

NEW YORK CLEAN ENERGY TRANSMISSION SUMMIT

“Reforming the Energy Vision” (REV) is a far-reaching strategy for reforming New York State’s energy systems launched by Governor Andrew Cuomo. Major initiatives include Public Service Commission orders to modernize utility regulations and the New York Green Bank. In December 2015, Governor Cuomo directed the State Department of Public Service to enact a Clean Energy Standard mandating that 50 percent of all electricity consumed in New York come from renewable sources by 2030.

according to several speakers, transmission has received less attention than other topics in REV discussions to date. Discussions have tended to focus on generation and retail distribution of electricity instead. There was consensus that utility-scale renewables, distributed renewables, demand-side solutions and transmission will all be important in meeting New York State’s energy goals.

On February 4, 2016, Columbia University’s Center on Global Energy Policy and Americans for a Clean Energy Grid convened a conference on the role of New York’s transmission grid in meeting the State’s clean energy targets. The event featured keynote presentations by Richard Kauffman (Chair, Energy & Finance, New York State), Audrey Zibelman (Chair, New York State Public Service Commission), Jon Wellinghoff and Jim Hoecker (both former chairs of the Federal Energy Regulatory Commissions), Gil Quiniones (CEO, New York Power Authority), Mark Lynch (CEO, New York State Electric & Gas) and many others. In opening the conference, David Sandalow, Inaugural Fellow at the Center on Global Energy Policy, quipped, “With apologies to John Kennedy, we have more expertise on New York electricity markets in one room today than at any time since Thomas Edison dined alone.”

Many speakers at the Summit highlighted the importance of long-distance transmission to New York State’s electricity system. New York has 2,832 miles of high-voltage transmission lines (more than 230 kilovolts, or kV) and 4,731 miles of low-voltage transmission lines (less than 230 kV).¹ Congestion often occurs on the path from upstate New York to New York City and Long Island. The southeastern part of New York State consumes two-thirds of the state’s electricity, yet has only half the State’s generating capacity.²

Many speakers said that, without additional transmission investments, meeting the goal of 50 percent renewable energy by 2030 would be impossible. Nevertheless,

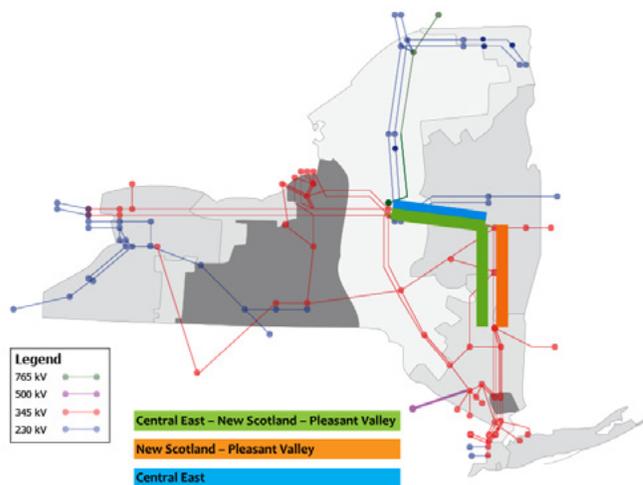


Figure 1: NY transmission lines and top congestion corridors
Source: NYISO (2015)





PANEL 1: ENHANCING TRANSMISSION WHILE “REFORMING THE ENERGY VISION”

“It’s really about optimizing the entire system”—Audrey Zibelman, discussing REV

Audrey Zibelman, Chair, New York Public Service Commission (keynote remarks); Steve Mitnick, Editor in Chief, Public Utilities Fortnightly (moderator)

Mark Lynch, President and CEO, New York State Electric & Gas and RG&E; Sergej Mahnovski, Director, Utility of the Future, Consolidated Edison; Jon Wellinghoff, Partner, Stoel Rives, and former Chair, Federal Energy Regulatory Commission

Audrey Zibelman opened the session by emphasizing that “transmission is a key component of REV.” REV is about improving efficiencies throughout the entire system, she said. In this regard, transmission is more than just wires and poles: “It’s a whole complement of resources available to the customer.” She noted that while it’s sometimes difficult to obtain public understanding of the need for new transmission infrastructure, properly planned transmission infrastructure can help solve many of the state’s energy problems.

In Zibelman’s view, designing a better system with the consumer in mind requires better demand response, more transparent pricing structures, real-time resources to help reduce load congestion, and a more



Audrey Zibelman, Chair, New York Public Service Commission



Jon Wellinghoff, Partner, Stoel Rives, and former Chair, Federal Energy Regulatory Commission

competitive field. To monetize Location Marginal Pricing–Distribution (“LMP-D”) and time-varied effects, Zibelman said they are “looking at unpacking the D,” as part of an evolution toward more dynamic distribution pricing.

