

**MINUTES OF THE
NEW YORK STATE ENERGY PLANNING BOARD MEETING
HELD ON JULY 9, 2012**

Pursuant to notice dated July 2, 2012, the seventh meeting of the New York State Energy Planning Board (“Board”) was convened on July 9, 2012 at 1:00 p.m. at the Albany office of the New York State Energy Research and Development Authority, 17 Columbia Circle, Albany, New York. A copy of the meeting Notice is annexed as Exhibit A.

The following Energy Planning Board Members or their designees were present:

- Francis J. Murray, Jr., President and CEO of the New York State Energy Research and Development Authority and chair of the Board
- Garry Brown, Chairman of the NYS Public Service Commission
- Thomas Coakley
- Stephen Whitley, President and CEO of the New York Independent System Operator
- Kenneth Adams, Chairman and CEO of Empire State Development (Jen McCormick, designee)
- Darrel Aubertine, Commissioner of the NYS Department of Agriculture & Markets (Phil Giltner, designee)
- Assemblyman Kevin Cahill (Conor Bambrick, designee)
- Jerome Hauer, Commissioner of the Division of Homeland Security and Emergency Services (Terry Hastings, designee)
- Joe Martens, Commissioner of the NYS Department of Environmental Conservation (Jared Snyder, designee)
- Joan McDonald, Commissioner of the NYS Department of Transportation (Robert Zerrillo, designee)
- Cesar Perales, Secretary of State (George Stafford, designee)
- Dr. Nirav Shah, Commissioner of the NYS Department of Health (Kevin Gleason, designee)
- James Winebrake (Mark Colman, designee)

Also present were Janet Joseph, NYSERDA's Vice President for Technology and Strategic Planning; John Williams, Director of NYSERDA's Energy Analysis program and director of the Board's Working Group; Hal Brodie, NYSERDA General Counsel and Counsel to the Board; David Munro, NYSERDA Deputy Counsel and Secretary to the Board; and staff from various entities on the Board as well as members of the public.

Mr. Murray stated that the meeting is being videotaped and that the video would be placed on the Energy Planning Board website within the next few days. He added that although the Board meeting is open to the public, the Board will not be accepting comments from members of the public during the meeting.

Minutes from June 2012 Meeting

Mr. Murray stated that a copy of the draft Minutes of the June 4, 2012 meeting was provided to Board members on July 2, 2012. Whereafter, upon motion duly made and seconded, and by unanimous voice vote, the Minutes of the June 4, 2012 meeting were approved.

Mr. Murray stated that presentations by agency staff would address the following: (1) Energy Highway initiatives, (2) energy security issues, and (3) preliminary results from an energy efficiency and renewable energy potential study. The Board would then discuss the process leading to approval by the Board and public release of the draft State Energy Plan.

Mr. Murray stated that a copy of each of the presentations was placed in Board members' packets, and the presentations will also be posted on the State Energy Plan website, at

<http://www.nysenergyplan.com/boardmeetings.html>

These Minutes provide a high-level summary of each of the presentations.

Energy Highway

Mr. Murray stated that the first agenda item would be a presentation on the work of the Energy Highway Task Force. He stated that this is a very important and high profile initiative of Governor Cuomo. Mr. Murray introduced Jill Anderson, Director of Energy Policy and Chief of Staff at the New York Power Authority. Ms. Anderson stated that the Task Force is comprised of the following individuals:

- Gil C. Quiniones (*Co-Chair*), President & Chief Executive Officer of the New York Power Authority
- Joseph Martens (*Co-Chair*), Commissioner of the New York State Department of Environmental Conservation
- Kenneth Adams President, Chief Executive Officer & Commissioner of Empire State Development
- Garry A. Brown, Chairman of the New York State Public Service Commission
- Francis J. Murray, Jr., President & Chief Executive Officer of the New York State Energy Research and Development Authority

Ms. Anderson said that in addition to the Task Force members, each agency has dedicated technical, legal, and communications staff as well as outside consultants to work on subgroups for the Energy Highway initiative.

