive Power LLC
Inspire Energy Holdings, LLC
International Paper Company
IPKeys Power Partners, LLC
Islip Resource Recovery Agency
J. Aron & Company LLC
Jamestown Board of Public Utilities
Jericho Rise Wind Farm LLC
Josco Energy Corp.
Just Energy New York Corp
Just Energy Solutions Inc.
Kaleida Health
KFW Energy Trading, LLC
Kingston CoGen Limited Partnership
Kiwi Energy NY LLC
Liberty Power Holdings LLC
Linde Energy Services, Inc.
Lockport Energy Assoc.
Logistic Energy LLC
Long Island Power Authority
Lyonsdale Biomass, LLC
M&R Energy Resources Corp.
Macquarie Energy LLC
Macquarie Energy Trading LLC
Madison Windpower, LLC
MAG Energy Solutions Inc.
Major Energy Electric Services, LLC
Manifold Energy Inc.
Marathon Power LLC dba Marathon Energy
Marble River, LLC
Marsh Hill Energy LLC
Median Energy Corp.
Mercuria Energy America, Inc
Mercuria SJAK Trading, LLC
Merrill Lynch Commodities, Inc.
MidAmerican Energy Services, LLC
Midwest Energy Trading East LLC
Mindex Consultations Inc.
Mirabito Power & Gas, LLC
Model City Energy, LLC
Modern Innovative Energy, LLC
Monroe County NY
Monterey NY, LLC
Morgan Stanley Capital Group, Inc.
Morgan Stanley Services Group Inc.
MP2 Energy NE LLC
MPower Energy LLC
Munnsville Wind Farm, LLC
Nalcor Energy Marketing Corporation
National Gas & Electric, LLC
Nationwide Energy, LLC
NDC Partners LLC
New Athens Generating Company LLC
New Wave Energy Corp
New York Industrial Energy Buyers, LLC
New York Municipal Power Agency
New York Power Authority
New York State Electric & Gas Corp.
New York Transco LLC
Next Utility Energy LLC
NextEra Energy Marketing, LLC
NextEra Energy Services Massachusetts, LLC
NextEra Energy Services New York, LLC
Nexus Energy Inc.
Niagara Frontier Transportation Authority
Niagara Mohawk Power Corp.
Niagara University
Niagara Wind Power, LLC
Nine Mile Point Nuclear Station, LLC
Nissequogue Cogen Partners
Noble Altona Windpark, LLC
Noble Bliss Windpark, LLC
Noble Chateaugay Windpark, LLC
Noble Clinton Windpark I, LLC
Noble Ellenburg Windpark, LLC
Noble Wethersfield Windpark LLC
NOCO Electric LLC
Nordic Energy Services, LLC
North American Power and Gas LLC
North Country Data Center Corp
Northbrook Lyons Falls, LLC
Northern States Power Company
Northstar NY Ltd.
NRG Curtailment Solutions, Inc.
NRG Power Marketing LLC
NuEnerGen, LLC
Nyquist LLC
Oasis Power, LLC d/b/a Oasis Energy
Occidental Power Services Inc
OCP Resources, LLC
Ontario Power Generation Energy Trading, Inc.
Ontario Power Generation Inc.
Open Book Energy, LLC
Orange & Rockland Utilities, Inc.
ORU-LSE
Pacific Summit Energy LLC
Palmco Power NY, LLC
Pay Less Energy, LLC
Peninsula Power, LLC
Perigee Energy, LLC
Phoenix Energy Group, LLC
Plant-E Corp.

Plymouth Rock Energy, LLC
Precept Power LLC
Premier Empire Energy LLC
PSEG Energy Resource & Trade, LLC
Public Power, LLC
Pure Energy Inc
Pure Energy USA, LLC dba Pure Energy
Quantum Power Corp.
R.E. Ginna Nuclear Power Plant, LLC
Rainbow Energy Marketing Corp
RED-Rochester, LLC
ReEnergy Black River LLC
Reliant Energy Northeast, LLC dba NRG Retail Solut
Renaissance Power & Gas, Inc.
Rensselaer Generating LLC
Residents Energy, LLC
Rinar Power LLC
Riverbay Corporation
Robison Energy (Commercial) LLC dba OriginalEnergy
Robison Energy, LLC
Rochester Gas & Electric Corp.
Roctop Investments Inc
Roseton Generating LLC
Royal Bank of Canada
Rubicon NYP Corp.
S.J. Energy Partners, Inc.
Sanctorum Energy Inc.
Saracen Energy East LP
Saracen Energy West LP
Saracen Power LP
Saranac Power Partners, L.P.
SBF New York, L.L.C.
SBR Energy, LLC
Schools & Municipal Energy Cooperative (SMEC)
Selkirk Cogen Partners, L.P.
Seneca Energy II, LLC
Seneca Power Partners, L.P.
SESCO Enterprises LLC
Sheldon Energy LLC
Shell Energy North America (US), L.P.
Siemens Industry, Inc
Smart One Energy, LLC
SmartEnergy Holdings, LLC
Sol Energy, LLC
Solios Power LLC
Somerset Operating Company, LLC
South Bay Energy Corp.
South Jersey Energy Company
South Jersey Energy ISO10, LLC
South Jersey Energy ISO3, LLC
South Jersey Energy ISO4, LLC
South Jersey Energy ISO6, LLC
South Jersey Energy ISO7, LLC
South Jersey Energy ISO8, LLC
South Jersey Energy ISO9, LLC
Southern Energy Solution Group, LLC
Spark Energy, LLC
Spartan Electricity Futures, Inc
Starion Energy NY, Inc
StatArb Investment LLC
State of New York - OGS
State of New York - OGS Municipal
State of New York - SUNY
State of New York - SUNYBuffalo
Stephentown Spindle, LLC
Stony Creek Energy LLC
Stream Energy New York, LLC
SunSea Energy, LLC
Sunwave Gas & Power New York Inc.
Sustaining Power Solutions LLC
Synergy Biogas LLC
Talen Energy Marketing, LLC
TEC Energy Inc.
Tenaska Power Services Co.
Texas Retail Energy, LLC
Thordin ApS
Tidal Energy Marketing Inc.
Time Warner Inc.
Tnergy LLC
Tomorrow Energy Corp
TrailStone Power, LLC
TransAlta Energy Marketing (U.S.) Inc.
Transgrid Midwest LLC
Triton Power Company
TrueLight Energy Fund, LP
Twin Eagle Resource Management, LLC
U.S. Energy Partners LLC
UGI Energy Services, LLC
Uncia Energy, LP - Series F
Uniper Global Commodities North America LLC
University of Rochester
Valcour Wind Energy LLC
VECO Power Trading, LLC
Velocity American Energy Master I, L.P.
Verde Energy USA New York, LLC
Village of Rockville Centre
Viridian Energy NY, LLC
Viridity Energy Solutions Inc.
Vitol Inc.
Voltus, Inc.
Watchtower Bible and Tract Society of New York, In
Westar Energy, Inc.
Western New York Wind Corp.
Wheelabrator Hudson Falls, LLC
Wheelabrator Westchester, L.P.
WM Renewable Energy, LLC
XO Energy NY, LP
XO Energy NY2, LP
XOOM Energy New York, LLC
XOOM Energy, LLC
Ziarre Trading LLC
Zone One Energy, LLC

Corporate Governance

Board of Directors

Ave M. Bie, Board Chair
Partner in the law firm of Quarles & Brady and former Chair of the Wisconsin Public Service Commission

Daniel C. Hill, Board Vice Chair
Former Senior Vice President and Chief Information Officer of Exelon Corporation

Michael B. Bemis
Former President of Exelon Power and President of Energy Delivery for the Exelon Corporation, Chief Executive of London Electricity, and Executive Vice President for Entergy Corporation

Robert A. Hiney
Former Executive Vice President for Power Generation of the New York Power Authority

Roger B. Kelley
Former President and CEO of the New York Power Authority, and former President and CEO of Fortistar Renewables

Mark S. Lynch
Former President and CEO of New York State Electric and Gas Corporation and Rochester Gas and Electric Corporation, and former President and CEO of the New York Independent System Operator

James V. Mahoney
President and CEO of Energy Market Solutions, former President and CEO of DPL, and former President and CEO of EarthFirst Technologies

Teresa F. Marrinan
Former Senior Vice President, US SBU Commercial for The AES Corporation, former officer for the Dayton Power and Light Company, and a former Founding Partner of Hanover Strategy Advisors LLC

Thomas F. Ryan, Jr.
Former President and Chief Operating Officer of the American Stock Exchange

Richard J. Dewey
President and CEO of the New York Independent System Operator

Corporate Officers

Richard J. Dewey
President & CEO

Robert E. Fernandez
Executive Vice President,
General Counsel &
Chief Compliance Officer

Emilie Nelson
Executive Vice President

Rick Gonzales
Senior Vice President &
Chief Operating Officer

Rana Mukerji
Senior Vice President,
Market Structures

Douglas L. Chapman
Vice President &
Chief Information Officer

Kevin Lanahan
Vice President, External Affairs
& Corporate Communications

Cheryl L. Hussey
Vice President &
Chief Financial Officer

Diane L. Egan
Corporate Secretary &
Board Secretary

Robb Pike
Vice President,
Market Operations

Zachary G. Smith
Vice President, System &
Resource Planning

Wesley J. Yeomans
Vice President,
Operations

2018 Financial Statements

Independent Auditors' Report

The Board of Directors
New York Independent System Operator, Inc.:

We have audited the accompanying financial statements of New York Independent System Operator, Inc. which comprise the statements of financial position as of December 31, 2018 and 2017, and the related statements of activities, and cash flows for the years then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with U.S. generally accepted accounting principles; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly in all material respects, the financial position of New York Independent System Operator, Inc. and the results of its operations, change in its net assets, and its cash flows for the years then ended in accordance with U.S. generally accepted accounting principles.