“Transmission is the backbone of grid,” said Sergej Mahnovski. He emphasized that the New York metropolitan area, which generates 10 percent of US GDP, will require a significant amount of renewable energy from generation sources upstate to meet clean energy goals. “We’re a growing economy that needs both traditional infrastructure and creative and flexible solutions,” said Mahnovski. He noted that new solutions can create new problems and that the electric sector must be ready to adjust quickly to changes. For example, with photovoltaic (PV) installations dotted across Manhattan, networks are now peaking at night. More flexibility will also lead to more customer-sited resources, both in terms of generation and storage.

The panelists agreed on the importance of competition

in fostering flexibility. “Competition is going to make New York shine,” said Zibelman. FERC’s Order 1000, explained Jon Wellinghoff, aims to do just that. Fostering competition in transmission and planning will help New York State achieve its vision, bringing more transparency and technology-driven “dynamic resiliency” to the grid.

Wellinghoff called for better planning at the underlying distribution level: “In order to do proper planning at the bulk power level, we need to have better information about distribution networks.” He said that strong market structures will lead to the right solutions, no matter what they are: “It’s not just about better storage, it’s about the markets.”

In response to a question from Jim Hoecker, Jon Wellinghoff said FERC Order 1000 has not reached its full potential, giving it a “C+.” Wellinghoff said that ISO processes are often dominated by generators and transmission owners and that other stakeholders often don’t get enough attention in those processes.



PANEL 2: THE ROLE OF TRANSMISSION IN MEETING AMBITIOUS CLEAN ENERGY TARGETS

“Both Tesla and Edison made their inventions in the State of New York, and this is where we are going to change the energy industry.”—Gil Quiniones

Gil Quiniones, President and CEO, New York Power Authority (keynote remarks); Peter Behr, E&E News (moderator)

Steve Demers, Vice President of Business Development, Acquisitions, and Strategy, HydroQuébec; Ed Krapels, President, Anbaric Transmission, LLC; Abigail Dillen, Vice President of Litigation for Climate and Energy, Earthjustice; Michael Eckhart, Managing Director and Global Head of Environmental Finance, Citigroup, Inc.

Panelists in this session highlighted two broad themes. First, transmission will be essential in meeting New York State’s clean energy goals. Second, transmission alone is not sufficient—non-transmission alternatives are essential as well.

Peter Behr opened by noting that “we as a nation continue to build what we need today,” instead of planning for the long term. Behr asked panelists to consider how we can do a better job of thinking and planning for the long term. Gil Quiniones said that the State of New York and its energy leaders have a central role to play in the transformation of the energy system,

especially in high-voltage transmission. This part of the energy system can present unique challenges, addressing the needs and concerns of multiple communities, villages, and towns. This is typically time consuming. Quiniones said that, with respect to transmission, “people may think nothing is happening in New York, but actually a lot is going on.” As one of the latest concrete examples, a new license now authorizes a transmission project from Québec to New York City as part of Governor Cuomo’s Energy Highway initiative. Quiniones emphasized that long-term planning remains both critical and underestimated.

Quiniones discussed several new trends in the transmission industry that are potential game changers. Power electronics will allow for bidirectional energy flow on the transmission grid, and sensor technology will enable the grid to be run at a higher capacity factor, extracting additional performance from existing assets. New power electronics and sensor technologies also help “predict the future” through data analytics, providing more accurate supply-and-demand forecasts (from 5 milliseconds to 5 hours ahead and beyond). Finally, dynamic line rating contributes to a better use of the grid, allowing planners to know exactly how much power each line is carrying when.

“Québec and New York have been exchanging electricity since 1914.”—Steve Demers

Steve Demers spoke on how HydroQuébec’s surplus energy of about 25 to 30 terawatt hours (“TWh”) per year can help supply New York with clean, reliable energy. This may, however, require additional transmission.



Gil Quiniones, President and CEO, New York Power Authority



Peter Behr of E&E News and Abigail Dillen, Vice President of Litigation for Climate and Energy, Earthjustice

Several panelists discussed the importance of considering both transmission and non-transmission alternatives (NTAs). According to Ed Krapels, there is space for both new transmission and NTAs, such as microgrids. “New York doesn’t have to do all its renewables in-state,” he said. The Vermont Green Line illustrated Krapels’s point: the transmission line brings both hydropower from Québec and wind power from upstate New York to Vermont.

