FOR CONSIDERATION

November 18, 2020

TO:	The Board of Trustees
FROM:	Thomas Falcone
REQUEST:	Consideration of the Adoption of Recommendations from the Isaias Task Force Reports and the Storm Scorecard Evaluation

Requested Action

The Board of Trustees (the "Board") of the Long Island Power Authority ("LIPA") is requested to approve a resolution adopting (i) the recommendations from the 30-Day Report and the 90-Day Report (collectively, the "Reports") of LIPA's Isaias Task Force (the "Task Force"); and (ii) the Storm Scorecard Evaluation, which resolution is attached hereto as <u>Exhibit "A"</u>.

Background

On Tuesday, August 4, 2020, Tropical Storm Isaias landed on Long Island with rain and wind gusts of up to 70 miles per hour. The resulting damage to the electrical system caused approximately 646,000 customer outages.

On August 5, LIPA's Chief Executive Officer initiated an independent review of the circumstances and root causes that led to well-documented lapses in PSEG Long Island's storm response. The Task Force was charged with providing actionable recommendations and overseeing PSEG Long Island's remediation activities. LIPA committed to reporting the Task Force's findings and recommendations to the LIPA Board of Trustees and the public in a 30-Day Preliminary Report, 90-Day Interim Report, and 180-Day Final Report.

The Task Force presented the 30-Day Report to LIPA's Board of Trustees at the September 23, 2020 Board Meeting and released it to the public. Because of the urgency of the immediate threat of another major storm, the 30-Day Report focused on the failures of PSEG Long Island's information technology and communication systems and their proximate causes. The 90-Day Report expands on those findings and addresses broader questions on the effectiveness of PSEG Long Island's Long Island's management of utility operations.

Additionally, Section 8.4(C) of the Amended and Restated Operations Services Agreement ("OSA") between LIPA and PSEG Long Island establishes the criteria for metrics failure, including failure of the Major Storm Performance Metric. The OSA provides LIPA with the right to terminate its contract with PSEG Long Island without penalty "if …the Service Provider, in the then-current Contract Year and any one of the preceding two (2) Contract Years, fails to achieve at least 410 points out of a maximum of 1,000 points as calculated pursuant to the modified version [of the Storm Scorecard], as agreed upon by LIPA and the Service Provider in the letter agreement dated as of the date of the Agreement. ..." LIPA also retains other contract termination rights.

The Storm Scorecard is based on a 1,000-point maximum score, spread across the dimensions of Preparation (100 possible points), Operational Response (600 possible points), and Communications (300 possible points). Consistent with the Public Service Commission Order in Case 13-E-0140, within each dimension, the component measures are each scored on a satisfactory/unsatisfactory basis, as measured against the established criteria within the context of the approved Emergency Restoration Plan ("ERP").

Recommendations from the 30-Day and 90-Day Reports

As set forth in Appendix 2 and Appendix 3 of the 90-Day Report, the Task Force has provided nearly 100 recommendations for the Board's consideration (the "Task Force Recommendations"). The Task Force Recommendations are designed to, among other things, (i) Change Management Incentives and Accountabilities; (ii) Reform Information Technology and Emergency Management; and (iii) Strengthen LIPA's Oversight. The Task Force Recommendations are tiered based upon priority. The tiered system allows LIPA and PSEG Long Island to either implement or present implementation plans for the most critical recommendations on an accelerated basis.

Storm Scorecard Failure

LIPA's evaluation of the Storm Scorecard for Tropical Storm Isaias, included as Appendix 4 of the 90-Day Report, demonstrated the failure of PSEG Long Island to achieve a minimum score of 410 out of 1,000 points on the Storm Scorecard. PSEG Long Island's response to Tropical Storm Isaias earned 260 out of a possible 1,000 points.

DPS Investigation and Recommendation

On August 5, Governor Andrew M. Cuomo directed the Department of Public Service ("DPS") to conduct an investigation into utility performance, including the performance of PSEG Long Island.

On August 18, DPS issued a Notice of Apparent Violations and Direction of Prompt Remedial Action letter to PSEG Long Island for its apparent failures to properly anticipate and/or respond to the weather emergency in accordance with its approved ERP.

On November 13, DPS provided a recommendation (the "DPS Recommendation") to the LIPA Board as a result of its ongoing investigation of PSEG Long Island's storm response (see Exhibit C). DPS Staff has identified more than 70 potential violations of PSEG Long Island's ERP. The DPS recommends, among other things, that LIPA:

- evaluate options to terminate PSEG Long Island as LIPA's Service Provider;
- declare PSEG Long Island's poor performance during Isaias as a first failure of the Major Storm Performance Metric as defined in the OSA; and
- seek to either terminate or renegotiate the OSA to enable greater oversight by LIPA and DPS.

Implementation Plans, Contingency Plans, and Status Reports

The 90-Day Report and the DPS Recommendation both recommend either termination or renegotiation of the OSA. If LIPA and PSEG Long Island cannot reach an agreement on acceptable contractual and management reforms, or if there is a lack of progress to implement the Task Force Recommendations, the Task Force recommends that the Board of Trustees consider the exercise of its rights to terminate the OSA contract with PSEG Long Island before 2025.

The Board of Trustees has requested regular reporting on the status of each Task Force Recommendation, as well as actions taken by staff in response to the DPS Recommendation. LIPA's Isaias Task Force, in coordination with PSEG Long Island, will submit an Implementation Plan for each Task Force Recommendation to the Board of Trustees. The Implementation Plan for those recommendations designated as Tier 1 shall be completed by the Board's December meeting, currently scheduled for December 16, 2020. The Implementation Plan for those recommendations designated as Tier 2 shall be completed for the Board's January 2021 meeting. The Implementation Plan for those recommendations designated as Tier 3 shall be completed simultaneous with the Task Force's completion of the 180-Day Report. Thereafter, the Task Force shall submit a Status Report to the Board no less than quarterly that summarizes the status of the Implementation Plans for each Task Force Recommendation, including:

- a summary of activities completed to date,
- any revisions to completion targets contained within an Implementation Plan for a Recommendation, and
- the Task Force's opinion of the effectiveness of the Implementation Plan in addressing each Task Force Recommendation.

Furthermore, the Board has requested that the Chief Executive Officer conduct contingency planning for the termination of the OSA and report to the Board on the results.

Recommendation

The issues identified by the Task Force's investigation, as well as the DPS' separate investigation, need to be fixed with urgency. Furthermore, the Board retains its contractual, legal, and equitable claims against PSEG Long Island for its unsatisfactory performance before, during, and after Tropical Storm Isaias. Based upon the foregoing, I recommend approval of the above requested action by adoption of a resolution in the form attached hereto.

