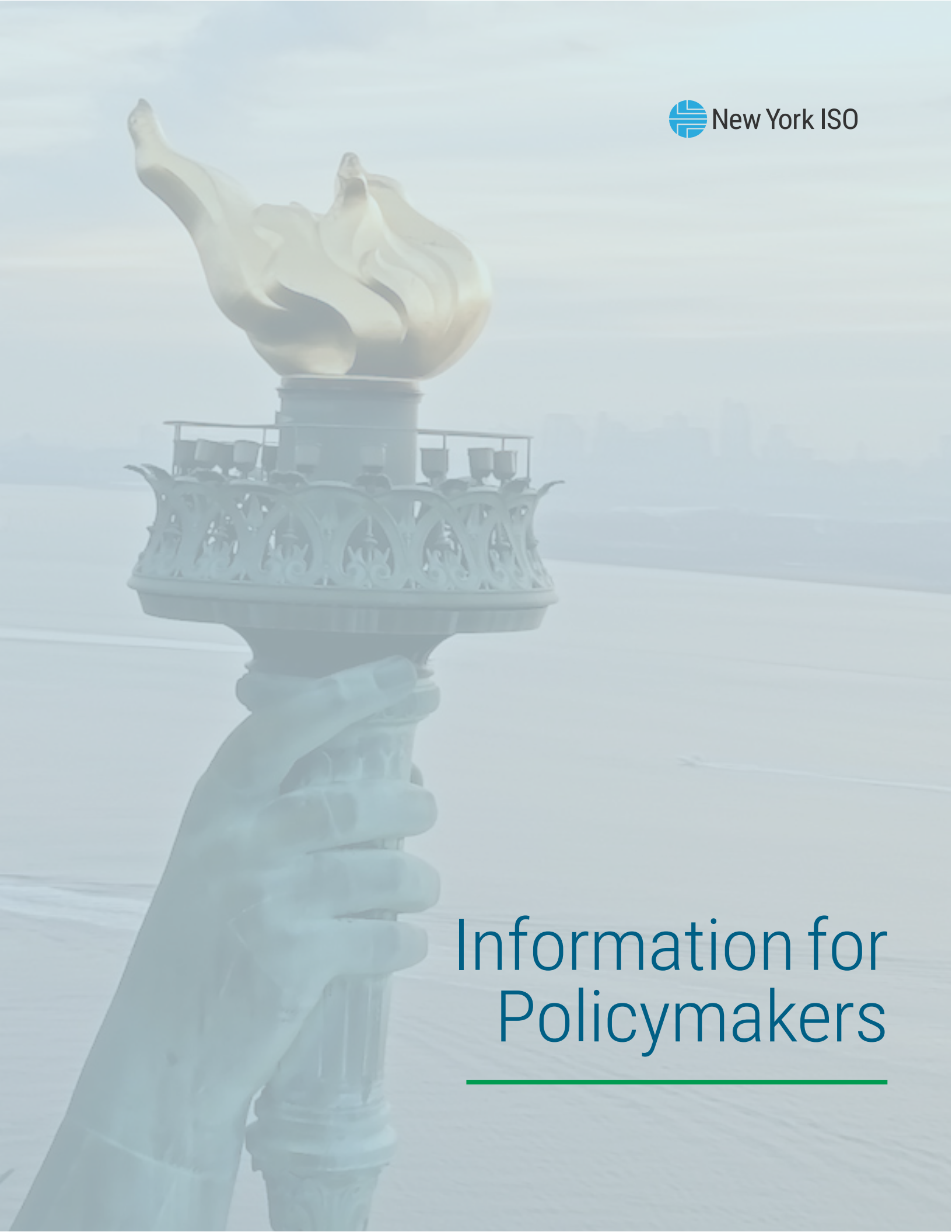
New York ISO



Information for Policymakers

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Delivering the Grid of the Future

Through expert system operations, planning, and wholesale electricity market design, the NYISO is working to identify the reliability needs of the future grid envisioned by New York's nation-leading climate policy goals. We will continue to engage policymakers and our stakeholders to design and implement the operations, planning and market enhancements necessary for the grid in transition, consistent with our mission and vision.

To learn more about the issues currently impacting New York's grid and the NYISO's role in this transition, see below.

Planning for Reliability

At the NYISO, keeping the electric grid reliable will always be job one. We manage the flow of electricity across the bulk electric system, or grid, in the state around the clock, every day of the year. For most consumers, "reliability" simply means the lights stay on and phones are charged. But as the grid operator in New York, keeping the lights on also means planning far into the future to make sure the electric system and its interrelated components can meet customer demand.