Albany, New York
March 15, 2019

NEW YORK INDEPENDENT SYSTEM OPERATOR, INC.

Statements of Financial Position

December 31, 2018 and 2017

Assets		**2018**	**2017**
Current assets:			
Cash and cash equivalents	$	47,252,645	41,038,251
Restricted cash		368,035,848	402,474,459
Marketable securities - (note 8)		1,290,562	1,097,651
Accounts receivable – net (note 2)		8,359,716	6,514,674
Prepaid expenses		8,077,813	8,324,320
Regulatory assets - current portion (note 3)		—	1,778,962
Total current assets		433,016,584	461,228,317
Noncurrent assets:			
Regulatory assets (note 3)		18,825,201	19,672,395
Property and equipment – net (note 4)		110,925,435	110,942,990
Other noncurrent assets (note 7)		2,688,982	2,744,395
Total noncurrent assets		132,439,618	133,359,780
Total	$	565,456,202	594,588,097
Liabilities			
Current liabilities:			
Accounts payable and accrued expenses	$	111,069,517	101,383,316
Market participant security deposits		245,290,519	295,761,033
Market participant prepayments		10,368,954	8,920,739
Working capital reserve (note 10)		34,495,523	33,527,919
Long-term debt – current portion (note 6)		33,543,616	27,058,891
Regulatory liabilities – current portion (note 3)		12,171,929	4,621,822
Deferred revenue (note 11)		15,401,200	13,545,876
Other current liabilities (note 8)		2,527,302	1,449,538
Total current liabilities		464,868,560	486,269,134
Noncurrent liabilities:			
Accrued pension liability (note 8)		6,020,088	6,489,090
Accrued postretirement liability (note 8)		6,917,375	9,523,178
Regulatory liabilities (note 3)		5,724,195	3,496,584
Other noncurrent liabilities (notes 7 and 8)		5,999,588	10,034,584
Long-term debt (note 6)		75,926,396	78,775,527
Total noncurrent liabilities		100,587,642	108,318,963
Total liabilities		565,456,202	594,588,097
Unrestricted net assets		—	—
Total liabilities and net assets	$	565,456,202	594,588,097

See accompanying notes to financial statements.

NEW YORK INDEPENDENT
SYSTEM OPERATOR, INC.

Statements of Activities

Years ended December 31, 2018 and 2017

	2018	2017
Revenues:		
Rate Schedule 1 tariff charge	$ 156,810,368	155,341,396
Federal Energy Regulatory Commission fees recovery	12,556,391	12,878,135
Planning studies revenue	10,921,281	10,346,409
Fees and services	1,060,092	1,199,388
Interest income	1,301,929	497,042
Total revenues	182,650,061	180,262,370
Operating expenses:		
Compensation and related benefits (note 8)	87,570,057	85,940,345
Professional fees and consultants	26,719,660	23,759,260
Maintenance, software licenses and facility costs	21,301,499	21,535,917
Depreciation (note 4)	19,400,167	20,587,146
Federal Energy Regulatory Commission fees	12,556,391	12,878,135
Administrative and other expenses	4,332,879	4,641,338
Interest expense	4,035,631	4,037,409
Telecommunication expenses	3,030,847	3,236,109
Insurance expense	2,740,722	2,843,827
Training, travel, and meeting expenses	1,892,477	2,017,384
Northeast Power Coordinating Council fees	260,590	281,227
Change in fair value of marketable securities	63,853	(117,006)
Change in fair value of interest rate swaps (note 7)	(1,254,712)	(1,378,721)
Total operating expenses	182,650,061	180,262,370
Change in unrestricted net assets	—	—
Unrestricted net assets, beginning of year	—	—
Unrestricted net assets, end of year	$ —	—

See accompanying notes to financial statements.

NEW YORK INDEPENDENT SYSTEM OPERATOR, INC.

Statements of Cash Flows

Years ended December 31, 2018 and 2017

		2018	2017
Cash flows from operating activities:			
Change in unrestricted net assets	$	—	—
Adjustments to reconcile change in unrestricted net assets to net cash provided by operating activities:			
Depreciation		19,400,167	21,535,917
Amortization of debt issuances cost		72,730	88,355
Loss on disposition of assets		971	171,044
Change in fair value of marketable securities		63,853	(117,006)
Change in operating assets and liabilities:			
(Increase) decrease in accounts receivable and prepaid expenses		(1,577,535)	(1,353,592)
(Increase) decrease in restricted cash		34,438,611	18,458,904
Increase in marketable securities		(256,764)	(260,113)
Decrease in regulatory assets		2,101,741	(4,668,653)
Decrease other assets		140,413	1,423,088
(Decrease) increase in accounts payable and accrued expenses		11,022,085	(82,606,472)
(Decrease) increase in market participant prepayments		1,448,215	(2,241,920)
Increase (decrease) in market participant security deposits		(50,470,514)	63,360,851
Increase in working capital reserve		967,604	379,205
Increase (decrease) in regulatory liabilities		6,052,804	(2,504,826)
Decrease in deferred revenue and other liabilities		72,616	895,274
Net cash provided by operating activities		23,476,997	12,560,056
Cash flows from investing activities:			
Acquisition of property and equipment (including capitalized interest)		(20,719,467)	(23,920,359)
Net cash used in investing activities		(20,719,467)	(23,920,359)
Cash flows from financing activities:			
Payment of debt issuance cost		(121,000)	(15,000)
Proceeds from revolving credit facility loan		12,800,000	6,000,000
Repayment of revolving credit facility loan		(12,800,000)	(6,000,000)
Repayment of 2011 – 2013 budget facility loan		0	0
Proceeds from 2014 – 2018 budget facility loan		25,329,000	24,671,000
Repayment of 2014 – 2018 budget facility loan		(21,785,341)	(24,641,321)
Proceeds from 2016 – 2018 EMS/BMS facility loan		9,575,000	10,100,000
Repayment of 2016 - 2018 EMS/BMS facility loan		(5,610,000)	(2,243,333)
Repayment of 2012 Infrastructure Loan		(2,646,316)	(2,646,316)
Repayment of Mortgage and Renovations loans		(1,284,479)	(1,210,589)
Net cash provided by financing activities		3,456,864	4,014,441
Net decrease in cash and cash equivalents		6,214,394	(7,345,862)
Cash and cash equivalents – beginning of year		41,038,251	48,384,113
Cash and cash equivalents – end of year	$	47,252,645	41,038,251
Supplemental disclosure of cash flow information: – cash paid during the year for interest, net of capitalized interest	$	4,297,716	3,909,959
Noncash operating activity:			
Change in pension and postretirement liabilities	$	(4,249,329)	2,272,732
Change in fair value of interest rate swaps		(1,254,712)	(1,378,721)
Noncash investing activities:			
Property and equipment additions which were accrued but not paid	$	1,424,558	2,760,443
Property and equipment additions previously accrued which were paid		2,760,443	4,593,356

See accompanying notes to financial statements.

(1) Summary of Significant Accounting Policies

(a) Business Description

The New York Independent System Operator, Inc. (NYISO) was formed in April 1997 and commenced operations on December 1, 1999. NYISO is incorporated in the state of New York as a not-for-profit organization. NYISO assumed the responsibilities of its predecessor, the New York Power Pool (NYPP), which had coordinated the reliability of New York State's electric power grid for more than 30 years. Formed as a result of Federal Energy Regulatory Commission (FERC) policies, NYISO monitors a network of 11,000 circuit miles of high-voltage transmission lines and serves approximately 400 market participants.