Attachments

Exhibit "A"	Resolution
Exhibit "B"	90-Day Report
Exhibit "C"	DPS Recommendation

<u>Exhibit "A"</u> RESOLUTION ADOPTING THE RECOMMENDATIONS FROM LIPA'S ISAIAS TASK FORCE AND STORM SCORECARD EVALUATION

WHEREAS, on Tuesday, August 4, 2020, Tropical Storm Isaias landed on Long Island with rain and wind gusts of up to 70 miles per hour, resulting in damage to the electrical system and causing approximately 646,000 customer outages; and

WHEREAS, pursuant to Section 1020-f(y) of the Public Authorities Law, General Powers of the Authority, LIPA, in part, may "make any inquiry, investigation, survey or study which the authority may deem necessary to enable it effectively to carry out the provisions of this title. . ."; and

WHEREAS, pursuant to Section 4.4(16), Rights and Responsibilities of LIPA, of the Amended and Restated Operations Services Agreement ("OSA"), LIPA, in part, has the right to "make recommendations to the Service Provider, in each case as may be reasonably necessary or appropriate to perform LIPA's oversight responsibilities and obligations with respect to the provision of Operations Services under this Agreement and as may otherwise be necessary or appropriate to comply with LIPA's legal, contractual and fiduciary obligations..."; and

WHEREAS, pursuant to the OSA, the "Service Provider will be deemed to have failed the Major Storm Performance Metric under Section 8.4(C) of the Agreement if, commencing in the third Contract Year of the Term, the Service Provider, in the then-current Contract Year and any one of the preceding two (2) Contract Years, fails to achieve at least 410 points out of a maximum of 1000 points as calculated pursuant to the modified version, as agreed upon by LIPA and the Service Provider in the letter agreement dated as of the date of the Agreement. . ."; and

WHEREAS, on August 5, LIPA's Chief Executive Officer initiated an independent review of the circumstances and root causes that led to the lapses in PSEG Long Island's Tropical Storm Isaias storm restoration; and

WHEREAS, LIPA's Chief Executive Officer appointed an Isaias Task Force that was charged with both providing actionable recommendations and overseeing PSEG Long Island's remediation activities; and

WHEREAS, LIPA committed to reporting the Isaias Task Force's findings, observations, and recommendations to the LIPA Board of Trustees and public in a 30-Day Report, 90-Day Report, and 180-Day Final Report; and

WHEREAS, the Task Force presented the 30-Day Report to LIPA's Board of Trustees at the September 23, 2020 Board Meeting and released it to the public; and

WHEREAS, the 30-Day Report identified PSEG Long Island's most consequential failures during Isaias, provided preliminary results of the Task Force's investigation of the root causes, and recommended corrective actions; and

WHEREAS, the LIPA Board of Trustees has received the 90-Day Report from the Task Force, which provides recommendations to, among other things, (i) Change Management Incentives and Accountabilities; (ii) Reform Information Technology and Emergency Management; and (iii) Strengthen LIPA's Oversight (together with the 30-Day Report recommendations, the "Task Force Recommendations"); and

WHEREAS, LIPA's evaluation of the Storm Scorecard showed that PSEG Long Island failed to meet the minimum threshold of 410 points as set forth in the OSA;

WHEREAS, on August 5, the Department of Public Service initiated an investigation into utility performance, including the performance of PSEG Long Island;

WHEREAS, on November 13, the Department of Public Service provided a recommendation to the LIPA Board of Trustees (the "DPS Recommendation") regarding the poor performance of PSEG Long Island during Tropical Storm Isaias; and

WHEREAS, the Board has reviewed and concurs with the Task Force Recommendations and the DPS Recommendation; and

WHEREAS, the Task Force Recommendations include that if LIPA and PSEG Long Island renegotiate and cannot reach an agreement on acceptable reforms, or should there be a lack of progress to implement the Isaias Task Force Recommendations, the Board of Trustees consider the exercise of its rights to terminate the OSA with PSEG Long Island before 2025 due to the urgent issues identified by the Task Force's investigation;

WHEREAS, the Board has asked the Isaias Task Force, in coordination with PSEG Long Island, to submit an Implementation Plan to the Board of Trustees for each Task Force Recommendation;

WHEREAS, the Board has asked the Isaias Task Force, to submit a Status Report to the Board no less than quarterly summarizing the status of the Implementation Plans for each Task Force Recommendation; and

NOW, THEREFORE, BE IT RESOLVED, the Board hereby adopts the Task Force Recommendations; and

BE IT FURTHER RESOLVED, that the Board hereby directs the Isaias Task Force, together with PSEG Long Island, to implement the Task Force Recommendations, including the creation of Implementation Plans to be completed within the tiered structure as set forth in Appendix 2 and Appendix 3 of the 90-Day Report; and to report to the Board at least quarterly until such Task Force Recommendations are fully implemented; and

BE IT FURTHER RESOLVED, that the Board hereby directs the Isaias Task Force to opine on the effectiveness of each Implementation Plan in addressing each Task Force Recommendation; and

BE IT FURTHER RESOLVED, that the Board hereby adopts the Storm Scorecard demonstrating PSEG Long Island's failure to meet the minimum threshold of 410 points as set forth in the OSA; and

BE IT FURTHER RESOLVED, that the Board hereby directs the Chief Executive Officer to conduct contingency planning for the termination of the OSA and report to the Board on the results; and

BE IT FURTHER RESOLVED, that the Board directs LIPA's Chief Executive Officer to report on action taken in response to the DPS Recommendation; and

BE IT FURTHER RESOLVED, that PSEG Long Island's performance is wholly unsatisfactory and the Board directs that all of LIPA's potential contractual, legal, and equitable claims be investigated and pursued.

Dated: November 18, 2020

Exhibit "B"



For the Long Island Power Authority Board of Trustees Submitted by the Isaias Task Force

TROPICAL STORM ISAIAS 90-DAY REPORT

November 18, 2020

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GLOSSARY OF ACRONYMS

Acronym	Description
AMI	Advanced Metering Infrastructure
BCP	Business Continuity Planning or Plan
CATRR	Causal Analysis Team Review Report (draft)
CAD	Computer Aided Dispatch
CIO	Chief Information Officer
CISO	Chief Information Security Officer
CMS	Crisis Management System
CMT	Crisis Management Team
COO	Chief Operating Officer
CSS	Customer Safeguard Solutions
DPS	New York State Department of Public Service
EOC	Emergency Operations Center
ERP	Emergency Restoration Plan
ESB	Enterprise Service Bus
ETR	Estimated Time of Restoration
FEMA	Federal Emergency Management Agency
FTE	Full-time Equivalent
HVCA	High Volume Call Answering (system)
ICS	Incident Command Structure
IT	Information Technology
ITF	Isaias Task Force
IVR	Interactive Voice Response (system)
LIPA	Long Island Power Authority
LSE	Life Support Equipment
MDMS	Meter Data Management System
MSTC	Make Safe to Clear (protocols)
NAMAG	North Atlantic Mutual Assistance Group
NIMS	National Incident Management System
NOC	Network Operating Center
OEM	Office of Emergency Management
OMS	Outage Management System
OSA	Amended and Restated Operating Services Agreement
RCA	Remote Command Authority
RDA	Remote Dispatch Authority
SCADA	Supervisory Control and Data Acquisition
T&D	Transmission and Distribution

NOTE FROM THE CEO

Dear Customers and Stakeholders,

This 90-Day Report is the second of three reports to be issued by LIPA's Tropical Storm Isaias Task Force.