Michael Eckhart reported that “from a financial perspective, regional connectivity addresses a risk that ruins a lot of potential wind farms and solar projects.” In project financing, there is a real risk of curtailment due to not having enough lines connecting a resource to the grid. Project financing requires the transmission to be a precursor to successful energy projects. However, Eckhart said, interregional transmission gets even more complicated as you involve multiple ISOs. Eckhart further suggested it would be helpful if FERC would encourage more cross-ISO collaboration on transmission.

Abigail Dillen said there is “radical agreement” among stakeholders in New York that the energy system needs better link energy generation and distribution. However, she argues that from political, economic, and environmental perspectives, critical questions about proposed transmission lines deserve to be clearly answered. She highlighted the need for better and more long-term planning: “How do we ensure that only necessary projects are approved? How do we really do this planning? How do we set our environmental and equity goals?”

In this context, Dillen stated that New York State and California play a major role in moving clean energy forward. They are currently defining a new way of doing business, building a model to be potentially replicated across the United States. The required major changes toward cleaner energy are a unique opportunity to reshuffle the cards in a transparent way for more efficiency. From this perspective, all stakeholders have a role to play and can contribute to reach the ambitious goals set up. She stressed that “customers are able to learn about what is at stake quickly and should be included in the conversation; they can become allies.”



LUNCH KEYNOTE BY RICHARD KAUFFMANN, CHAIR OF ENERGY & FINANCE FOR NEW YORK, OFFICE OF GOVERNOR ANDREW M. CUOMO

Introduced by James Hoecker, Counsel to WIRES and former Chair, Federal Energy Regulatory Commission

“The system needs to change and the change is coming. The question is how much capital will be wasted, how much opportunity cost will be lost and how much time will be lost in the battle against climate change.”—Richard Kauffman

Richard Kauffman said that there is an urgent need to move from the one-way grid of Westinghouse and Tesla to the grid of the future. In that context, he emphasized that REV is not just about distributed resources -- it’s about combining Distributed generation (“DG”) flexibility and innovation with a strong central backbone through reliable transmission. Kauffman told the audience that the challenges are more about policy than technology. “You get what you regulate,” he said. Regulatory and policy frameworks, particularly in New York, have grafted onto a regime that has been designed to do something else. Carrying on as usual means a high cost for customers, not adequately addressing greenhouse gas emissions, and slowing economic growth.



Richard Kauffman, Chair of Energy & Finance, State of New York

Kauffman compared the changes in most US businesses since the early 1980s to changes in the utility sector in the same period. He identified five important trends that have shaped most US business—but not the utility sector—in the past few decades. These are:

First, a focus on returns on invested capital. For other industries, the capital utilization rate is 88 percent. In the utility sector, it’s roughly 54 percent. The regulatory system rewards utilities for deploying capital, and there is no market-based incentive for seeking better returns on that capital.

Second, a shift from “production push” to “customer pull,” where companies start with customer wants and provide them with customer solutions. Kauffman quoted the CEO of a drill bit manufacturer who summed up the change in business thinking as follows: “We’re not in the drill bit business anymore, we’re in the hole-making business.” Utilities are very much operating in the pre-1980s world of a “production push” mentality.

Third, price deflation in commodity markets, which forced companies to survive by cutting costs, improve service, and provide more value to customers. Utilities have been an exception to this trend.

Fourth, disintermediation blurred the lines between customers and suppliers, adding value for both customers and suppliers. Utilities will be required to encourage competitive markets around customers. Currently, policy reasons prevent utilities from owning DG, and thus market competition is needed to bring innovations to customers.



James Hoecker, Counsel to WIRES and former Chair, Federal Energy Regulatory Commission

Finally, technology has enabled markets to create virtual companies where different functions can come together to serve customer needs. However, the lines between utilities and their customers are still sharp, mainly due to the way they're regulated. A shift is needed to think about supplying systems instead of parts.

Ultimately, Kauffman said the forces of history can only be kept at bay for so long. REV is about aligning utilities with these forces. REV demonstrations are not technology trials but business model trials, designed to instill a culture of innovation in utilities. Government must also change. It has been in the resource allocation business, creating a market through grant-giving. If true market forces are going to be part of the new paradigm, then the regulatory environment must change. Kauffman signaled that the system needs to change and that change is coming with REV.