The acceleration of New York's transition to a zero-emission grid is creating a system of new, intermittent generation, which benefits the environment but can make it more challenging to keep the system reliable.

Grid In Transition

Renewable energy resources like wind-powered generators or solar panels have the benefit of being emissions-free, but they are not dispatchable, meaning they cannot produce electricity on demand and respond to signals to increase electricity production in the same ways that many fossil-fueled generators can. Electricity produced by wind and solar powered resources are intermittent suppliers, meaning they cannot produce energy when the sun is not shining, or the wind is not blowing. Energy storage can help resolve this challenge by storing excess wind and solar energy and discharging that electricity when needed. But current electricity storage technologies are limited in how much electricity they can store and then supply to the grid when needed. Because of these characteristics, a successful transition to a zero-emission grid means synchronizing the addition of clean energy resources with the retirement of fossil-fuel generators to maintain reliability.

The grid will always need sufficient flexible and dispatchable resources to balance variations in wind and solar resource output. These resources need to be long-duration, dispatchable, and emission-free.

Essentially, they must have the attributes of fossil generators (responding quickly to rapid system changes) without the emissions. Such resources are not currently commercially available and may not be for many years.

The retirement of fossil-based resources is outpacing the development of new renewable-based resources and other dispatchable, emissions-free resources. The effect is that reliability margins will thin to concerning levels beginning in 2023, highlighting the need for a careful transition that maintains grid reliability and resilience.

Another factor in this transition is that, during periods of high demand, constraints along key transmission lines can limit the amount of carbon-free electricity that can be delivered from upstate, where generation is predominantly emission-free, to meet demand downstate, where most of the electricity is required. Today, New York City and its surrounding suburbs at times rely more on fossil-fuel powered generation located in the downstate region to serve customer needs.

New transmission investment will be important because of the so-called "peaker rule," which will require that certain fossil fuel generators meet tightening regulations on smog-forming pollutants beginning in 2023. Many peaker plants are located within "pockets" in New York City and Long Island where the ability to transmit electricity into these areas is limited. To fully meet consumers' needs in these areas, local supply is necessary. As it does with all generators retiring from serving the grid, the NYISO has conducted reliability studies to understand the impacts of generators retiring in response to the "peaker rule." While reliability needs have not been identified to date, the NYISO continues to monitor the impacts of these retirements, along with expected levels of electricity demand and available transmission, to identify and take steps to address reliability needs should they occur.

Addressing Transmission Needs

Like any product, electricity must travel from where it is produced to where it is consumed. Our Public Policy Transmission Planning Process identifies the transmission investments needed to achieve public policy goals, such as increased renewable energy production.

As a first step, the New York Public Service Commission (PSC) opens a public process to examine what transmission system upgrades and additional investments need to be made. Chief among the considerations is where the system is most constrained and, looking into the future, where expected renewable supply will be developed, and where forecasted demand will be greatest. Many parties participate in this part of the process, including the NYISO, making suggestions and putting forward ideas.

Once the PSC identifies specific needs for the power system, we request proposals from developers to meet those needs. The NYISO then evaluates the proposed solutions based on their ability to satisfy the needs identified by the PSC. The proposals are ranked based on design criteria, efficiency, and cost-effectiveness.

Most of the land-based wind generation and large-scale solar electricity production is located in northern and western New York. This is because these regions have the strongest winds to support land-based wind turbines, and where land is more available for solar farms. These regions, which typically have lower demand levels than other regions of the state, have limitations to their ability to transmit electricity. Absent upgrades to the transmission system, renewable resources in northern and western New York would increasingly be bottled. Bottling occurs to renewable resources when they are generating more energy than can be consumed within the region it is produced or can be reliably transmitted to other regions. Existing constraints on the transmission system lead to "curtailing," or purposefully reducing the output of solar or wind in order to maintain grid reliability.

A historic level of investment in the transmission system is currently underway, with projects that will deliver more clean energy to consumers while enhancing grid resilience and reliability.

Interconnection Process

The increase in renewable generating facilities and new clean energy technology is driving a transition of the transmission system. Integrating a high volume of new facilities onto the transmission system can have major implications for reliability and the flow of power across the state.

To address this, the NYISO has an Interconnection Process, which requires proposed new generation and transmission projects to enter an "interconnection queue." Proposals undergo a series of studies and detailed analysis that serve two key functions on behalf of customers:

- Determinations of whether adding a new resource creates reliability issues on the system; and
- If the project does impact system reliability, determine what system upgrades are necessary to interconnect the project while maintaining system reliability, and the costs of those upgrades.