While the Task Force reports describe the causes of PSEG Long Island's inadequate response, I would like to provide my assessment of the reports' most critical conclusion – that **PSEG Long Island could have anticipated and prevented most of the challenges it experienced during the storm**.

PSEG Long Island's shortcomings have one root cause—mismanagement. Addressing PSEG Long Island's failures during Isaias requires changing the way LIPA's assets are managed, including the incentives, accountabilities, and organizational structure, as I describe here.

Balanced Scorecard Blinders

LIPA and PSEG Long Island have together achieved many accomplishments since the LIPA Reform Act of **2013.** To name a few, we have:

- Increased customer satisfaction by 42 percent;
- Improved system-wide reliability by 35 percent;
- Hardened over 1,000 miles of Long Island's electric grid;
- Procured over 1,000 megawatts of clean energy; and
- Achieved four upgrades of LIPA's credit ratings.

Many people have asked me how an organization that accomplished these things could also have had such challenges during Isaias. In any organization, there are areas of success and pockets for improvement. But in this case, **two problems are at the root of PSEG Long Island's management challenges**. First, **PSEG Long Island's Balanced Scorecard-based management system leads to an incomplete set of management priorities**. This is something I call "Balanced Scorecard Blinders."

What is a Balanced Scorecard? It is a 1990s-era management theory that links goals with a limited set of performance metrics. Those metrics are "balanced" because they include customer, operational, and financial perspectives. The idea is to focus managers on the handful of most critical measures in a single management report and continuously monitor that report.

What is on PSEG Long Island's Balanced Scorecard? A lot of worthy, quantifiable measures of performance, including metrics for customer satisfaction and system reliability. And over the last seven years, **PSEG Long Island has generally performed well, as measured by the Balanced Scorecard**.

What is the problem? The flaw is that the Balanced Scorecard can lead management to focus on the limited set of statistics that appear on this Scorecard. **But there are critical things that cannot be measured by a performance metric**. In fact, from LIPA's perspective, only about half of what is important appears on PSEG Long Island's Balanced Scorecard. For the rest, management must guard against "out of sight, out of mind."

What kinds of things are important but cannot be meaningfully evaluated by a performance metric? One example is regular resiliency reviews of critical information technology systems, including robust stress tests before storm season and actionable Business Continuity Plans (BCP) in the event of a system failure. A

performance metric can only measure if a stress test was performed or a BCP was put in place. That's "check the box" management.

The most critical part of a resiliency review is the risk culture around the exercise – whether the system stress tests were well-designed, whether the organization was sufficiently imaginative in evaluating all the possible modes of failure, whether management adequately mitigated the risks that can be remediated, and whether employees are trained and ready to implement the BCPs. That takes hands-on review and judgment. **Preventing the failure of mission-critical information technology (IT) systems is a key business risk that requires significant management time and attention. But there is no useful metric for that (until after the system fails)**.

The Balanced Scorecard is a useful tool for those items that can be quantified. But it is only part of management's job – it is just one tool in the toolkit. **PSEG Long Island's management culture, and PSEG** headquarters in Newark, New Jersey, pays inordinate attention to this limited set of metrics as a measure of success.

This flaw in PSEG's management culture is magnified by LIPA's contract with PSEG Long Island. The contract relies on the Balanced Scorecard as a measure to determine incentive compensation. **Experience has shown that the Balanced Scorecard needs to be supplemented with qualitative measures of performance, as in any management evaluation**. The Balanced Scorecard can neither be the principal method for evaluating management's performance nor management's primary focus in operating the business each day.

Fundamental Design Flaw – The Matrix

PSEG Long Island's Balanced Scorecard Blinders are compounded by a second management flaw – the matrix organizational structure itself, which diffuses accountability for critical business functions. LIPA's contract with PSEG Long Island requires "full-time, core Senior Management... with defined responsibilities to carry out in a timely manner the Service Provider's obligations... from which one such Senior Manager, located on Long Island, shall [have]... overall oversight responsibility related to the Operations Services."

Over the last seven years, PSEG Long Island has moved numerous functions from the original organization design—four senior managers reporting to a single Chief Operating Officer (COO) located on Long Island—to a matrix organization with a New Jersey headquarters.¹

What is a matrix? It is an organizational design where the managers of certain functions report to two bosses. The matrix creates dual, rather than single, chains of command, with, for example, the Long Island Director of IT reporting to the head of the business unit (PSEG Long Island's COO) and also to the head of the functional unit (PSEG's Chief Information Officer (CIO) in Newark). The dangers are that either one chain of command dominates, or that the function (e.g. IT) is only casually supervised by both chains of command.

Why do companies use matrix management? Typically, to either spread "best practice" across silos or to save money. As an example, the logic would go something like "we have great IT here in Newark and now we can share management and costs across both Newark and Long Island by having the Long Island Director of IT report to the CIO in Newark."

In LIPA's contract with PSEG Long Island, LIPA has the ability to approve the selection of the Chief Operating Officer and his or her four senior managers. However, PSEG Long Island has shifted responsibilities from these Long Island-based senior managers to Newark managers, including for such areas as IT and business services, meeting the language of the contract, but not the intent.

No organizational design is perfect. However, matrix organizations can be particularly challenging. They require skillful managers and full cooperation between the heads of the business units and the functional areas. Making a matrix work requires a corporate culture that openly and efficiently navigates conflict, balances competing priorities across silos, and makes shared decisions in a timely manner. It requires individuals with proactive communication skills, carefully designed job responsibilities, and effective feedback loops.

In my observation, **PSEG Long Island's organizational chart is a matrix in name only**. In practice, key Long Island functions like IT, legal services, procurement, and finance are only accountable to managers in Newark, whose priority is the corporate parent organization rather than Long Island. **PSEG Long Island's COO has little control over the quality of services provided by Newark to LIPA's assets**. For IT alone, the services provided to LIPA report to three different organizational silos in New Jersey, as illustrated in Figure 1.

PSEG Long Island has produced thousands of documents and e-mails as part of the Isaias Task Force's investigation. I will quote from a single series of email exchanges that occurred on July 16, 2020 to illustrate what bad matrix management looks like.