Ms. Anderson explained that the Energy Highway focuses on the supply side of generation and transmission. Demand side is an important aspect of the State's energy policy, but it is being addressed through other areas and programs. Ms. Anderson explained that the Energy Highway addresses these issues:

- An aging generation and transmission infrastructure
- Opportunities for economic development and job creation in replacing aging infrastructure
- Congestion on the transmission system
- Preparing for compliance with upcoming environmental regulations at both the federal and State level, especially with regard to impacts on energy generation
- Application of new technologies as the next generation of the grid evolves

Ms. Anderson presented slides depicting New York's aging transmission system and aging generating facilities. Ms. Anderson stated that 25% of the State's transmission lines over 115KV will need to be replaced in the next ten years, and 40% of New York's generation plants are over forty years old. These needs led to establishment by Governor Cuomo of the Energy Highway Task Force. Ms. Anderson listed the Task Force objectives, as follows:

- Reduce constraints on the flow of electricity within New York State
- Promote economic development, job creation, and investment in New York State
- Expand diversity of downstate power generation
- Enhance reliability of the electric system
- Encourage development of renewable generation
- Increase efficiency of power generation

Ms. Anderson then presented a slide reflecting Task Force activities to date:

- April 4, 2012 Summit at Columbia University attended by over 400 people, including speakers from environmental groups, academia, industry organizations, technology groups, consultants, and utilities
- April 11, 2012 Request for Information (RFI) issued
- April 19, 2012 Conference of Interested Parties in Tarrytown attended by over 250 people
- May 30, 2012 Responses to the RFI due
- June 29, 2012 Summary of responses posted to website

Ms. Anderson then summarized the RFI Responses:

- 85 Respondents identifying over 130 proposals were submitted, representing over 25,000 megawatts (MW) of new generation or transmission capacity

- Generation proposals included existing power plants, repowering existing upstate and downstate power plants, and renewable energy sources located both upstate and offshore
- Transmission proposals included upgrading existing Alternating Current (AC) and building new Direct Current (DC) , either from Canada or within New York State
- Other ideas included fuel cells, gas pipelines, and energy storage

Ms. Anderson presented two slides depicting the locations within New York where proposed transmission and generation projects would be located. By clicking on a location on the map, members of the public can access the text of the proposal. Ms. Anderson then discussed the timeline for upcoming Task Force activities, as follows:

- July 31, 2012- Public Comment period closes
- Now through Fall- detailed review of responses continues
- Fall 2012- Action Plan issued by the Task Force

Ms. Anderson stated that the Action Plan will be informed by the responses to the RFI and comments received from the public and stakeholders. The Action Plan will include specific recommendations including assignments and timelines for follow-up to ensure the plan can be executed. It is envisioned that the Plan will help create the environment that will be needed to spur private-sector actions. Ms. Anderson closed with a quote from Governor Cuomo in his 2012 State of the State address: “Key to powering our economic growth is expanding our energy infrastructure.”

Mr. Murray stated that the next two presentations would be by staff from the Division of Homeland Security and Emergency Services. The first speaker was Terry Hastings, Deputy Director of Planning & Preparedness, within the Division of Homeland Security and Emergency Services’ Office of Emergency Management. Mr. Murray stated that as the Board learned at its last meeting, storms and storm severity pose the greatest risk to much of the State’s electric system reliability. Mr. Murray said that Mr. Hastings would discuss the State’s response to Hurricane Irene and Tropical Storm Lee last Fall, which may help demonstrate how essential emergency response is becoming to our overall system and policy planning.

Hurricane Irene/Tropical Storm Lee Overview

Mr. Hastings first presented a slide depicting a timeline of major events regarding Hurricane Irene and Tropical Storm Lee. Key events included the following:

- 8/24/11 State Office of Emergency Management (OEM) activated the Emergency Operations Center (EOC)
- 8/26 Federal Emergency Management Agency (FEMA) emergency declaration for Irene
- 8/28 Irene made landfall
- 9/2 first Disaster Recovery Center opened
- 9/7 Lee began impacting New York State
- 9/8 FEMA emergency declaration for Lee
- 9/23 State EOC returned to normal operations
- 11/18 last Disaster Recovery Center closed

Mr. Hastings said that given the magnitude of the two storms, the State will be dealing with recovery issues for years to come.