NYISO's mission, in collaboration with its stakeholders, is to serve the public interest and provide benefit to consumers by maintaining and enhancing regional reliability, operating open, fair and competitive wholesale electricity markets, planning the power system for the future, and providing factual information to policy makers, stakeholders and investors in the power system. The NYISO facilitates fair and open competition in the wholesale electricity markets in which electricity and related services are purchased and sold on the basis of competitive bidding. Billing invoices are issued by NYISO to each market participant to settle transactions occurring in the NYISO markets.

NYISO is governed by an independent board of directors, as well as a committee structure consisting of market participant representatives. In addition to FERC oversight, NYISO is also subject to regulation in certain aspects by the New York State Department of Public Service Commission.

(b) Basis of Accounting and Presentation

The accompanying financial statements have been prepared on an accrual basis of accounting in accordance with U.S. generally accepted accounting principles.

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates. Significant items subject to such estimates and assumptions include the useful lives of fixed assets, recoverability of regulatory assets, the valuation of derivative instruments, and reserves for employee benefit obligations.

(c) Regulatory Accounting

NYISO's financial statements are prepared in accordance with generally accepted accounting principles for rate-regulated entities, Financial Accounting Standards Board Accounting Standards Codification (FASB ASC) Topic 980, *Regulated Operations*. As such, regulators may permit specific incurred costs, typically treated as expenses by unregulated entities, to be deferred and expensed in future periods when it is probable that such costs will be recovered in customer rates. Incurred costs are deferred as regulatory assets when NYISO concludes that it is probable future revenues will be provided to permit recovery of the previously incurred cost. A regulatory liability is recorded when amounts that have been recorded by NYISO are likely to be refunded to customers through the rate-setting process.

(d) Revenue Recognition

Settlements of market participants' energy transactions are not reflected in NYISO's Statements of Activities since they do not represent revenues or expenses of NYISO, as NYISO merely acts as an intermediary in the settlement process. In this role, NYISO receives and disburses funds from and to market participants for each settlement period.

Effective July 1, 2012, NYISO's two FERC-approved tariffs, the Open Access Transmission Tariff (OATT) and the Market Administration and Control Area Services Tariff (Services Tariff), were amended to clarify NYISO's role as the single counterparty to market participant transactions in the NYISO markets. For all market participant transactions in the NYISO markets, flash title passes through NYISO immediately prior to passing to the ultimate buyer and seller of the product. This arrangement reinforces NYISO's authority to continue to net a market participant's offsetting financial positions in NYISO markets for credit and billing purposes; provides clarity in NYISO's legal standing to pursue collection from a bankrupt market participant; and, also complies with the FERC directives on credit policy requirements for competitive wholesale electricity markets.

NYISO's tariffs allow recovery of NYISO's capital requirements, operating expenses and debt service costs through a surcharge assessed to market participants. The revenue from this surcharge, Rate Schedule 1, is earned when energy is scheduled and dispatched. Market participants are then billed for such charges in the subsequent settlement period's invoice.

NYISO's Rate Schedule 1 includes a timing mechanism that effectively meets the requirements of an alternative revenue program set forth in ASC Topic 980, Regulated Operations, Subtopic 602, Revenue Recognition. Accordingly, revenue is recognized for net financing obligations and capital costs incurred during the reporting period based on the revenue requirement formula in the tariffs. NYISO has recorded as a component of Other Noncurrent Liabilities $1,183,447 and $4,778,865, respectively, in the accompanying 2018 and 2017 Statements of Financial Position in connection with this rate-making recovery mechanism.

Revenues recorded as planning studies revenues arise from billing and collection services in the study service agreement process performed by NYISO. These revenues are offset by the corresponding study expenses, recorded in operating expenses, which were incurred in performing such studies. A portion of the deposits related to planning studies are nonrefundable and recorded as revenue when received.

(e) Cash and Cash Equivalents

NYISO considers short-term marketable securities with original maturities of three months or less to be cash equivalents. The cash equivalents at December 31, 2018 and 2017 were held in money market accounts invested primarily in short-term U.S. government obligations. NYISO's cash and cash equivalents consist primarily of funds accumulated for the working capital reserve, for general operating purposes, and amounts for funding certain employee benefit plans.

(f) Restricted Cash

Restricted cash consists primarily of market participant security deposits held in escrow accounts, amounts prepaid by market participants in advance of settlement billing dates, amounts collected on settlement invoices, amounts collected for Transmission Congestion Contract (TCC) auctions, amounts deposited for planning studies, amounts collected for the estimated annual FERC fee and amounts collected for voltage support services. Security deposits are invested at the market participant's choice in money market funds or short or intermediate-term bond funds. Effective September 2017, the short and intermediate-term bond fund investment options were eliminated. NYISO presents changes in restricted cash in the operating activities section of the Statements of Cash Flows instead of in the investing activities section. NYISO has determined that this classification is more suitable to the nature of its operations.

(g) Other Assets

Other assets consist primarily of timing differences on certain rate-making recoveries, the fair value of interest rate swap agreements, and noncurrent prepaid expenses.

(h) Property and Equipment

Property and equipment are recorded at cost. NYISO capitalizes property and equipment additions in excess of $5,000 with a useful life greater than one year. Depreciation is computed on the straight-line method over the assets' estimated useful lives of three to five years, except for building and building improvements, which are depreciated on a straight-line basis over 20 years. When assets are retired or otherwise disposed of, the cost and related depreciation are removed, and any resulting gain or loss is reflected in expense for the period. Repairs and maintenance costs are charged to expense when incurred.

Labor, overhead, interest, consulting, and related costs incurred to acquire and develop computer software for internal use are capitalized and amortized using the straight-line method over three years. These costs are reported as work in process until the deployment of the developed software. Costs incurred prior to the determination of feasibility of developed software and following the in-service date of developed software are expensed.

NYISO capitalizes the interest cost as part of the historical cost of developing certain assets.

Long-lived assets are recorded at cost, and are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amounts of the assets may not be recoverable. Management is not aware of any events or changes in circumstances that would necessitate a review of any long-lived assets as of the years ended December 31, 2018 and 2017.

(i) Working Capital Reserve

In order to maintain the liquidity and stability of NYISO's markets, NYISO has accumulated a working capital fund through amounts charged to market participants under the Rate Schedule 1. Any change to NYISO's working capital needs would be billed to market participants in future Rate Schedule 1 charges. Market participants are entitled to interest on their principal contributions to the working capital reserve. Each market participant is allocated interest based on the respective ratio share of each market participant's principal contributions to the total working capital fund. Accumulated interest on the working capital fund is distributed annually to market participants.

(j) Market Participant Prepayments

To reduce certain energy and ancillary services credit requirements, Market Participants may choose to prepay to the NYISO, in advance of settlement billing dates, their energy and ancillary services financial obligations. Moreover, certain Market Participants choose to make advance payments to the NYISO to be applied to future settlement invoices.

(k) Deferred Revenue

Advance payments from developers for planning studies are reflected as deferred revenue. Fees for participation in NYISO's governance process are billed to market participants in advance of the year for which they apply and are amortized over the related governance period. All such unamortized amounts are included in deferred revenue.

(l) Income Taxes

NYISO has been recognized by the Internal Revenue Service as an organization described in Internal Revenue Code (The Code) Section 501(c)(3) and is generally exempt from income taxes under Section 501(a) of the Code. During the calendar years 2018 and 2017, no unrelated business taxable income was generated by NYISO, and therefore no disclosure is made for federal or state income taxes.

The NYISO has determined prior to recording any benefit in the financial statements that it is more likely than not that the tax position will be sustained upon examination by the appropriate taxing authorities, as required by the Accounting for Uncertainty in Income Taxes Topic of the FASB ASC. 740. A tax position is measured at the largest amount of benefit that is greater than fifty percent likely of being realized upon settlement.

On December 22, 2017, the President signed into law H.R. 1, originally known as the Tax Cuts and Jobs Act. The new law includes several provisions that result in substantial changes to the tax treatment of tax-exempt organizations. NYISO has reviewed these provisions and the potential impact and concluded the enactment of H.R. 1 did not have a material effect on the operations of the organization.

(m) Fair Value

NYISO utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible. Fair value is determined based on assumptions that market participants would use in pricing an asset or liability in the principal or most advantageous market. When considering market participant assumptions in fair value measurements, the following fair value hierarchy distinguishes between the observable and unobservable inputs, which are categorized in one of the following levels:

Level 1 inputs: Unadjusted quoted prices in active markets for identical assets or liabilities that NYISO has the ability to access at the measurement date

Level 2 inputs: Other than quoted prices included within Level 1 inputs that are observable for the asset or liability, either directly or indirectly, for substantially the full term of the asset or liability

Level 3 inputs: Unobservable inputs for the asset or liability used to measure fair value to the extent that observable inputs are not available, thereby allowing for a situation in which there is little, if any, market activity for the asset or liability at the measurement date

The level in the fair value hierarchy within which a fair value measurement in its entirety falls is based on the lowest-level input that is available for that particular financial instrument.