PANEL 3: OPTIMIZING THE NEW TRANSMISSION-DISTRIBUTION INTERFACE

“If you don’t know where you’re going, you might not get there.”—Yogi Berra as quoted by William Hederman

William Hederman Jr., Deputy Director for Systems Integration and Senior Advisor to the Secretary, US Department of Energy (keynote remarks); Chris Martin, Bloomberg News (moderator)

Paul Centolella, President, Paul Centolella & Associates, LLC; Chris King, Global Chief Regulatory Officer, Siemens Digital Grid; Steve Hauser, President, Gridwise Alliance; Todd Ryan, Director of Regulatory Affairs, Smart Wires, Inc.

William Hederman explained that the US Department of Energy (DOE) examines energy policy issues through the lens of three national goals for energy policy: economic competitiveness, energy security and environmental responsibility. The relationship between those goals is mutable; at times, certain policies that help advance one goal also buttress another, while at other times the three-part mandate is in greater internal conflict. These three, sometimes competing, goals were the focus of much of the panel’s discussion.

Paul Centolella discussed how distribution level markets, distributed controls and the use of increasingly granular data may provide significant economic benefits. He argued that: (i) the value of distributed energy resources (DER) can vary both by time and between and within distribution circuits; (ii) reactive power is poorly represented in existing models and distributed grid edge control could provide significant energy and demand savings; and (iii) the thermal inertia in buildings and other forms of flexible demand could provide large amounts of virtual storage if facilitated by the use of interval load data in wholesale settlements.

Centolella described three models for utility interactions with DER. First, the utility could become a DER integrator. Second, it could be a distribution system operator tasked with aggregating DER participation in Regional Transmission Organization demand response programs. Finally, the utility could become a distribution system platform combining technology and

analytics with standardized rules and business practices to facilitate multi-party transactions. In this model, the utility would be an entity, like Airbnb, that fosters profitable transactions. This structure would capture positive network externalities supported by learning effects. Ultimately, Centolella foresees a power system that may combine central dispatch of larger resources with local distribution level markets and additional distributed controls.

Chris King also discussed the need for changes in technology and business models; he focused on the variety of challenges facing the transmission and distribution interface. He pointed to technical issues, including systems not designed for bidirectional flow. He also pointed to problems with voltage control, such as the spike in net demand in California when the sun goes down and cuts off power to solar. Second, he focused on business process issues, including the planning process, grid operations based on existing rules and constraints. Third, he discussed the market issues where problems included: 1) price signals that were, at best, opaque, as demonstrated by the fact that fewer than 5 percent of customers with smart meters use them, 2) market access, and 3) utilities’ problems with engaging customers.

In each area, King proposed solutions. In the market solutions, he advocated for better price information, including time-varying rates, data access including billing and usage data, and utilities that did a better job with customer engagement. As far as technology solutions, which promised more precise grid control, King advocated greater use of smart devices and better market operations. As far as smart devices, he pointed to saving customers money and increasing their comfort, combined with autonomous rules consistent with security, and a standard protocol to facilitate effective cross-platform functionality.

Steve Hauser discussed a series of priorities for improving transmission: increasing asset utilization, improving efficiency opportunities and increasing reliability. Asset utilization is currently in the 50 to 55 percent range; there was broad agreement that it needed to get above 70 percent. Among efficiency priorities, Hauser identified the load side, utilities’ own operation efficiency and integrating clean technology, which includes wind, solar, EV and fuel cells. Finally, he made the point that reliability needs vary by customer.

Todd Ryan from Smart Wires discussed the difficulty of knowing how to plan, site and build transmission infrastructure given the unpredictability surrounding future generation retirements and new capacity additions, as well as the uncertainty in load growth as distributed technologies continue to proliferate. Even if one could plan, site and build major infrastructure, it would be difficult to have confidence that these investments will be necessary in 20 years. He stressed that flexible technologies can create feasible and prudent transmission investments despite this uncertainty. Examples of such technology include Smart Wires products that increase the utilization of the existing transmission network, such as the Guardian (which pushes power away from congested lines) and the Router (which pulls power onto underutilized lines). Ryan said that these products are rapidly deployable and redeployable, giving transmission operators flexibility, and can solve short- or long-term transmission needs, guaranteeing the asset is used and useful.

Overall, panelists agreed that the United States will need new transmission lines in some places, but specific needs for transmission are uncertain. In light of the considerable uncertainty, caution is appropriate in building assets that could become stranded. There was also broad agreement that the new policy regime should work to make price signals clearer. King explained that load shifting can mitigate the need for costly new assets. Oklahoma, for example, has load shifts of roughly 30 percent thanks to smart thermostats. Other speakers agreed that other technologies to help manage load would be incorporated to offset transmission.