Mr. Hastings showed several more slides regarding the impacts of Irene/Lee:

- 38 of New York's 62 counties were impacted by Irene or Lee
- Irene/Lee is New York's second most costly disaster to date- the 9/11 terrorist attacks cost FEMA \$4.5 billion in public infrastructure repairs; Irene/Lee cost an estimated \$1.5 billion; and the third most costly event was storms and flooding in June 2006, amounting to about \$277 million
- over 300 staff from 40 State agencies were engaged in response efforts
- 18,518 individuals were provided shelter in 198 emergency shelters
- the two storms accounted for 9 fatalities
- 45 Swift Water Rescue Teams assisted with evacuations
- 951 survivors were rescued through Urban Search and Rescue and Air Ops Evacuations
- Approximately 10,000 patients from 11 hospitals, 26 long-term care facilities, and 25 adult care facilities were successfully evacuated and repatriated
- Irene/Lee had 74 opened Disaster Recovery Centers; the previous record in NYS was 17 (by comparison, Hurricane Katrina had 56)
- the vast majority of 19,000 separate infrastructure projects involved repairs to roads and bridges
- 17 States supported New York through the Emergency Management Assistance Compact (EMAC) program

Mr. Hastings advised that the two storms had a massive impact on the energy and telecommunications systems: there were nearly 1,100,000 power outages at the peak; 390,000 evacuation orders were issued; there were more than 260 major road closures; and there were more than 900,000 telecommunications outages. Mr. Hastings stated that the investor-owned utilities had to deal with all these issues at once- i.e., power outages at a time when communications systems were down and many roads were impassable. Utility health and safety concerns included: responding to safety concerns, including live downed wires; restoration of key facilities, such as hospitals (10 were without power) or police stations; and feeders with critical customers or high-priority customers. Repairs to the electric system included the following:

- Transmission/sub-transmission facilities, including substations
- Distribution substations
- Three-phase primary (main feeder from substation)
- Single-phase side taps (one phase)
- Secondary services and individual distribution transformers supplying small groups of customers

Finally, Mr. Hastings discussed "lessons learned" by the Office of Emergency Management. These included:

- Go bigger faster
 - EMAC assistance from other states was invaluable
 - Updating EOC activation timeline
- Recognition of the need for more capacity
 - Staff and resources
 - New OEM regional construct, Incident Management Teams, stockpile equipment
- Need better situational awareness
 - “Warning Point” to Watch Center
 - Rapid Regional Response Teams

Mr. Hastings concluded by stating that due to retirements and reorganizations, OEM has experienced a 43% reduction in staff over the last 5 years and went into Irene/Lee with some of the lowest staffing levels in recent history. Fortunately, the agency is now expanding its staff.

Garry Brown stated that the Public Service Commission (PSC) devoted its June 28, 2012 session to a review of the utilities’ response to Irene and Lee. While the response was generally adequate, the PSC identified the need to improve communications when power outages occurred - utilities need to rely more on PDAs (smart phones, iPads, etc.) and other methods (Facebook, Twitter) to convey information to customers. Mr. Brown said he assumed communication issues will be addressed in the Energy Plan. Conor Bambrick asked whether thought had been given to a more centralized mutual aid response. Mr. Hastings responded that recent legislation has established an intrastate mutual compact to better facilitate the movement of resources across the State. He stated that coordination of fire department responses is adequate, but delivery of other, non-fire resources (e.g., water, volunteer response teams) can be improved. Mr. Brown pointed out that because Irene and Lee impacted the entire Eastern United States, New York utilities were not assisted by utilities in neighboring states, as is generally the case with more localized storms. He also said individual New York utilities were reluctant to assist other areas in the state until they had a better sense of the extent of damage in their respective service areas. Mr. Brown stated that the PSC has recommended faster deployment of response resources once it is determined where such resources are most needed.