Under the process, the costs of equipment and upgrades required to connect projects are assigned to project developers, and in some cases, the local utility, not consumers. The interconnection process is required to identify the lowest cost solution to solve the reliability need. The allocation of upgrade costs identified through the process are not subject to negotiation, providing an important element of certainty for developers. This cost certainty is a highly regarded aspect of the New York process.

The interconnection process ensures "open access" to the transmission grid for new supply resources seeking to enter operation and is an essential element in maintaining the performance and reliability characteristics of the electric system on behalf of customers.

Planning for the Future

The NYISO is constantly analyzing the electric system and its future capabilities by conducting reliability planning studies. These studies identify when and where reliability rules, set by state, federal, and regional entities, will be violated unless action is taken in the form of system upgrades and investments. If a scenario is identified in which the grid may lack enough available supply of electricity or transmission capability to serve future demand, a "Reliability Need" is declared, setting off a set of steps to address the situation.

Four times a year, we conduct a *Short-Term Assessment on Reliability* (STAR), which focuses on identifying reliability needs up to five years out. For a longer-term approach, our *Reliability Needs Assessment* (RNA) looks out 10 years. This process cycle runs every two years and begins with the development and publishing of the RNA report. The RNA looks at both the adequacy of energy resources and limitations of the transmission grid to determine whether the electric system will be able to supply enough power to meet demand.

The NYISO's role in identifying system needs, and finding solutions, is part of the process of planning for the grid of the future.

Wholesale Electricity Markets

Since 1999, when wholesale electricity markets were established in New York, consumers have seen considerable benefits.

Competitive Wholesale Electricity Markets

Wholesale energy markets in the U.S. use a competitive auction structure to establish the cost of energy. In this structure, generators consider their fuel and other operational costs in offering their supply to the market. Those with lower costs offer into the market at lower prices and fluctuations in the costs for fuel influence generators' offers.

The NYISO calculates the price of electricity by determining the expected demand and evaluating numerous supply offers to meet that demand. These offers are ranked by cost from lowest to highest, with the NYISO's market software selecting the least costly resources first, and then continuing to select supply resources until the total demand is met. All selected suppliers receive the price set by the last supplier

needed to meet demand — this is known as the clearing price.

A key element of the market design is that it enables actual costs, including fuel costs, to be accounted for in the clearing price for electricity. As a result, while the competitive market works to minimize cost, electricity prices are significantly influenced by fuel costs and these costs are ultimately passed through to consumers in the electricity supply component of their bills.

Energy markets are like a commodities market, with one major exception: electrical energy can only be stored in very limited quantities. Other commodities such as oil, gas, or wheat, can be stored. Electricity is different. The amount of energy on the grid being consumed must, at all times, be equal to the amount of energy being generated. This is true 24 hours a day, 7 days a week. To run the energy grid, you need operators to balance the flow between generation and consumption. And you need energy markets that work both a day ahead and in real time to incentivize and pay the energy generators to be available to generate the power we need to meet demand.

To do that, we have three markets: the energy market, ancillary service market, and capacity market. These three markets work together. In simple terms:

- Energy markets secure resources to supply the demand on a minute-to-minute basis.
- Ancillary service markets procure a variety of additional services to protect the electric system and balance supply and demand to meet system needs instantaneously.
- Capacity markets provide incentives to generation resources to maintain additional energy reserves over a longer period. Through the capacity market, we determine how much capacity is needed to meet the expected peak demand for the year plus a margin of additional resources to call on, if necessary.

Working together, these markets keep the system reliable in real time and also drive system response so that if we have a sudden need, for example if the wind suddenly dies down, other resources can ramp up and fill that need. The purpose of the energy market and ancillary service market is to meet the reliability needs in real time, and the purpose of the capacity market is to make sure that we have sufficient resources in the longer time frame.

How Markets Can Support Climate Goals

Competitive, wholesale markets can help with the transition to a zero-emission grid by sending the right economic signals to developers to invest in new technologies in the right geographic area to best serve the grid. These markets leverage competition to keep electricity as cost-effective and efficient for New Yorkers as possible, and to help make sure there are adequate resources in place in the future.

Competitive markets have over time created pressure on the generating fleet to switch to newer, more efficient generation plants. Emissions from the electric sector declined and prices generally followed.

Since 2000, electric generators that primarily combust natural gas increased from less than 50% to more than 60% of the generating capacity in the state. That transition towards natural gas contributed to the complete phase-out of coal-fired generating capacity from the grid during this time frame.

Additionally, the NYISO has implemented market enhancements to support climate goals and to position the NYISO as a national leader in competitive wholesale electricity markets. Through engagement with stakeholders and regulators, new market rules for energy storage integration, participation in our wholesale electricity markets by distributed energy resources, and new ancillary services products support reliability and minimize costs for consumers. Market rules that incentivize investment in resources that can respond rapidly to changing conditions will be essential for maintaining reliability of the grid of the future.