NYISO's financial instruments consist primarily of cash and cash equivalents, restricted cash, marketable securities, accounts receivable, prepaid expenses, accounts payable and accrued expenses, short-term and long term debt, and benefit plan assets such that carrying value approximates fair value. The fair value of derivative instruments and benefit plan assets is discussed in notes 7 and 8, respectively.

(n) Pension and Other Postretirement Benefit Plans

NYISO has a defined benefit pension plan covering certain employees upon their retirement. The benefits are based on years of service and employee's compensation during the five years before retirement. NYISO also sponsors a defined postretirement benefit medical plan for retired employees and their dependents. NYISO records annual amounts relating to its pension and postretirement plans based on calculations that incorporate various actuarial and other assumptions, including discount rates, mortality, assumed rates of return, compensation increases, turnover rates, and healthcare costs and trend rates. Assumptions are reviewed on an annual basis and modifications are made to the assumptions based on current rates and trends. The effect of modifications made to those assumptions utilized in recording its obligations under its plans are reasonable based on its experience and market conditions.

The net periodic costs are recognized as employees render the services necessary to earn the pension and postretirement benefits. Unamortized amounts that are expected to be recovered in rates in future years are recorded as a regulatory asset or liability. See note 8 for additional information.

(o) Concentration of Credit Risk

Financial instruments that subject NYISO to credit risk consist primarily of market settlement invoices and Rate Schedule 1 revenue due from market participants. As provided in the OATT and Services Tariff, NYISO reviews the creditworthiness of market participants, who are required to either maintain certain financial statement criteria and/or approved credit ratings, to post with NYISO, specified financial security in an amount sufficient to cover their outstanding liability to NYISO, or to prepay their obligations in advance of settlement billing dates.

NYISO's tariffs establish specific periods for the adjustment of settlement invoices and for market participant challenges to amounts billed for a particular service period. Settlement invoices can be adjusted for up to four months after the date of the monthly invoice issuance, and these invoices can be challenged for an additional one month after the issuance of all settlement adjustment invoices. Subsequent invoices issued during the settlement adjustment period "true up" amounts previously billed. After all true-up invoices are issued during the settlement adjustment period, market participants may challenge the amounts billed for a particular service period. If NYISO agrees with the provisions of the challenge, a final invoice is issued for that service period.

As a result, NYISO is exposed to credit risk until all settlement adjustments and final invoices for each service period are finalized and liquidated. As of December 31, 2018, the adjustments and true-ups of all settlement invoices through March 2018 were completed. However, in the event of a market participant default and bad debt loss, Rate Schedule 1 of the OATT allows NYISO to recover bad debt losses from all remaining market participants on future invoices.

(p) Derivative Instruments

NYISO recognizes all derivative instruments as either assets or liabilities in the Statement of Financial Position at their respective fair value. The fair values of NYISO's derivative instruments are quoted by external sources. The changes in the fair value of these derivatives are recorded as a change in fair value of interest rate swaps in the Statement of Activities. Due to NYISO's regulated rates, any changes in fair value of these derivative instruments are recorded as either Other Current or Noncurrent Assets or Other Current or Noncurrent Liabilities, as appropriate and ultimately deferred for recognition due to regulatory recovery of interest costs. Payments on these derivative instruments are recorded and classified as interest expense.

NYISO uses derivative instruments primarily to hedge the effects of fluctuations in interest rates. NYISO is exposed to credit loss in the event of nonperformance by the commercial banks under the interest rate swap agreements. The credit risk related to hedge agreements is limited to the cost to NYISO to replace the aforementioned hedge arrangements with like instruments. NYISO monitors the credit standing of the counterparties and anticipates that the counterparties will be able to fully satisfy their obligations under the hedge arrangements. See note 7 for additional information.

(q) Debt Issuance Costs

Debt issuance costs are included as a direct deduction to the corresponding debt liability and have been deferred. Debt issuance costs are amortized using the effective interest method over the life of the associated debt issuance.

(2) Accounts Receivable

NYISO's accounts receivable at December 31, 2018 and 2017 consisted of the following:

		2018	2017
Billed:			
Past-due settlement invoices	$	2,402,727	—
Miscellaneous billed receivables		698,610	905,666
		3,101,337	905,666
Unbilled:			
Rate Schedule 1 revenue for December		4,322,761	4,485,155
Miscellaneous unbilled receivables		935,618	1,123,853
		5,258,379	5,609,008
Total	$	8,359,716	6,514,674

Past due settlement invoices as of December 31, 2018 are expected to be recovered in 2019. Rate Schedule 1 of the OATT allows NYISO to recover bad debt losses from market participants and provides guidance on the provisions of such recoveries.

Miscellaneous billed and unbilled receivables are for planning study services provided by the NYISO in accordance with the NYISO (OATT). These revenues are offset by the corresponding planning study expenses, which were incurred in performing such studies.

NYISO recovers its Rate Schedule 1 revenue in the invoice following the period of service. Therefore, a portion of unbilled Rate Schedule 1 revenues for December are billed and recovered in January of the subsequent year.

(3) Regulatory Assets and Liabilities

At December 31, 2018 and 2017, regulatory assets and liabilities consisted of the following:

		2018	2017
Regulatory assets:			
Funding for pension benefits	$	10,423,929	10,148,344
Funding for postretirement deferred charges		8,401,272	7,282,161
Funding for postretirement benefits		—	2,241,890
Voltage support service (reactive power) market		—	1,354,779
Rate Schedule 1 transactional volume undercollection		—	424,183
Total regulatory assets		18,825,201	21,451,357
Less current		—	(1,778,962)
Noncurrent regulatory assets	$	18,825,201	19,672,395
Regulatory liabilities:			
Rate Schedule 1 underspending	$	5,819,493	4,621,822
Rate Schedule 1 transactional volume overcollections		4,800,027	—
Funding for pension deferred charges		4,241,171	3,496,584
Voltage support service (reactive power) market		1,552,409	—
Funding for postretirement benefits		1,483,024	—
Total regulatory liabilities		17,896,124	8,118,406
Less current		(12,171,929)	(4,621,822)
Noncurrent regulatory liabilities	$	5,724,195	3,496,584

(a) Funding for Pension and Postretirement Benefits

The pension and postretirement funding regulatory assets and liabilities reflect the unrecognized pension and postretirement benefit costs that under GAAP for rate-regulated entities are recorded as deferred noncurrent regulatory assets or liabilities. These amounts are expected to be included in future rates.

(b) Funding for Deferred Charges

The NYISO recovers its annual employer cash contributions for both the pension and postretirement benefit plans via Rate Schedule 1. The amounts in funding for deferred charges represents the pension and postretirement benefit costs net of cash contributions.

(c) Rate Schedule 1 Underspending

To the extent that NYISO’s spending does not exceed the annual Rate Schedule 1 revenue requirement, a regulatory liability is established for the underspending amount.

(d) ***Rate Schedule 1 Transactional Volume Collections***

NYISO recovers its costs through a surcharge assessed to market participants via Rate Schedule 1 of the OATT and Services Tariff. To the extent that transactional volumes billed under Rate Schedule 1 fall short of the amount expected when the Rate Schedule 1 surcharge is established, NYISO reflects a regulatory asset for the undercollection amounts. To the extent that transactional volumes billed under Rate Schedule 1 exceed the amount expected when the Rate Schedule 1 surcharge is established, NYISO reflects a regulatory liability for the overcollection amounts.

(e) ***Voltage Support Service***

In order to maintain acceptable transmission voltages on the New York State transmission system, certain market participants within the New York Control Area produce or absorb voltage support service (reactive power). Payments to market participants supplying voltage support service and recoveries from other market participants are assessed via Rate Schedule 2 of the OATT and Services Tariff. Differences between the timing of recoveries and payments for voltage support service that result in undercollections or overcollections are reflected as regulatory assets or liabilities.

(4) Property and Equipment

As of December 31, 2018 and 2017, property and equipment consisted of the following:

		2018	2017
Software developed for internal use	$	178,564,482	174,745,846
Building, building improvements, and leasehold improvements		105,949,020	105,001,210
Computer hardware and software		68,613,646	66,432,085
Work in Progress		25,948,862	15,032,453
Machinery and equipment		7,495,213	7,427,961
Land and land improvements		3,361,818	3,361,818
Furniture and fixtures		3,252,793	3,265,094
		393,185,835	375,266,467
Accumulated depreciation		(282,260,400)	(264,323,477)
Property and equipment – net	$	110,925,435	110,942,990

Property and equipment includes interest of $381,899, and $225,176 capitalized during 2018 and 2017, respectively. Depreciation expense for the years ended December 31, 2018 and 2017 was $19,400,167 and $21,535,917, respectively.