FIGURE 1: PSEG Long Island IT Organization

On that day, a PSEG Long Island Operations Supervisor emailed his manager regarding Outage Management System (OMS) performance issues that had been ongoing for several weeks. The OMS is a mission critical IT system that is essential for storm response. The Supervisor stated that an OMS upgrade implemented in June 2020 was **"NOT even managing on a day by day basis and [we] are definitely NOT prepared for [a] weather event."**

The manager forwarded the email to PSEG Long Island's Vice President of Transmission and Distribution (T&D), who in turn emailed PSEG's Director of IT, who reports to Newark, urging "some big efforts to drive improvement" to the recently upgraded OMS.

The IT director replied to the email copying the OMS vendor asking, "what are the issues?," demonstrating his disengagement from managing repairs on a mission-critical system that had already been crashing for several weeks. After more back and forth emails, the Long Island vice president asked the IT director, **"who [in New** Jersey] are you reporting to these days and is that person engaged and aware of our issues?"

PSEG Long Island's COO then replied asking, "at what point do we back out the changes [i.e. abandon the malfunctioning June OMS upgrade]?" Unfortunately, PSEG Long Island's most senior officer could not simply act on his own judgment and order the rollback, despite this high-risk situation with an OMS that was "NOT prepared for [a] weather event."

Three weeks later, at 11:30 a.m. on the morning of August 4, the OMS Computer Aided Dispatch (CAD) system remained defective, with a bottleneck of more than 2.5 hours of unprocessed jobs **before** Tropical Storm Isaias even landed on Long Island. That afternoon, the OMS failed, and the consequences are the subject of this *90-Day Report*.²

This is not matrix management. It is a lack of accountability and responsiveness even to critical and urgent business needs. IT is the fabric of a modern utility. If critical IT systems fail, the utility fails. Core business functions simply cannot be left to manage themselves in a failed matrix structure.

LIPA's Oversight of PSEG Long Island

LIPA oversees PSEG Long Island's management of utility business processes, programs, and systems as the asset owner.³ The purpose of this oversight is to review whether PSEG Long Island is meeting its contractual obligations and providing value to LIPA's customers.

The LIPA Board has asked me how we missed PSEG Long Island's inadequate management and testing of the IT and communications systems that failed during Isaias. There are three factors.

- First, we relied too much on PSEG Long Island's representations that it was meeting its contractual obligations. For example, PSEG Long Island's Emergency Restoration Plan (ERP) states that the OMS is routinely stress tested. PSEG Long Island told LIPA that the stress testing was performed to Superstorm Sandy like conditions, i.e. 90% of customers losing power during a storm. But LIPA did not independently verify the test design or validate the testing. It is now clear that whatever stress testing PSEG Long Island performed, it did not test end to end functionality of the OMS and related systems under realistic "severe storm" conditions. LIPA will now independently verify and validate the testing of all mission-critical systems, as the Isaias Task Force has uncovered severe deficiencies in PSEG's IT management.
- Second, we have discovered that PSEG Long Island was not transparent with LIPA about IT problems.

² Stress testing after the storm has identified that the prior version of the OMS would have failed under high load during Isaias too. However, the IT organization was not even responsive to known issues with OMS under blue-sky conditions let alone proactive in anticipating potential risks.

³ In addition, both LIPA and PSEG Long Island are subject to oversight by the Department of Public Service, as are the other major New York utilities. The DPS provides independent recommendations to the LIPA Board of Trustees in addition to those provided by the LIPA staff. DPS' oversight includes periodic management audits, annual review of PSEG Long Island's Emergency Restoration Plan, and review of all aspects of preparation and performance during storms and other emergency events.

For example, we learned **after** the storm about the significant OMS performance issues described in the e-mail exchange above. In fact, this information was not disclosed to LIPA until October 2020, months after Isaias, and then only as a result of this investigation. **That both PSEG Long Island management and PSEG IT leadership in Newark did not feel obligated to alert LIPA to recurring problems with the OMS during storm season speaks to the cultural challenges and communication issues within PSEG that led to these failures.**

 And third, LIPA missed what in hindsight were warning signs about the declining quality of IT services being provided to Long Island operations, including high levels of turnover of consultants and staff serving Long Island, frequently changing priorities, and delayed IT projects. PSEG Long Island often ascribed these issues to changing business needs and tight budgets, but as a result of this investigation, we now understand the degree to which the matrix IT management structure lacked accountability to Long Island operations.

Where Do We Go from Here?

There are things that have worked well in our contract with PSEG Long Island and other aspects, as demonstrated by this storm, that have not. **Resolving the management failures that led to PSEG Long Island's poor response to Tropical Storm Isaias will require changing the way LIPA's assets are managed**. We have two options:

- Terminate LIPA's contract with PSEG Long Island, the Operations Services Agreement (OSA); or
- Renegotiate the OSA to modify PSEG Long Island's management structure and incentives to provide better alignment and accountability to LIPA's operations, particularly in the areas of IT, emergency management, and risk management but also in other areas.

This Task Force Report provides numerous findings and recommendations to address the shortcomings in the OSA. A revised OSA would need to include:

Changing Management's Incentives and Accountabilities

- Enhancing LIPA's approval rights of PSEG Long Island's senior management, including fixed terms of four years to encourage continued responsiveness to Long Island's needs;
- Disclosing the compensation of PSEG Long Island's most senior officers, including its key drivers, to ensure transparency and alignment with the performance of Long Island operations;
- Eliminating the "matrix" organizational structures that have critical business functions reporting to managers in Newark disconnected from LIPA, to assure that management of LIPA's assets are not subordinated to PSEG's New Jersey operations;
- Incorporating qualitative feedback from LIPA into the performance evaluations of PSEG Long Island's senior officers to ensure holistic evaluations in Newark; and
- Revisiting the Balanced Scorecard metrics used to determine PSEG Long Island's incentive compensation, including enhanced penalties for violations of the ERP;

Information Technology and Emergency Management Reforms

- Forming a new Crisis Management Team (CMT) dedicated to Long Island operations during emergencies that includes both LIPA and PSEG Long Island management;
- Requiring PSEG Long Island to hire a "turnaround" CIO, a Chief Information Security Officer (CISO), and a Vice President of Emergency Management, all dedicated exclusively to Long Island operations;

- Centralizing Long Island IT under one Enterprise IT organization, with separate IT systems from those in New Jersey;
- Requiring PSEG Long Island to develop actionable BCPs for all key systems, with sufficient training and drills for all key staff, independently validated by LIPA; and
- Enhancing PSEG Long Island's Network Operating Center (NOC) to, among other things, monitor mission critical IT applications and systems in real time during weather events.

Strengthening LIPA's Oversight

- Increasing PSEG Long Island's accountability to the LIPA Board of Trustee's policy setting and strategic priorities to balance Newark's over-reliance on a Balanced Scorecard;
- Requiring PSEG Long Island to proactively disclose emerging risks and critical system issues, as well as to develop and provide LIPA with real-time access to documents, analytics, and operational dashboards, enabling LIPA to "trust but verify" issues in real time; and
- Enhancing LIPA's budget approval rights and reconfiguring the budget approval process to require PSEG Long Island to engage with LIPA at an earlier stage of projects and initiatives, supporting independent verification and validation activities throughout the project lifecycle.