Electricity Prices in the NYISO Region

Fossil fuel costs have risen dramatically due to economic factors rooted in the pandemic and amplified by the Russian invasion of Ukraine, among other factors. Spiking global demand for fossil fuels, lagging supply, and global instability caused by war, have combined to bring fossil fuel prices to historic high levels. While consumers might expect these conditions to impact the cost of gasoline, many have been surprised by the degree to which these fossil fuel prices find their way into electricity bills as well.

That's because the power grid does not operate in isolation. The competitive wholesale electricity markets in New York are heavily influenced by national and global fossil fuel markets. The same economic and geopolitical factors that are causing volatility in oil and natural gas markets nationally and globally ultimately affect wholesale electricity markets as well. These conditions impact the costs to produce electricity, which ultimately are reflected in wholesale electricity prices and in supply charges seen in consumer bills.

Independent and Transparent

History

NYISO was created in 1999, three decades after the formation of its predecessor, the New York Power Pool. The New York Power Pool was created by the utilities in the state in the late 1960s to manage the transmission of power around New York while balancing the needs of different regional utilities.

In the 1990s, regulators and utilities nationally and within New York had a greater interest in minimizing costs for electricity consumers. The NYISO grew out of that need.

The need for independence was recognized along the way.

Regulatory and Reliability Organization Oversight

Federal Energy Regulatory Commission (FERC)

FERC is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil under the authority of the Federal Power Act. Among its responsibilities is the regulation of the transmission and wholesale sale of electricity in interstate commerce. The NYISO's two tariffs are regulated by FERC. As such, FERC must approve all changes to the NYISO's Tariffs, and the NYISO's procedures and operations must comply with FERC orders and applicable federal laws.

New York Public Service Commission

The Public Service Commission (PSC) regulates the state's electric, gas, steam, telecommunications, and water utilities, including by setting retail rates for consumers and ensuring New York's utilities provide adequate service. They further have jurisdiction over the siting of major gas and electric transmission facilities. While the PSC and its Department of Public Service (DPS) do not have regulatory oversight of the NYISO's federally-regulated tariffs, DPS staff actively participate in the NYISO's shared governance process, and the PSC has regulatory oversight of certain elements of the NYISO's finances.

North American Electric Reliability Corporation (NERC)

NERC is the Electric Reliability Organization (ERO) for North America. It supports the reliability and security of the electric grid through the development and enforcement of Reliability Standards, which the NYISO must comply with, and annually assesses seasonal and long-term reliability. In the US, NERC is overseen by FERC.

New York State Reliability Council (NYSRC)

The NYSRC is a nonprofit entity whose mission is to preserve electric reliability for New York State. The NYSRC establishes reliability rules specific to the operation of the power system in New York State.

Northeast Power Coordinating Council (NPCC)

NPCC is a not-for-profit corporation dedicated to ensuring the reliability of the international, interconnected bulk power system in Northeastern North America, including New York. NPCC, together with five other Regional Entities, coordinates reliability requirements with NERC.

Governance Process

The NYISO and its stakeholders utilize a shared governance process to establish wholesale electricity market rules and processes associated with grid planning and operations. This transparent and inclusive process ensures that individual interests cannot unduly influence grid reliability or energy market outcomes.

Under this model, a supermajority of stakeholders must approve voting items before a committee before moving forward, a practice that requires consensus among entities with various interests. The allocation of votes ensures that no one sector can dominate the decision-making process.

Representatives have voting power in areas that include:

- Developing and adopting procedures for operation of the bulk power system
- Designing and planning the market design and NYISO systems
- Preparing the NYISO's annual budget
- Reviewing and recommending candidates for vacancies on the NYISO Board of Directors

As part of the NYISO's shared governance structure, stakeholders play a vital role in developing the NYISO's budget. Through this process, the Budget and Priorities Working Group (BPWG) provides guidance to the NYISO on project identification, prioritization, and evaluation.

After the BPWG provides their input to the annual budget process, the working group sends a budget proposal to the Management Committee for review. The Management Committee is the NYISO's highest-ranking stakeholder committee and votes on whether to recommend the budget proposal to the NYISO's Board of Directors for final approval.

Independence

The NYISO is transparent, open and independent of its stakeholders. We are a registered 501(c)3 not for profit corporation. NYISO and its directors, executives and employees are prohibited from having financial interests in any company participating in New York wholesale competitive electric markets.

Additional Resources

Please visit our Information for Policymakers page for additional resources

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