Total capitalized labor for the years ended December 31, 2018 and 2017 was $6,212,658 and $6,323,453, respectively.

(5) Revolving Credit Facility

On October 22, 2013, NYISO entered into a $50.0 million Revolving Credit Facility with an effective date of January 1, 2014 through December 31, 2017. On March 18, 2016, this agreement was amended to extend the effective date through December 31, 2018. The proceeds from this Revolving Credit Facility are to be used for working capital purposes. Interest on borrowings under the Revolving Credit Facility is based on NYISO's option of varying rates of interest tied to either the prime rate or the London Interbank Offered Rate (LIBOR). At December 31, 2018 and 2017, respectively, there were no amounts outstanding on the Revolving Credit Facility. During 2018 and 2017, $12.8 million and $6.0 million in borrowings were made under this credit agreement, respectively, at an average interest rate of 2.921% and 2.067%, respectively.

On December 14, 2018 NYISO entered into a $30.0 million Revolving Line of Credit Facility with an effective date of January 1, 2019 through December 31, 2023. The proceeds from this Revolving Line of Credit Facility are to be used for working capital purposes. Interest on borrowings under this Revolving Line of Credit Facility is based on NYISO's option of varying rates of interest tied to either the prime rate or the London Interbank Offered Rate (LIBOR).

(6) Long-Term Debt

At December 31, 2018, the following amounts were outstanding on NYISO's long term debt:

		2014–2018 Budget facility loan (i)	2016–2019 EMS/BMS facility loan (ii)	Mortgage (iii)	Renovations (iii)	2012 Infrastructure loan (iv)	Total
Outstanding balance	$	45,912,026	18,551,667	6,474,268	5,504,557	33,299,480	109,741,998
Less current portion		(20,761,312)	(8,786,826)	(816,618)	(544,386)	(2,634,474)	(33,543,616)
Less unamortized debt issuance costs		(79,126)	(32,646)	(7,313)	(4,875)	(148,026)	(271,986)
Long-term portion	$	25,071,588	9,732,195	5,650,337	4,955,296	30,516,980	75,926,396

At December 31, 2017, the following amounts were outstanding on NYISO's long-term debt:

		2014–2018 Budget facility loan (i)	2016–2018 EMS/BMS facility loan (ii)	Mortgage (iii)	Renovations (iii)	2012 Infrastructure loan (iv)	Total
Outstanding balance	$	42,368,367	14,586,667	7,245,499	6,017,805	35,945,796	106,164,134
Less current portion		(17,545,467)	(5,596,346)	(770,105)	(512,498)	(2,634,475)	(27,058,891)
Less unamortized debt issuance costs		(115,085)	(40,701)	(8,438)	(5,625)	(159,867)	(329,716)
Long-term portion	$	24,707,815	8,949,620	6,466,956	5,499,682	33,151,454	78,775,527

(i) On October 22, 2013, NYISO entered into an unsecured $100.0 million line of credit facility (2014– 2017 Budget Facility), the proceeds of which could be drawn between January 1, 2014 through December 31, 2017 to fund capital purchases and the development of significant projects during 2014–2017. Interest on borrowings under this facility is based on NYISO's option of varying rates of interest tied to LIBOR plus 95 basis points for borrowings, or the prime rate. Interest payments on borrowings are due monthly. On March 18, 2016, NYISO amended and restated its unsecured $100.0 million line of credit facility to increase the unsecured amount to $125.0 million and allow the proceeds to be drawn through December 31, 2018 (2014–2018 Budget Facility). NYISO must convert each year's annual borrowings to term loans, with principal and interest payments payable over three years.

On December 14, 2018 NYISO entered into a $90.0 million revolving Term Loan Facility with an effective date of January 1, 2019 through December 31, 2023. The proceeds from this Term Loan Facility are to be used for capital purchases and significant projects during 2019 -2023. Interest on borrowings under this Term Loan Facility is based on NYISO's option of varying rates of interest tied to either the prime rate or the London Interbank Offered Rate (LIBOR).

As of December 31, 2018 and 2017, the loan details on the 2015–2018 Budget Facility consisted of the following:

Draw year		2015	2016	2017	2018
Draw amount	$	25,000,000	25,000,000	24,671,000	25,329,000
Converted to term loan		January 2016	January 2017	January 2018	January 2019
Term period		36 months	36 months	36 months	36 months
Maturity date		12/1/2018	12/1/2019	12/1/2020	12/1/2021
As of 12/31/18:					
Outstanding balance at fixed interest rate	$	—	3,864,111	13,333,333	20,000,000
Fixed interest rate		N/A	3.370 %	4.076 %	2.250 %
Outstanding balance at variable interest rate	$	—	271,582	3,114,000	5,329,000
Variable interest rate		N/A	3.299 %	3.299 %	3.299 %
As of 12/31/17:					
Outstanding balance at fixed interest rate	$	1,030,701	13,333,333	20,000,000	—
Fixed interest rate		2.510 %	3.370 %	4.076 %	N/A
Outstanding balance at variable interest rate	$	—	3,333,333	4,671,000	—
Variable interest rate		N/A	2.457 %	2.465 %	N/A

(ii) On March 18, 2016, NYISO entered into a new unsecured $30.0 million delayed-draw term loan (EMS/BMS Facility Loan) to fund the replacement of NYISO's Energy Management and Business Management Systems (EMS/BMS). In accordance with the loan agreement, the proceeds can be drawn beginning March 18, 2016 through December 31, 2018. NYISO must convert each year's annual borrowings to term loans, with principal and interest payments payable over three years. Interest on borrowings under this facility is based on NYISO's option of varying rates of interest tied to LIBOR plus 95 basis points for borrowings, or the prime rate. Interest payments on borrowings are due monthly.

On December 12, 2018, NYISO amended its EMS/BMS Facility Loan to allow proceeds to be drawn through December 31, 2019

As of December 31, 2018 and 2017, the loan details on the EMS/BMS Facility Loan consisted of the following:

Draw year		2016	2017	2018
Draw amount	$	6,730,000	10,100,000	10,100,000
Converted to term loan		January 2017	January 2018	January 2019
Term period		36 months	36 months	36 months
Maturity date		12/1/2019	12/1/2020	12/1/2021
As of 12/31/18:				
Outstanding balance at fixed interest rate	$	1,301,944	3,907,765	5,556,958
Fixed interest rate		2.070 %	2.070 %	2.070 %
Outstanding balance at variable interest rate	$	941,389	2,825,568	4,018,042
Variable interest rate		3.299 %	3.299 %	3.299 %
As of 12/31/17:				
Outstanding balance at fixed interest rate	$	2,676,005	6,023,995	—
Fixed interest rate		2.070 %	2.070 %	N/A
Outstanding balance at variable interest rate	$	1,810,662	4,076,005	—
Variable interest rate		2.457 %	2.433 %	N/A

(iii) On July 8, 2005, NYISO entered into two financing agreements to purchase and renovate a 140,000-square foot office building in Rensselaer, NY. The first agreement is a $14.7 million mortgage to finance the building purchase (Mortgage), and the second agreement represents a $10.0 million line of credit for renovations during an 18-month period, beginning in July 2005 (Renovations Loan). Both agreements are secured by liens on the building and subsequent capitalized renovations. Interest on borrowings under both facilities is due monthly and is based on varying rates of interest tied to LIBOR plus 100 basis points.

As of December 31, 2018 and 2017, the loan details on the Mortgage and Renovation Loans consisted of the following:

Loan		Mortgage	Renovation
Draw amount	$	14,708,750	10,000,000
Converted to term loan		September 2005	January 2007
Term period		20 Years	20 Years
Maturity date		7/1/2025	12/1/2026
As of 12/31/18:			
Outstanding balance at fixed interest rate	$	6,474,268	5,504,557
Fixed interest rate		5.790 %	5.960 %
As of 12/31/17:			
Outstanding balance at fixed interest rate	$	7,245,499	6,017,805
Fixed interest rate		5.790 %	5.960 %

(iv) On July 18, 2012, NYISO entered into the 2012 Infrastructure Loan to renovate its facilities in Guilderland, NY and to perform construction at its facility in Rensselaer, NY. The agreement permitted borrowings of up to $45.0 million through July 18, 2014, at which point the full $45.0 million was converted to a term loan. The NYISO is required to make interest only payments for up to 24 months, followed by 17 years of principal and interest payments. Interest on borrowings under the 2012 Infrastructure Loan is due monthly and is based on varying rates of interest tied to LIBOR plus 225 basis points.