These reforms would ensure that the entirety of the services performed for LIPA are accountable to **PSEG Long Island's COO**, and that **PSEG Long Island's COO** puts LIPA's operational needs first. Right now, accountability is diffuse for any aspect of LIPA's operations that do not appear on PSEG Long Island's Balanced Scorecard.

Conclusion

The LIPA Reform Act of 2013 envisioned a service provider with a dedicated management team, located on Long Island, and focused exclusively on the management of LIPA's assets. It is time to get back to basics. LIPA customers have paid PSEG Long Island \$467 million over the last seven years to provide management services, including to implement the IT and communications systems that failed during Isaias. For nearly half-a-billion dollars, LIPA's customers deserve best-in-class service and top-notch management that are focused every day on Long Island.

The OSA with PSEG Long Island runs through the end of 2025. By working together, LIPA and PSEG Long Island may be able to build on what has worked, while correcting flaws that have become evident over time. That would provide PSEG Long Island with several years to demonstrate to the LIPA Board of Trustees and our customer-owners that PSEG Long Island can put Long Island customers first, before we consider any extension of our relationship.

If LIPA and PSEG Long Island cannot reach an agreement on acceptable reforms, or if there is a lack of progress to implement the Task Force's recommendations in this Report, the LIPA Board of Trustees should exercise their rights to terminate the contract with PSEG Long Island before 2025. Tropical Storm Isaias was not a worst-case emergency. The issues identified by the Task Force's investigation need to be fixed with urgency.

Thomas Falcone

November 18, 2020

SIGNIFICANT FINDINGS AND RECOMMENDATIONS

2.1 Summary of Findings

1. Mismanagement was the Root Cause of Storm Response Failures.

PSEG Long Island did not adequately prepare for weather events before Isaias. They did not prepare IT systems for stresses and surge, nor did they have BCPs in place in the event an IT system failed. Crashed IT systems with no manual backup plan caused customer power outages to last for longer than necessary. Failed IT systems were an outcome of mismanagement not the cause of the Isaias storm response challenges.

2. Voice Communications Failed Outright During Isaias.

Communications failed due to faulty systems architecture, inadequate capacity, and inherent system errors that were undiscovered due to lack of testing. Over a million calls and texts were lost or unanswered. Data from customers on the extent of outages was lost. Communications and IT systems are not well integrated due to poor IT management practices.

3. Outage Management System was Failing Before Isaias Hit.

PSEG Long Island unwisely implemented a new software version of the OMS in June at the beginning of the 2020 Atlantic hurricane season and did not adequately test the new system. PSEG Long Island IT staff already knew in July, before Isaias, that the OMS was not working during "blue-sky" conditions and did not fix it or revert to a prior version before the storm. Nor did IT prepare to go offline to isolate system failures or have a BCP for the OMS to fall back to, despite knowing the system was performing poorly. The OMS did not fail because of Isaias – it was known to be failing before Isaias.⁴

4. Interconnected Systems Dragged Each Other Down.

The avoidable failure of the OMS dragged down other interconnected IT systems, with no way to isolate the systems from each other. The Long Island customer communication and storm recovery systems need new architecture, better systems integration, and the ability to isolate failed systems.

5. Faulty Estimated Times of Restoration Misled the Public.

The failure of the OMS caused PSEG Long Island to issue overly optimistic Estimated Time of Restorations (ETRs) to the public, causing confusion, hardship, and a lack of trust. PSEG Long Island was unable to isolate the OMS from other systems and continued to issue incorrect ETRs. Once again, there was no BCP in place, and no ability to abandon a failing system.

⁴ Stress testing after the storm has identified that the prior version of the OMS would have failed under high load during Isaias too. However, the IT organization was not even responsive to known issues with OMS under blue-sky conditions let alone proactive in anticipating potential risks..

6. Without the OMS, PSEG Long Island Inefficiently Managed the Recovery

The crash of the OMS caused the inefficient management of field resources during Isaias, increasing downtime. Bad data in the OMS drove inefficient field decisions. PSEG Long Island was unable to effectively switch to decentralized management of field resources. Again, there was no BCP for effectively delegating damage assessment and decentralizing management of field recovery teams in the face of a failing OMS.

7. Drills and Training Are Inadequate.

PSEG Long Island does not in fact have a well-worked-out ERP. That requires extensive drills and training, including on BCPs, and PSEG Long Island's drills and training are inadequate.

8. 90-Days After Isaias Many System Defects Remain Uncorrected.

PSEG's lack of strong internal IT technical and management competency has resulted in several false starts and over-reliance on vendor solutions. The latest tests of PSEG's design and configuration of the high-volume telephone system continue to fail under only moderate loads. The OMS system continues to fail when subjected to appropriate stress testing. PSEG IT has deficiencies in project management, vendor management, and their approach to system validation.

9. PSEG Lacks Transparency.

Before Isaias, PSEG IT managers and PSEG Long Island management knew that the OMS was failing in bluesky conditions but took inadequate corrective action. They knew the system could crash during a storm, but they did not inform LIPA of this high-risk situation. Even after the OMS crashed during Isaias and LIPA launched its investigation, PSEG was not transparent about what it knew until questioned about reports the system was failing before the storm. PSEG's own root cause analysis of its Isaias response is, at best, incomplete and resolutely ignores management deficiencies, while attempting to shift blame to vendors.

2.2 Summary of Recommendations

A. Changing Management Incentives and Accountabilities

1. LIPA Must Either Terminate or Renegotiate the Operations Services Agreement.

There are two options open to LIPA: either terminate or renegotiate the OSA. Based on the IT and storm performance failures, LIPA should be prepared to terminate the contract early. Tropical Storm Isaias has demonstrated that the present OSA with PSEG Long Island provides insufficient protection of LIPA's assets. Elements of the contract have worked, but reforms to key provisions of the OSA are needed to ensure accountability for and responsiveness to Long Island operations.

2. Monitor Readiness as well as Performance.

The OSA's Storm Scorecard objectively documents that management failed to perform to the minimum standard required by the OSA during Isaias. This failure must be taken into account in renegotiating the OSA. LIPA needs to be able to detect lack of preparedness ex ante, rather than punish the consequences ex post.

3. Change Matrix Management to Long Island Accountability.

The PSEG Long Island organizational chart is broken and must be reorganized. IT staff on Long Island report to a corporate CIO in New Jersey, whose priority is New Jersey IT. The management that let the Long Island IT systems fall into such disrepair is obviously unqualified to redesign, repair, and rebuild the faulty IT systems. Each of the matrix organizational management structures that report critical functions to distant and unaccountable managers in Newark must be replaced with Long Island management that is accountable and responsive to LIPA's operational needs.