Cyber Security and Energy Infrastructure Issues

Mr. Murray stated that the next presenter was Karen Sorady, Assistant Deputy Director for Cyber Programs within the Division of Homeland Security and Emergency Services, who discussed Cyber Security and New York’s Energy Infrastructure. Ms. Sorady first presented an overview of the responsibilities of the Office of Cyber Security (OCS). It was established as the Office of Cyber Security and Critical Infrastructure Coordination in September 2002. OCS is responsible for leading the State’s efforts regarding cyber security readiness and critical infrastructure coordination, and it operates on the principles of collaboration and cooperation. Ms. Sorady stressed that cyber issues have no boundaries, and that while OCS is primarily focused on assisting local and state governments, it sometimes works with non-profits and the private sector as well.

Ms. Sorady stated that while critical infrastructure systems are unique, they all rely on industrial control systems to monitor and regulate activities. These systems were designed for

reliability, and it was never intended that they be connected to the internet, or to other business or financial systems. According to the federal Department of Homeland Security (DHS) Control Systems Security Program, cyber incidents reported by the owners and operators of critical infrastructure were up over 200% from FY 2010. She cited these examples:

- “Cyber search engine Shodan exposes industrial control systems to new risks” (Washington Post, June 3, 2012). This story demonstrated that uncounted numbers of industrial control computers, the systems that automate water plants and power grids, were linked in, and in some cases they were wide open to exploitation by even moderately talented hackers.
- Andrew James Miller was arrested for trying to sell access to two National Energy Research Scientific Computing Center supercomputers for \$50,000. (U.S. Department of Justice press release, June 14, 2012). These were two of the most sophisticated supercomputers in the world. According to the indictment, between 2008 and 2011, Miller and others allegedly remotely hacked into computer networks belonging to the University of Massachusetts, the U.S. Department of Energy, and other institutions and companies. The indictment alleged that when Miller hacked into the computers, he obtained other users’ access credentials to the compromised computers. He then allegedly sold access to these computer networks as well as other access credentials.

Ms. Sorady also stated that according to a 2012 report by the Carnegie Mellon University CyLab 2012 Report, “[B]oards and senior management still are not exercising appropriate governance over the privacy and security of their digital assets.” Of the 108 survey respondents, 75% were critical infrastructure companies, and 13% were from the energy sector. Ms. Sorady stated that threats and attacks have moved from the theoretical and alleged to the actual, and gave several examples:

- 2003 Northeast Black Out - the U.S.-Canada Power System Outage Task Force “...provided sufficient certainty to exclude the probability that a malicious cyber event directly caused or significantly contributed to the power outage events.” However, (1) indications of procedural and technical IT management vulnerabilities were observed in some facilities, and (2) a failure in a software program not linked to malicious activity may have significantly contributed to the power outage.
- Brazilian Black Outs - there were allegations that black outs in 2005, 2007, and 2009 were the result of cyber intrusions. Notwithstanding speculation by security “experts” and reporting on “60 Minutes,” there was no evidence that the disruptions of service were caused by hackers.
- Stuxnet is a Windows-specific computer worm first discovered in June 2010 that spies on and reprograms industrial systems. It was specifically written to attack systems used to control and monitor industrial processes used in power plants, oil and gas refineries, factories and the like. The worm can be used for both espionage and sabotage. Given its complexity, there has been speculation that one or more nation-states created Stuxnet (a June 2012 New York Times article reported that the United States and Israel may have

developed Stuxnet to attack computer systems that run Iran's main nuclear enrichment facilities).

Ms. Sorady also discussed an FBI investigation in 2006 that disclosed a compromised computer within a local government, apparently to covertly use the computer as a distribution system for e-mails or pirated software. The hacker operating on the Internet tapped into an employee's laptop and then used an employee's remote access as the point of entry and installed a virus and spyware on the network. The administrative network also supported water treatment operations. Potential hackers could have changed critical systems, chemical levels, and operating parameters.