As of December 31, 2018 and 2017, the loan details on the 2012 Infrastructure Loan consisted of the following:

		December 31, 2018	December 31, 2017
Outstanding balance at fixed interest rate	$	29,607,843	31,960,784
Fixed interest rate		4.149 %	4.149 %
Outstanding balance at variable interest rate	$	3,691,637	3,985,012
Variable interest rate		4.599 %	3.781 %

At December 31, 2018, scheduled maturities of NYISO's long-term debt was as follows:

		2014–2018 Budget facility loan	2016–2019 EMS/BMS facility loan	Mortgage	Renovations	2012 Infrastructure loan	Total
2019	$	20,802,360	8,801,667	817,743	545,136	2,646,316	33,613,222
2020		16,666,666	6,558,333	866,134	578,162	2,646,316	27,315,611
2021		8,443,000	3,191,667	919,297	614,926	2,646,316	15,815,206
2022		—	—	974,739	653,131	2,646,316	4,274,186
2023		—	—	1,033,525	693,710	2,646,317	4,373,552
Thereafter		—	—	1,862,830	2,419,492	20,067,899	24,350,221
Total	$	45,912,026	18,551,667	6,474,268	5,504,557	33,299,480	109,741,998

(7) Derivatives and Hedging Activities

NYISO's derivative instruments are economic hedges used to manage its exposure related to changes in interest rates related to long-term debt. The NYISO does not enter into derivative instruments for any purposes other than cash flow hedging. By using derivative instruments to hedge exposure to changes in interest rates, NYISO is exposed to credit and market risk. Credit risk is the failure of the counterparty to perform under the terms of the derivative contract. When the fair value of a derivative contract is positive, the counterparty owes the NYISO, which creates credit risk. When the fair value is negative, the NYISO owes the counterparty and, therefore, the NYISO is not exposed to the counterparty's credit risk in those circumstances. NYISO minimizes counterparty credit risk in derivative instruments by entering into transactions with high-quality counterparties. Market risk is the adverse effect on the value of a derivative instrument that results from a change in interest rates.

In February 2005, NYISO entered into two interest rate swap agreements with a commercial bank to fix interest rate payments on the financing of a new office building purchase. The notional amount of debt on the swap agreement for the Mortgage was $14,708,750. NYISO pays a fixed interest rate of 5.79% on the outstanding principal amount of this financing on payments from August 2005 through August 2025.

The notional amount of debt on the swap agreement for the Renovations Loan was $10,000,000, and NYISO pays a fixed interest rate of 5.96% on payments from January 2007 through January 2027. As of December 31, 2018 and 2017, the fair value of these interest rate swap agreements was $(511,248) and ($761,519), respectively, for the Mortgage and $(564,461) and ($790,978), respectively, for the Renovations Loan, recorded in Other Noncurrent Liabilities. For the years ended December 31, 2018 and 2017, NYISO recorded a fair value gain of $476,788 and $545,044, respectively, related to these two swap agreements.

In July 2012, NYISO entered into an interest rate swap agreement with a commercial bank to fix interest rate payments on the 2012 Infrastructure Loan. The notional amount of debt on the swap agreements was $40,000,000. NYISO pays a fixed interest rate of 4.149% through July 2031. As of December 31, 2018 and 2017, the fair value of this interest rate swap agreement was $1,070,999 and $682,001, respectively, recorded in Other Noncurrent Assets. For the years ended December 31, 2018 and 2017, NYISO recorded a fair value gain of $388,997 and $197,607, respectively, related to this swap agreement.

In October 2013, NYISO entered into four interest rate swap agreements with a commercial bank to fix interest rate payments on the 2014–2017 Budget Facility. The notional amount of the debt on the swap agreements was $80,000,000. In May 2016, NYISO entered into a fifth interest rate swap agreement with a commercial bank to fix interest rate payments on the 2014–2018 Budget Facility. The notional amount of the debt on the swap agreement was $20,000,000. NYISO pays fixed interest rates ranging from 1.780% to 4.076% through December 2021 on the five swap agreements. As of December 31, 2018 and 2017, the fair value of these five interest rate swap agreements was $275,905 and ($128,708), respectively, recorded in Other Noncurrent Assets and Noncurrent Liabilities, respectively. For the years ended December 31, 2018 and 2017, NYISO recorded a fair value gain of $404,612 and $596,781, respectively, related to these five swap agreements.

In October 2016, NYISO entered into an interest rate swap agreement with a commercial bank to fix interest rate payments on the EMS/BMS Facility loan. The notional amount of the debt on the swap agreement was $15,000,000. NYISO pays a fixed interest rate of 2.07% through December 2021. As of December 31, 2018 and 2017, the fair value of this interest rate swap agreement was $170,001 and $185,687, respectively, recorded in Other Noncurrent Assets. For the years ended December 31, 2018 and 2017, NYISO recorded a fair value loss of $15,686 and fair value gain of $39,289, respectively, related to this swap agreement.

	Swap Notional amount at inception	**Swap Notional amount at December 31, 2018**	**Swap Fair value at December 31, 2017**	**Swap Fair value at December 31, 2018**	**2018 Gain (loss) on fair value**
Loan:					
2014 – 2018 Budget Facility	$ 100,000,000	37,197,444	(128,708)	275,904	404,612
2012 Infrastructure Loan	40,000,000	29,607,843	682,001	1,070,999	388,998
EMS/BMS Facility Loan	15,000,000	10,766,667	185,687	170,001	(15,686)
Mortgage	14,708,750	6,474,268	(761,519)	(511,248)	250,271
Renovations	10,000,000	5,504,557	(790,978)	(564,461)	226,517
Total					$ 1,254,712

The fair value of NYISO's interest rate swaps are determined using pricing models developed based on the LIBOR swap rate and other observable market data (Level 2 inputs).

The fair value of interest rate swaps is included in Other Noncurrent Assets and Other Noncurrent Liabilities. The following table presents the carrying amounts and estimated fair values of NYISO's interest rate swaps at December 31, 2018 and 2017:

		2018		2017	
		Carrying amount	**Fair value**	**Carrying amount**	**Fair value**
Financial assets:					
Interest rate swaps	$	1,524,878	1,524,878	867,688	867,688
Financial liabilities:					
Interest rate swaps	$	1,075,708	1,075,708	1,681,205	1,681,205

(8) Employee Benefit Plans

Defined Benefit Pension and Postretirement Plans

NYISO has a defined benefit pension plan covering certain employees upon their retirement. Plan benefits are based on employee compensation levels and years of service, including service for certain employees previously employed by NYPP member companies. There was $800,000 and $0 in NYISO cash contributions made during 2018 and 2017, respectively, to the pension plan. Effective December 1, 2009, NYISO adopted changes to its pension plan to end the accrual of future benefits for most employees. NYISO replaced the defined benefit accruals with equivalent contributions to employee 401(k) plan accounts after December 1, 2009.

NYISO sponsors a defined benefit postretirement plan to provide medical benefits for eligible retirees and their dependents. NYISO employees who retire on or after age 55 become eligible for these benefits provided they have been credited with at least ten years of NYISO service (5 years of NYISO service for those employees hired before January 1, 2005). The benefits are contributory based upon years of service, with NYISO paying up to 50% of costs for retired employees and up to 25% for their dependents (subject to specified dollar limits). Medical coverage becomes secondary upon Medicare eligibility.

Pursuant to resolutions adopted by NYISO's Board of Directors, NYISO's Retirement Board is responsible for administration of NYISO's pension and postretirement plans, including recommending investment policy to the Board of Directors, and monitoring investment performance. The Retirement Board reports to NYISO's Board of Directors and currently consists of NYISO's Chief Financial Officer, Director of Human Resources, General Counsel, Controller and Assistant Treasurer and one non-executive employee. The Retirement Board provides reports to the Commerce and Compensation Committee of the Board of Directors on at least an annual basis.

NYISO records the overfunded or underfunded position of a defined benefit pension and postretirement plan as an asset or liability, with any unrecognized prior service costs, transition obligations, or gains/losses reported as recoverable under ASC Topic 980 and recorded as a regulatory asset or liability.

For payment of benefits under the postretirement plan, as noted above, the NYISO established a Voluntary Employee Benefit Association (VEBA) trust in January 2010. The assets held in the VEBA trust reduce the accumulated postretirement benefit obligation as reported on the NYISO's Statements of Financial Position. The VEBA trust held assets of $5,037,480 and $5,720,041 as of December 31, 2018 and 2017, respectively. As noted in the following table, current obligations are assumed to be paid out of the trust assets, with the remaining unfunded obligation to be reflected as a noncurrent liability.