B. Information Technology and Emergency Management Reforms

4. Immediately Strengthen OMS and Communications IT.

Public safety demands an emergency turnaround of the IT systems on Long Island. The IT systems on Long Island are poorly designed and not well integrated, so they are fragile and prone to malfunction. The OMS must be repaired, redesigned, updated, tested thoroughly when installed, and then tested regularly. The OMS must be integrated properly with other systems. The communications systems must be redesigned and hardened with expanded capacity and then rigorously and regularly tested. BCPs for both will be required.

5. Seek the Assistance of Outside Independent Consultants to Immediately Fix OMS and Communications Systems.

PSEG's efforts to fix the OMS and communications systems have been slow and mired with false starts. Frequent back and forth with the various vendors, lack of clear objectives and requirements, and poor vendor management has dragged on since Isaias with still no new design executed that customers can confidently rely upon in the event of another storm. PSEG IT's internal team lacks the expertise to manage these projects to completion. The Task Force recommends that PSEG seek the assistance of outside independent consultants to fix these systems with urgency.

6. Appoint Dedicated Long Island Chief Information Officer.

PSEG Long Island needs a "turnaround" Long Island CIO, primarily and only, responsible for all IT systems on Long Island. The Long Island CIO must have the competence, authority, budget control, staff and mandate to turn around the failed IT systems and organization on Long Island.

7. Appoint Dedicated Long Island Vice President of Emergency Management.

PSEG Long Island should hire a Vice President of Emergency Management for Long Island, whose focus is storm preparedness and management. This executive should rebuild the NOC, staff and activate the CMT when required, create and integrate a comprehensive set of BCPs for all systems, build and exercise a robust ERP, and train staff in emergency management (EM) roles. The vice president should be responsible for readiness audits, stress testing IT systems, storm event exercises, and independent verification of the performance of all systems in "red" storm conditions.

8. Establish a Long Island Crisis Management Team and Expand the Long Island Network Operating Center.

There is no senior executive CMT on Long Island, and the Long Island NOC needs to be upgraded to provide better visibility to the health of mission critical IT applications and systems. There is no provision for senior executives to take over during an emergency and no good place for them to provide on-site guidance, command, and control. Neither management nor staff train in their ERP and business continuity storm roles. There is a CMT in New Jersey, which was not activated during Isaias. PSEG Long Island needs to develop a CMT of its own and further invest in a strengthened Long Island NOC.

9. Build a More Robust Emergency Response Plan with Improved Training and Drills.

More generally, the ERP must be improved and expanded, with regularly conducted drills. Staff and management must be trained in their roles for emergency management, with the new teams described in 7 and 8 above.

10. Create Comprehensive Long Island Business Continuity Plans.

LIPA must independently oversee the development of a comprehensive integrated set of BCPs for every IT system on Long Island, plus all repair and recovery activities. The network on Long Island must be kept working during emergency overload, redundancy backup is needed, and PSEG Long Island must be able to switch to manual mode if systems do fail.

C. Strengthening LIPA's Oversight

11. Create a new Balanced Scorecard and Make Changes to Realign PSEG Long Island Management Incentives.

LIPA must revisit the Balanced Scorecard metrics used for incentive compensation as part of renegotiating the OSA, including adding stronger penalties for both emergency readiness and emergency performance failures. LIPA needs to add qualitative feedback loops into the performance evaluations and compensation of PSEG Long Island managers to ensure readiness, reliability, and responsiveness to the needs of Long Island electricity customers rather than Newark headquarters.

12: Revise OSA to facilitate LIPA's Independent Review and Testing.

LIPA, as the system owner, must have the ability to independently evaluate and test all IT systems used on Long Island and oversee the IT redesign, repair, and upgrading. The revised OSA must give LIPA more tools to exercise its oversight responsibilities, including greater obligations for PSEG Long Island to disclose emerging system issues, real-time operational dashboards, and a retooled budget approval process.

SECTION 3 INTRODUCTION



On the early afternoon of Tuesday, August 4, 2020, Tropical Storm Isaias hit Nassau and Suffolk counties and the Rockaways with rain and wind gusts up to 70 miles per hour. The resulting damage to the electrical system resulted in approximately 646,000 customer outages. It took PSEG Long Island five days to restore 75% of customers and eight days to restore 99% of customers.

PSEG Long Island failed to respond adequately, beginning on the first day of the storm. **Customers were unable** to contact PSEG Long Island by any of the available communication channels. Telephone calls to PSEG Long Island were greeted by busy signals, text messages to the utility returned error messages, and attempts to use the smartphone application or website were similarly thwarted.

The ETRs provided by PSEG Long Island to customers were grossly optimistic. When those ETRs came and went, PSEG Long Island provided additional inaccurate ETRs.

On the afternoon of the storm, the OMS failed. With inadequate BCPs and no manual workarounds, **PSEG Long Island leadership was simply unable to override standard operating procedures and take corrective actions**. Relying on a malfunctioning OMS, field resources were inefficiently deployed, inaccurate information continued to go to customers, communication channels continued to fail, and the maelstrom persisted.

On August 5, the day after the storm landed on Long Island, LIPA initiated an independent review of the root causes that led to the lapses in PSEG Long Island's storm response. LIPA appointed Mr. Rick Shansky, Senior Vice President of Operations Oversight, and Mr. Mujib Lodhi, Chief Information Officer, to lead an Isaias Task Force, together with the heads of the Offices of Investigation and Enforcement and Resilience and Emergency Preparedness at the New York State Department of Public Service. The Task Force is supported by a team of independent utility consultants experienced in management, operations, and technical design of utility systems,

as well as by LIPA staff. Appendix 1 contains brief background information on the consulting team supporting the Isaias Task Force.

The Task Force is charged with providing actionable recommendations and overseeing PSEG Long Island's remediation activities. LIPA committed to report the Task Force's findings, observations, and recommendations to the LIPA Board of Trustees and public in a *30-Day Report*, *90-Day Report*, and *180-Day Final Report*.

The Task Force's investigation has involved near daily meetings with PSEG Long Island staff, hundreds of inquiries, and terabytes of data. PSEG Long Island and PSEG IT in Newark have made their staff available for the Task Force's inquiries and have responded to over 200 information requests, although in some cases responses have been slow or incomplete.

The Task Force presented the *30-Day Report* to LIPA's Board of Trustees at the September 23, 2020 Board Meeting and released it to the public. The *30-Day Report* provided the LIPA Board and other stakeholders with the preliminary results of the Task Force's inquiry and a snapshot of PSEG Long Island's remediation activities. Because of the urgency of the immediate threat of another hurricane event, the *30-Day Report* focused on the failures of the technical systems and their proximate causes. This *90-Day Report* expands on those findings and addresses broader questions on the effectiveness of PSEG Long Island's management of utility operations.