Ms. Sorady stated that while there is a growing awareness of threats to critical Infrastructure, responses remain uncertain. For example, McAfee/Center for Strategic and International Studies issued a report entitled "In the Dark: Crucial Industries Confront Cyberattacks" that surveyed 200 executives of critical electricity infrastructure facilities and reported these results:

- 85% had experienced network infiltrations
- 25% reported daily or weekly "denial-of- service" attacks (flooding a network in order to make a machine or network resource unavailable to its intended users)
- Nearly two-thirds reported they frequently (at least monthly) found malware designed for sabotage on their systems

Similarly, Q1 Labs/Ponemon Institute issued a report entitled "The State of IT Security: A Study of Utilities and Energy Companies," in which 291 IT and IT security practitioners in utilities and energy companies participated. Findings were as follows:

- 71% responded that the management team in their organizations does not understand or appreciate the value of IT security
- 41% indicated that their security operations are not proactive in managing risks associated with supervisory control and data acquisition (SCADA) networks and critical infrastructure

Ms. Sorady stated that Sanaz Browarny, Chief of Intelligence and Analysis within the Control Systems Security Program of the U.S. Department of Homeland Security, stated in April 2012 that with regard to critical infrastructure, "On a daily basis, the U.S. is being targeted." Ms. Sorady also reported results of a 2011 Industrial Control Systems Cyber Emergency Response Team (ICS-CERT, which is located within DHS) of a 2011 "fly-away" network and forensics investigation:

- 7 of 17 "fly-away trips" originated as spear-phishing attacks via e-mail against utility personnel
- 11 of the 17 incidents were very "sophisticated," signaling a well-organized "threat actor," perhaps a nation state
- In 12 of 17 cases, the most basic type of network security for corporate and industrial control systems would likely have detected or fended off the attack

Ms. Sorady next discussed threats posed by Hacktivists. “Hactivism” is generally defined as the use of computers and computer networks as a means of protest to promote political ends. She referenced an Al-Qaeda video shown to a number of United States Senators that identifies "Internet Piracy" attacks on cyber infrastructure as important parts of jihad. She also discussed (1) traditional “phishing,” defined as attempting to acquire information (and sometimes, indirectly, money) such as usernames, passwords, and credit card details by masquerading as a trustworthy entity in an electronic communication, and (2) “spear phishing,” a type of phishing that focuses on a single user or department within an organization, addressed from someone within the company in a position of trust and requesting information such as login IDs and passwords. Ms. Sorady gave several real world examples of each type of phishing, and noted that spear phishing often focuses on government facilities and contractors. For example, in attacks that became public on December 7, 2011, attackers created sophisticated, custom attacks on defense contractors and other organizations, with special e-mails and attachments targeting specific individuals within those organizations.

Ms. Sorady also described attacks on industrial control systems, giving this example. ICS-CERT deployed an incident response team to a bulk electric power organization that had been the victim of a broader spear-phishing campaign against the nuclear/energy sectors.

- The point of entry appeared to have been an employee opening a PDF attachment of a spoofed industry-specific newsletter, which contained malware
- Command and control (i.e., an outside actor) was positively identified as part of this analysis
- ICS-CERT provided indicators and mitigation strategies to this organization to detect further infections on their network and take appropriate defensive measures to combat the threat
- The recommendations given to this organization also included security recommended practices and mitigation techniques specific to the threat actors

Ms. Sorady suggested that effective responses to these threats will include adding layers of security that focus on: (1) people - via more education and training; (2) enhanced technology defenses; and (3) heightened operations such as appropriate policies and procedures in place. She stated that in February 2012, several state agencies (OCS, Taxation and Finance, Office of Temporary and Disability Assistance, Office of Children and Family Services, and the Office for Technology) participated in the DHS National Cyber Security Division’s national cyber exercise called Cyber Storm IV. Cyber Storm IV tested communications and incident response plans within New York in the event of a coordinated cyber attack against elements of the state government. The exercise featured an ongoing series of cyber events, some of which resulted in physical consequences. Similarly, a National Level Exercise (NLE) 2012 coordinated by FEMA examined the nation’s ability to coordinate and implement prevention, preparedness, response, and recovery plans and capabilities pertaining to a significant cyber event or a series of related cyber events. NLE 2012 encompassed four exercises over a three month period. OCS, in conjunction with the Office of Emergency Management and the Office of Counter Terrorism, participated in NLE 2012 to test plans and capabilities pertaining to a cyber event with physical consequences.