The schedules that follow show the benefit obligations, the plan assets, and the funded status as of December 31, 2018 and 2017, and the change in benefit obligations for NYISO's pension and postretirement plans for the years ended December 31, 2018 and 2017.

	Pension plan		Postretirement plan	
	2018	2017	2018	2017
Change in benefit obligation:				
Benefit obligation – beginning of year	$ 31,583,799	32,120,331	15,243,219	11,868,298
Service cost	7,409	17,485	981,049	904,086
Interest cost	1,022,876	1,142,533	497,494	486,098
Actuarial (gain)/loss	(1,475,231)	2,227,811	(4,440,567)	2,239,665
Participant contributions	–	–	172,857	160,216
Settlements	–	(3,128,839)	–	–
Benefits paid	(1,042,607)	(795,522)	(499,197)	(415,144)
Benefit obligation – end of year	30,096,246	31,583,799	11,954,855	15,243,219
Change in plan assets:				
Fair value of plan assets – beginning of year	25,094,709	27,190,053	5,720,041	5,234,811
Actual return on plan assets	(622,936)	1,993,936	(312,417)	766,350
Employer contributions	800,000	–	–	–
Participant contributions	–	–	172,857	160,216
Settlements	–	(3,128,839)	–	–
Benefits paid	(1,042,607)	(795,522)	(499,197)	(415,144)
Expenses paid	(153,008)	(164,919)	(43,804)	(26,192)
Fair value of plan assets – end of year	24,076,158	25,094,709	5,037,480	5,720,041
Funded status	$ (6,020,088)	(6,489,090)	(6,917,375)	(9,523,178)

Amounts recognized in the 2018 and 2017 Statements of Financial Position consist of the following:

	Pension plan		Postretirement plan	
	2018	2017	2018	2017
Net actuarial (gain)/loss recognized in regulatory assets (liabilities)	$ 10,423,929	10,148,344	(1,483,024)	2,241,890
Projected benefit obligation	(30,096,246)	(31,583,799)	(11,954,855)	(15,243,219)
Fair value of assets	24,076,158	25,094,709	5,037,480	5,720,041
Unfunded projected benefit obligation	$ (6,020,088)	(6,489,090)	(6,917,375)	(9,523,178)

Net periodic pension expense and other postretirement benefit costs include the following components:

	Pension plan		Postretirement plan	
	2018	2017	2018	2017
Service cost	$ 7,409	17,485	981,049	904,086
Interest cost	1,022,876	1,142,533	497,494	486,098
Expected return on plan assets	(1,179,239)	(1,221,646)	(359,432)	(313,365)
Amortization of unrecognized (gain) loss	203,019	154,223	—	—
Amortization of unrecognized prior service cost	1,348	1,348	—	—
Settlement loss	—	1,005,009	—	—
Total	$ 55,413	1,098,952	1,119,111	1,076,819

NYISO uses a December 31 measurement date for its pension and postretirement benefit plans. NYISO's accumulated benefit obligation for the defined benefit pension plan is $30,096,246 and $31,533,310 at December 31, 2018 and 2017, respectively.

During 2017, the sum of all lump-sum pension benefits paid during the year exceeded the sum of the service and interest cost components of the net periodic benefit cost for the year, resulting in the recognition of a net settlement loss of $1,005,009.

The following table as of December 31, 2018 and 2017 shows the assumptions used to calculate the pension and postretirement benefit obligations and net periodic costs:

	Pension plan		Postretirement plan	
	2018	2017	2018	2017
Benefit obligations:				
Discount rate	4.05%	3.40%	4.30%	3.75%
Rate of compensation increases	N/A	3.00	N/A	N/A
Net cost or credit:				
Discount rate	3.40%	3.75%	3.75%	4.10%
Rate of compensation increases	3.00	3.00	N/A	N/A
Expected return on plan assets	5.00	4.60	6.40	6.10

NYISO's expected rate of return on plan assets reflects anticipated returns on the pension and postretirement plans' current and future assets. To determine this rate, NYISO considers historical returns for equity and debt securities, as well as current capital market conditions and projected future conditions. The long-term investment objective for NYISO's pension plan is to maximize the total return on plan assets while limiting risk, reflected in volatility of returns, to prudent levels. To that end, NYISO's Retirement Board has appointed and regularly meets with an investment advisor to review asset performance, compliance with target asset allocation guidelines, and appropriate levels of asset diversification. NYISO's investment advisor operates under written guidelines provided by NYISO, which cover such areas as investment objectives, performance measurement, permissible investments, investment restrictions, and communication and reporting requirements.

NYISO's pension and postretirement plan investments are composed of common stocks, mutual funds and commingled trust funds that are redeemable at net asset value (NAV) on a daily basis. Redemption of such investments generally requires 1 to 2 days' notice prior to redemption.

NYISO measured benefit obligations using the most recent RP-2014 mortality tables and MP-2018 mortality improvement scale in selecting mortality assumptions as of December 31, 2018.

The targeted allocation and actual investment mix of the pension plan's assets are as follows at December 31:

	2018		2017	
Asset category	**Target**	**Actual**	**Target**	**Actual**
Fixed income	70%	71%	70%	70%
International and emerging equities	15	15	15	17
Large cap equities	8	8	8	7
Mid cap equities	5	4	5	4
Small cap equities	2	2	2	2
Total	100%	100%	100%	100%

The targeted allocation and actual investment mix of the VEBA Trust (postretirement) plan's assets are as follows:

	2018		2017	
Asset category	**Target**	**Actual**	**Target**	**Actual**
Domestic equities	50%	55%	50%	56%
Fixed income	35	33	35	29
International and emerging equities	15	12	15	15
Total	100%	100%	100%	100%

The actual rate of return for the pension plan's assets as of December 31, 2018 and 2017 is as follows:

	Annual returns December 31	
Asset category	**2018**	**2017**
International and emerging equities	(13.9)	26.4%
Large cap equities	(4.2)	22.8
Mid cap equities	(7.3)	20.1
Small cap equities	(13.3)	15.1
Fixed income	0.9	2.8
Total portfolio weighted average	(2.8)%	7.7%

The actual rate of return for the VEBA Trust (postretirement) plan's assets as of December 31, 2018 and 2017 is as follows:

Asset category	Annual returns December 31 2018	2017
International and emerging equities	(15.6)%	27.8%
Domestic equities	(7.9)	17.0
Fixed income	—	3.4
Total portfolio weighted average	(6.5)%	14.1%

The fair values of the pension plan assets at December 31, 2018 and 2017 are presented below:

	2018 Fair value Level 1	Level 2	Level 3	Total
Domestic investments:				
Equities:				
Small cap	$ 510,536	–	–	510,536
Mid cap	999,980	–	–	999,980
Large cap	1,771,650	–	–	1,771,650
Total	3,282,166	–	–	3,282,166
Fixed income	4,863,395	12,325,857		17,189,252
Total	4,863,395	12,325,857	–	17,189,252
International and emerging equities	3,631,324	–	–	3,631,324
Total	3,631,324	–	–	3,631,324
Cash and cash equivalents	(26,584)	–	–	(26,584)
	$ 11,750,301	12,325,857	–	24,076,158

	2017 Fair value			
	Level 1	Level 2	Level 3	Total
Domestic investments:				
Equities:				
Small cap	$ 535,633	—	—	535,633
Mid cap	943,284	—	—	943,284
Large cap	1,757,014	—	—	1,757,014
Total	3,235,931	—	—	3,235,931
Fixed income	5,070,768	12,568,618	—	17,639,386
Total	5,070,768	12,568,618	—	17,639,386
International and emerging equities	4,211,056	—	—	4,211,056
Total	4,211,056	—	—	4,211,056
Cash and cash equivalents	8,336	—	—	8,336
	$ 12,526,091	12,568,618	—	25,094,709

The fair values of VEBA Trust (postretirement) plan's assets at December 31, 2018 and 2017 are presented below:

	2018 Fair value			
	Level 1	Level 2	Level 3	Total
Domestic equities	$ 1,122,495	—	—	1,122,495
Fixed income	1,663,579	—	—	1,663,579
International and emerging equities	2,184,354	—	—	2,184,354
Total	4,970,428	—	—	4,970,428
Cash and cash equivalents	67,052	—	—	67,052
	$ 5,037,480	—	—	5,037,480

	2017 Fair value			
	Level 1	Level 2	Level 3	Total
Domestic equities	$ 1,394,099	—	—	1,394,099
Fixed income	1,670,194	—	—	1,670,194
International and emerging equities	2,565,250	—	—	2,565,250
Total	5,629,543	—	—	5,629,543
Cash and cash equivalents	90,498	—	—	90,498
	$ 5,720,041	—	—	5,720,041