A consolidated lists of recommendations from the *90-Day Report* and the *30-Day Report* are provided in Appendix 2 and Appendix 3, respectively. We have categorized each recommendation by "tier," with tier 1 being the highest priority.

What is an "OMS"?

"OMS" is an abbreviation for "Outage Management System." The OMS is a computer system used by electric utilities to help restore service to customers after a power failure. When a customer reports a power outage, that information goes to the OMS. The outage information from various customers is collected at the OMS so the utility can get a holistic view of the outage situation. Combining outage information with detailed knowledge of the electric system, the OMS can infer which specific component of the distribution network has failed and dispatch a crew to make repairs. Outage management systems are used by utilities to efficiently identify, diagnose and locate faults, notify affected customers, dispatch repair crews, restore service, maintain historical records of the outages, and calculate reliability statistics. Outage management is a crucial process in the operation of an electric distribution network and utilities increasingly rely on the OMS to help restore service after disruptive storms.

SECTION 4 CUSTOMER COMMUNICATIONS AND OUTAGE MANAGEMENT SYSTEM

4.1 High Volume Voice Communications Failed Outright

The widespread failure of PSEG Long Island's phone system and digital channels left customers unable to report their outage or receive status updates. There are a variety of channels by which customers can give and receive outage information with each channel useful for the purpose it was installed. However, each of the channels has underlying and unnecessary interconnectedness with other channels and the possible cascade effect of one channel's failure causing overload and problems in the other methods was not anticipated in the system design. These systems were not stress-tested. There was no provision for the contingency of communication failures.

The Task Force recommends PSEG Long Island develop and execute a revised comprehensive strategic technology plan for outage reporting and communications integrating all the methods customers can use now and in the future. The plan should address the flexibility, usefulness, capacity, stability, and redundancy of each system by itself and in conjunction with other systems to provide both stability and reliability for customers. It should include PSEG Long Island's plan for integrating greater capacity and flexibility through cloud-based calling and technology investments. And it should reflect integration of Advanced Metering Infrastructure (AMI) as a data gathering and communications feeder to work in conjunction with the traditional outage notifications platforms (e.g. voice channels, digital channels, SCADA, etc.).

A. Voice Calling Access and Reliability Failed

As described in detail in the 30-Day Report, the key reason for customers not being able to get through on the various phone lines was undersized capacity in the technology supporting the call center and inadequate line capacity provisioned with Verizon. These factors limited the number of callers who could get through at one time. Other contributing factors were:

- Complex and poorly understood call path design: a combination of call processing rules directing calls to be potentially delivered through several vendors, each handoff becoming a potential bottleneck for constraining call capacity;
- ·Inability to rapidly obtain support from Verizon during storm conditions; and
- Text capacity overload that exacerbated voice call overload: A substantial drop in the availability of the text message capabilities customers would otherwise use which increased call volumes beyond a level the call center could support.

B. PSEG Long Island's Intrado/HVCA Configuration Was Unable to Service the Load

PSEG Long Island has a contract with the telecommunications company Intrado to provide a High-Volume Call Answering System (HVCA) to allow customers to report outages to an automated voice response system and hear updates about their outage. Gaining access to this system is a key storm response component because it allows potentially thousands of calls per hour to reach the system to report an outage, giving PSEG Long Island's OMS outage records in much greater quantity and speed than could be handled with staff. It also allows staff to be focused on handling safety related outage calls such as wires down reports.

In this storm, many customers were unable to use this service because of limitations in how many calls PSEG Long Island could direct to the HVCA system. This arose because PSEG Long Island management were themselves unsure about the true capacity of the system that they have been using. Initially, PSEG Long Island stated that its "center management believes that historically they were guaranteed a minimum of 2,600 available ports at any time and could be higher depending on who else is using the Intrado service. Each HVCA call is estimated to last two minutes so if 2,600 ports were used, this would allow for a minimum of 78,000 calls per hour." LIPA has since learned that there were no such contractual guarantees with Intrado and no effort had ever been made to confirm the assumed capacity, which as it turned out, had been based on hearsay within PSEG Long Island staff. We estimate that one million customer calls did not go through because of this failure.

PSEG Long Island failed to review, understand, and document the true capacity of the emergency telephone system and also failed to periodically test this system, which would have revealed that it could not perform to the incorrectly-assumed capacity. This is a fundamental tenet of system design and operation and PSEG Long Island, unfortunately, did not abide by it. PSEG Long Island blames Verizon and AT&T for communications failures during Isaias but it was PSEG Long Island's duty to test and ensure that the system actually would work under PSEG Long Island's "78,000 call per hour" assumption. While PSEG Long Island continues to assert an investigation into vendor failures, we have seen no concrete evidence that the voice communication system failures were caused by vendors, while there is substantial evidence of PSEG Long Island's mismanagement.

PSEG Long Island has been working with Verizon to review the design and potentially implement a new solution with the objective of eliminating the identified bottlenecks. Verizon has offered a number of potential solutions for PSEG staff to review and consider.

Unfortunately, PSEG Long Island's HVCA redesign effort has been slow and mired with false starts. Frequent back and forth with the various vendors, lack of clear objectives and requirements, and poor vendor management has dragged on since Isaias with still no new design executed that customers can confidently rely upon in the event of another storm. More than 90 days after the storm, PSEG Long Island does not yet have a high-volume communications system design on which it has conducted a successful end-to-end performance test at the required capacity. The most recent load and volume test that PSEG Long Island conducted failed part way through the test. No root cause has been definitively identified and the investigation is continuing. We have concluded that the PSEG Long Island internal team lacks the expertise to manage this project to timely completion. We recommend that they seek the assistance of outside independent consultants to move this project forward.

While PSEG Long Island has not provided LIPA with a detailed final design or adequate testing proposal, LIPA has been advised generally to understand that in the newly proposed configuration, PSEG Long Island will implement the following major change:

• PSEG Long Island will have a contract with Verizon Business Network to manage call forwarding from the Verizon Telephony network to the Verizon Business Network and to Intrado's HVCA system. Wire down and other public-safety calls will be redirected through an AT&T link to PSEG Long Island's New York based call center for handling by live agent.

LIPA has deep reservations on this design. Figure 2 shows the flow for the main customer service number (0075) calls to the HVCA on the "Storm" days, with the new designs highlighted in green, on the assumption that 100 percent of customer calls to the main customer service number (0075) are diverted to Intrado.

PSEG Long Island has not provided any evidence that the rationale behind its proposed new high-volume architecture is sound. The design principles in maintaining the technology and number of trunks between Verizon Telecom and call center are not clear either. The design is overly complicated and has multiple potential points of failure and requires handoffs to four vendors to process an emergency wire down call. The Task Force believes that very little tangible progress has been made in this area.