Finally, with regard to critical infrastructure and emergency preparedness, Ms. Sorady stated that OCS supports OCT in the preparation of the statutorily required reviews of critical infrastructure, including this year's review of energy generating and transmission facilities. Additionally, OCS is conducting a survey of State agencies to identify industrial control systems maintained by those agencies. Ms. Sorady emphasized that OCS works to share actionable information with stakeholders and make them aware of federal and state government resources that are available to assist with their cyber security efforts.

Garry Brown stated that in implementing smart grid systems, in which much more "real time" data is involved, State agencies will need to ensure that privacy data such as social security information is protected. He noted that federal agencies are currently developing standards to address this.

New York State Energy Efficiency and Renewable Energy Potential Study

Mr. Murray stated that the next presentation would be by NYSERDA program manager Karl Michael, who would present the preliminary results from an energy efficiency and renewable energy potential study. Mr. Michael explained the objective of the study is to develop a quantitative assessment of the long-term technical, economic, and achievable potentials for:

- End-use energy efficiency improvements and conservation opportunities applicable to electricity, petroleum, and natural gas use in the residential, commercial, industrial, and government sectors; and
- Renewable energy, including grid-level electricity generation and customer-sited production of electricity and thermal energy.

Mr. Michael presented preliminary results from the study, which is ongoing. He identified the overall efficiency economic potential for the residential, commercial, and industrial sectors by the major energy fuel types: electricity, natural gas, and petroleum products. Renewable energy technical potential was identified for the following resources: hydropower, wind power, solar power, and bioenergy. Key findings regarding energy efficiency are as follows:

- Significant efficiency potential exists across all sectors and fuel types
- Electric efficiency shows the greatest potential to reduce primary energy use
- Across all fuel types, the commercial sector holds the largest efficiency potential

Similarly, with regard to renewable energy, (1) substantial potential exists for increases in hydropower, bioenergy, wind power, and solar energy, and (2) wind and solar provide the greatest potential for growth.

Mr. Michael emphasized that further research is needed to refine and build from the preliminary analysis. In response to a question from Mr. Murray, Mr. Michael stated that there can be a significant difference between "economic" and "achievable" potential, based on social, technical, and economic factors. Mr. Michael stated that achievable potential is typically about 50% of economic potential.

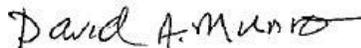
Schedule for Issuing Draft State Energy Plan

Mr. Murray reminded the Board that the Energy Law directs the Board to publish a draft Energy Plan by September 1st – less than eight weeks away. He introduced John Williams, Chair of the Working Group, who discussed the Board's upcoming review and approval of the Draft Plan, as well as release of the Plan for public comment. Mr. Williams provided updates on various components of the draft Plan, as follows:

- While the energy efficiency and renewable energy potential study will not be final for some time, many of the key results from the study will be incorporated into the draft Plan;
- Modeling of the electric system will be completed, and about ten different policy scenarios will be presented to the Board next month;
- The Working Group is finalizing 16 separate technical reports that will accompany the draft Plan;
- The Board will act upon the final electric transmission and distribution reliability study at its August 6, 2012 meeting, and the Board will submit a report on the study's findings and any legislative recommendations to the Governor and legislative leaders by September 1, 2012, as required by the enabling legislation;
- Volume 1 of the draft Plan, which will set forth policy strategies and recommendations, will be acted on by the Board at its August 23, 2012 meeting;
- After the draft Plan is issued, the Board will hold ten hearings across the State, ideally within each of the ten Regional Economic Development Council areas;
- The Board will also accept written comments on the draft Plan.

Mr. Murray encouraged Board members, particularly designees, to ensure that their principals (agency commissioners, etc.) are given ample time to weigh in on the various technical reports and other documents.

The final agenda item was other business; there being none, the meeting was adjourned at about 2:35 pm.



David A. Munro, Secretary to the Board
Deputy Counsel, NYSERDA