In 2018, the assumed postretirement plan healthcare cost trend rates for participants pre-65 are 7.5% for 2019 to 2020 decreasing to 4.5% in 2031, and the participants post-65 are 5.25% going from 2019 to 2020 decreasing to 4. 5% in 2022. In 2017, the assumed postretirement plan healthcare cost trend rates for participants pre-65 are 8.5% for 2018 to 2019 decreasing to 4.75% in 2033, and the participants post-65 are 8.0% going from 2018 to 2019 decreasing to 4.75% in 2031. A one-percentage point change in the assumed healthcare cost trend rate would change the 2018 postretirement benefit obligation as follows:

		1% increase	1% decrease
Effect on postretirement benefit obligation	$	1,612,300	(1,263,300)
Effect on total of service and interest cost components		326,200	(245,500)

The following benefit payments, which reflect expected future service, are expected to be paid:

	Pension plan	Postretirement plan
2019	2,516,341	262,724
2020	2,770,582	349,892
2021	2,347,162	423,665
2022	2,230,393	499,462
2023–2028	12,172,475	4,115,179

401(k) Plan

NYISO has a 401(k) Retirement and Savings Plan open to all non-temporary employees. This plan provides for employee contributions up to specified limits. NYISO matches 100% of the first 3% of employee contributions, and 50% of the next 2% of employee contributions. Beginning December 1, 2009, NYISO also contributes funds to employee 401(k) plan accounts equivalent to defined benefit accruals formerly earned in the pension plan.

Employees are immediately vested in NYISO's matching contributions and become vested in other employer contributions after three years of credited service. The total NYISO contributions to the 401(k) plan were $6,426,626 and $6,121,157 for 2018 and 2017, respectively.

Long-Term Incentive Plan

NYISO's Long-Term Incentive Plan provides certain members of senior management with deferred compensation benefits. Benefits are based upon the achievement of three-year performance goals established by the Board of Directors, with participants becoming fully vested and distributions payable for these deferred amounts after the completion of the audited financial statements for the third year. Benefits are paid out in equal installments over three years following the end of the three-year cycle. Accrued Long-Term Incentive Plan benefits included in Other Noncurrent Liabilities at December 31, 2018 and 2017, were $3,214,475 and $3,574,514, respectively. The short-term portion of such liability, included in Other Current Liabilities, at December 31, 2018 and 2017, was $1,607,238 and $1,166,381, respectively.

457(b) Plan - Eligible Deferred Compensation Plan

NYISO's 457(b) Plan provides for certain members of senior management to defer a portion of their current compensation and have it credited under a supplemental unfunded savings program. This Plan is intended to satisfy the requirements of an eligible deferred compensation plan maintained by NYISO as a non-government tax-exempt entity under Code section 457(e)(1)(B). Plan participants have the ability to invest these funds in the same investments offered by the NYISO 401(k) plan at their discretion. The investment balance at December 31, 2018 and 2017 was $1,290,562 and $1,097,651, respectively, recorded as marketable securities. The corresponding deferred compensation liability is recorded in Accounts Payable and Accrued Expenses.

(9) Other Commitments

On July 8, 2005, NYISO purchased an office building to relocate NYISO's alternate control center and to consolidate employees located in leased facilities. In connection with the purchase, management entered into a Payment in Lieu of Taxes (PILOT) Agreement with the Rensselaer County Industrial Development Agency (RCIDA) to achieve certain benefits. Per the terms of this agreement, NYISO was required to make annual payments of approximately $195,000 for the first 10 years. Effective January 1, 2016, this PILOT Agreement was amended to add three additional parcels of land purchased in 2014 and 2015, and to extend the term of the PILOT an additional 10 years. Per the amendment, NYISO is required to make annual payments of approximately $301,000, over the next 7 years through 2025. The agreement is cancelable at the discretion of NYISO.

(10) Working Capital Reserve

At December 31, 2018 and 2017, the working capital reserve consisted of the following:

		2018	2017
Market participant contributions through Rate Schedule 1	$	33,000,000	33,000,000
Interest on market participant contributions		1,495,523	527,919
Total	$	34,495,523	33,527,919

(11) Deferred Revenue

Deferred revenue at December 31, 2018 and 2017 consisted of the following:

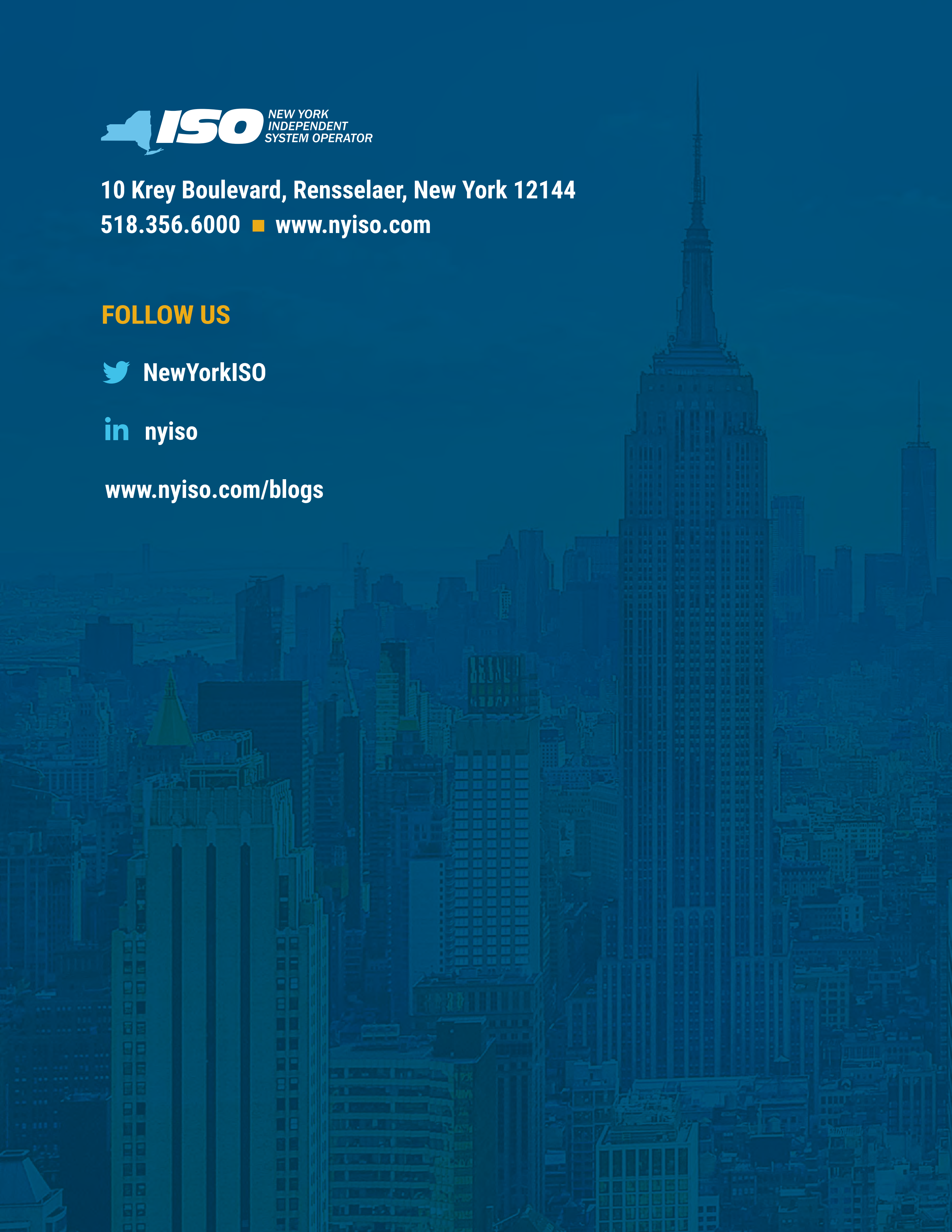
		2018	2017
Advance payments received on planning studies	$	14,975,100	13,128,976
Governance participation fees		426,100	416,900
Total	$	15,401,200	13,545,876

(12) Commitments and Contingencies

NYISO is routinely involved in regulatory actions. In the opinion of management, none of these matters will have a material adverse effect on the financial position, results of operations, or liquidity of NYISO.

(13) Subsequent Events

NYISO considers events and transactions that occur after the balance sheet date, but before the financial statements are issued, to provide additional evidence relative to certain estimates or to identify matters that require additional disclosure. These financial statements were available to be issued on March 15, 2019 and subsequent events have been evaluated through that date.



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