Mark Lynch, President & CEO, NYSEG



From left: Michael Eckhart of Citi, Ed Krapels of Anbaric and Bill White of Americans for a Clean Energy Grid)

PANEL 4: MODERNIZING THE GRID TO CAPTURE BENEFIT AT EVERY SCALE

Ladeene Freimuth, President, Freimuth Group (moderator)

Travis Bradford, Professor, Columbia University; Rudy Wynter, President, FERC-Related Business, National Grid; Jigar Shah, CEO, Generate Capital, and contributor to the Energy Gang.

The panelists discussed the innovations in regulation, technology and finance that will be needed for New York to achieve its clean energy goals. They agreed that transmission for renewable energy infrastructure could become an obstacle to meeting renewable energy targets.

Travis Bradford started the panel with a story about railways. In 1945 the Supreme Court heard arguments from the California Railway Commission and Market Street Railway Company of San Francisco over the Railway Commission's refusal to increase Market Street's rate following the company's infrastructure investments. Ultimately, the court ruled that Market Street could not be compensated for its investment in economically unviable technology, despite previous approval for the capital investment by the local PUC. Bradford noted the potential relevance of the Market Street case today. Transmission is a key component of the grid, he said. Yet if transmission lines are installed and financed as 40-year lifetime assets but can only be used for 10 years, then investors could be left with stranded assets as in the Market Street case.

In the question-and-answer session, Bill White of Americans for a Clean Energy Grid was skeptical that high-voltage transmission lines posed a significant risk of becoming "stranded assets" like the railroads cited in the Market Street case. He stated that recent investments in high-voltage transmission to enable renewable energy had consistently outperformed expectations, typically achieving benefit-cost ratios to ratepayers of 3-to-1 or better, while simultaneously adding large amounts of renewable energy to the grid, improving reliability, and reducing grid congestion and losses. Further, he said, the success of initiatives like Texas CREZ, California

RETI, MISO MVP, and SPP Highway/Byway have led planners and regulators to initiate efforts to build more transmission.

Rudy Wynter said that current transmission capacity will need to be increased to meet renewable energy targets. He predicted that utilities will embrace new technology partners and explore new business models in the years ahead and highlighted the central role of customer choice as utilities evolve. Traditional energy regulation focuses on reliability of services to customers; this can reduce incentives for risk taking and innovation. Business model innovation will have to address generation, storage, and transmission, he said.

Jigar Shah began his remarks by highlighting achievements made in the renewable energy space. Solar is finally getting enough sales that it can help solve other energy system problems, such as the energy intensity of HVAC. Ninety percent of demand volatility in Austin, Texas, relates to HVAC, and this is an issue the solar industry can now begin to address. In addition, he said we are seeing innovation in the area of large-scale solar project financing. Large-scale retail consumers such as Kaiser Permanente have begun to sign PPAs under which they, as consumers of energy, assume a disproportionate amount of risk in financing arrangements.

Shah highlighted that transmission remains a big issue for renewable energy developers. Transmission, he said, is a political rather than a technological issue at this point. Incorporating stakeholders in the discussion of where transmission lines shall be sited may lessen the intensity of debates around transmission siting, but we cannot know this for sure. Ultimately, siting debates may revolve around only a handful of large property owners.

All panelists agreed that finding new ways to finance innovation, rethinking the traditional utility model and securing effective transmission capacity for renewable energy generation sites will be key to New York's new energy vision. As mentioned in previous panels, stakeholder engagement will play an important role in meeting renewable energy targets and increasing capacity at scale.

CLOSING COMMENTS

David Sandalow of Columbia closed by saying the message of the Summit could perhaps be summarized in seven words: “Yes, we need transmission investments—with caveats.” He noted that while speakers at the Summit highlighted the need for additional transmission investments, speakers also emphasized the role of distributed and demand-side solutions in minimizing the need for additional transmission, the potential for improving utilization of existing transmission assets, the risk that transmission investments could become stranded and the challenges of transmission siting.

Bill White of Americans for a Clean Energy Grid left us on a hopeful note, explaining that 20 years ago, when he was working on climate change for the Clinton administration, the solutions to the problem weren’t there yet, but they exist today. We must move quickly, and long-distance high-voltage transmission will be an important part of the package.

NOTES

- 1 US Department of Energy, “State of New York Energy Sector Profile,” 2015, http://www.energy.gov/sites/prod/files/2015/06/f22/NY_Energy%20Sector%20Risk%20Profile.pdf.
- 2 New York Independent System Operator, “Power Trends 2015,” 2015, http://www.nyiso.com/public/webdocs/media_room/press_releases/2015/Child_PowerTrends_2015/ptrends2015_FINAL.pdf.

SUMMARY BY:

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John Jimison, Director, Americans for a Clean Energy Grid



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