C. PSEG Long Island's Live Telecom System Failed Their Latest Tests

More bad news: On November 6, PSEG Long Island conducted stress tests on part of the currently deployed telecom system. The test was designed to run 5,000 concurrent calls. **The test reached a peak volume of 1,200 calls per minute and then failed.** Since the test was conducted on the live system it is fair to say that the PSEG Long Island's current telecommunications systems may not fare any better should Long Island be battered by another damaging storm. **With no tangible BCP in place this risk remains unmanaged more than 90 days after Isaias.**

FIGURE 2:

Current design of high-volume call paths mediated by multiple vendors



Recommendation 4.01: PSEG Long Island should develop and execute a comprehensive strategic technology plan for outage reporting and communications.

Recommendation 4.02: PSEG Long Island needs to urgently engage qualified expert consultants to guide them through the telephony redesign process.

Recommendation 4.03: For the long term, PSEG Long Island needs to strengthen its voice communications engineering and project management staff.

In addition to implementing the interim solutions to give near term improvements on the risk of blocked lines and busy signals, we recommend as part of PSEG Long Island's strategic planning, they consider other comprehensive telephony architecture solutions that give the future capacity, flexibility, and elasticity they will need. In the following section, we recommend that PSEG Long Island totally re-engineer their call center to a modern design. The high-volume voice solution should be part of that overall design rather than a separate solution.

Recommendation 4.04: Explore integrating the high-volume voice communications design into a more powerful all-encompassing call center design.

4.2 Customer Call Center is Inadequately Staffed to Backup HVCA Failures

The call center staffing complement is usually 120 people and was supplemented for the duration of the storm by additional trained backup staff and extended work hours of up to 14-hour shifts. PSEG Long Island managers report that the combined effect of additional people and extended hours was equivalent to a tripling of their normal staff capacity. They were also aided by an outside contractor in reaching out to Life Support Equipment (LSE) customers. Their staffing projections and decisions relied on experience of how customers used the variety of options to report outages and get status updates.

Call Center Design Did Not Permit It to Handle Large Overflows of Calls

The lack of consistently reliable ETR data and problems with self-service digital channel options hampered call center performance. While the proportion of calls answered by technology was higher than expected, the inconsistent ETR accuracy and long restoration times caused customers to increasingly seek in-person help. These effects increased call handling time and average call answer time to be much longer than typically seen in a storm when supported by HVCA and digital channels. Preparing staffing levels compared to historic call volumes and past customer behavior is reasonable. The quantity of regular staff and backup and support staff PSEG Long Island has available would likely have been satisfactory if not for the technology problems and unreliable ETR data. Resolving the problems in these two areas will make it more feasible for PSEG Long Island to reach OSA performance levels for the call center in the next storm.

Recommendations 4.05: Develop a More Scalable Inbound Call Center, including:

- Design an integrated calling system capable of handling larger volumes of calls than currently designed. The telephony system must be designed holistically, and the design must allow for the possibility of losing digital channels again and handling a surge of calls in a storm situation. Modern cloud-based contact centers offer enormous scalability and resilience at very little incremental cost. The recommendation includes reviewing the relevance of the Intrado HVCA under such future scenarios.
- 2. Improve Outbound Communications: As part of a revised technology infrastructure strategic plan, consider ways data sources such as AMI-recognized outages could be used to proactively contact customers and reduce the demand from incoming calls.
- 3. Take proactive steps to regain customer confidence in digital channels. Utilities strive hard to get customer acceptance of technology-mediated communication channels. However, the frustrations encountered during Isaias have greatly impaired customer trust in PSEG Long Island's digital communication technologies. As the technical issues around the broken digital channels are resolved, PSEG Long Island must develop and execute a communications plan to encourage customers to return to these digital channels that failed to perform during Isaias.

4.3 Digital Channels Failed to Perform During Isaias

Our *30-Day Report* summarized the purposes and uses of the digital channels installed to help customers report outages, receive status updates or view changes on the storm map. As indicated in that Report, PSEG Long Island's OMS failed to function properly throughout the storm creating widespread havoc across all customer communications channels and detrimentally affecting the storm restoration and recovery processes. **As a result of dysfunctions within the OMS, Long Island residents were unable to reach their electric utility by any of a multiplicity of digital channels implemented to benefit the customers: Text messages were returning error messages, smartphone applications were not functioning, and website portals became unresponsive.** During the critical first days of the storm, every customer communication channel was simultaneously failing, exacerbating customer frustration. **It is estimated that more than 130,000 text messages failed on August 5th.**

Long Islanders faced an equally frustrating experience with the website portal and the mobile application, which became unresponsive in the face of customer attempts to report an outage.

Information reviewed since the release of the *30-Day Report* reinforces our recommendations to remediate the data integration and data processing difficulties between the OMS and the communications-related interfaces such as text messaging and the storm maps.

A. Inbound and Outbound Text Messaging (Kubra iNotify)

PSEG Long Island uses two-way text, outbound messaging, an outage map, and a Municipal Portal provided by Kubra, a software company contracted by PSEG Long Island. All of these systems are hosted by Kubra and use a common data source tied to the PSEG Long Island OMS. The messaging services include two-way text messaging and outbound messaging:

- **Two-way text messaging** services allow a customer to report an outage (by texting "OUT") or receive an on-demand outage status update (by texting "STAT") via text. This option is convenient and allows customers to receive updates without having to call the Contact Center. The "Status Check" function retrieves information about the outage time, condition/reason if known, and estimated restoration time from the OMS and provides it to the customer. The "Report Outage" function checks the OMS to see if the outage is known and if not, submits the relevant outage data to the OMS. The service is popular and in 2017, PSEG Long Island decided to enroll all customers who had a valid mobile phone number on file to participate in this service unless the customer did not want to do so. PSEG Long Island currently has 640,959 customers enrolled in the service.
- The **outbound messaging** service allows customers to receive proactive notifications (such as outage detection, update messages, and service restoration messages) from PSEG Long Island via their preferred channel, be it text, voice, or email.

The text message platform is a popular and easy to use feature. When functioning correctly it provides an alternate way for customers to communicate with PSEG Long Island and relieves the workload in the call center and on the phone lines.

In the initial days of the storm, the text message system suffered from the same problems of accessibility, data timeouts, and inconsistent ETR reliability as the phone lines and outage map. **The worst performance period**

was on August 4 between 6 p.m. and 11 p.m., when approximately 95.5 percent of customers received a timeout message and were not able to report their outage or receive a status update. Subsequent changes to data transmission processing allowed the text transactions to be submitted and received, which substantially reduced the average failure rate per hour.

PSEG Long Island has received a proposal from Kubra to modify the current data transmission plans and use a different protocol. This has the potential to alleviate the data congestion overload that caused the high number of connection failures early in the storm

Recommendation 4.06: Configure Kubra to Leverage Kubra's "Storm Mode."

The Kubra system has well-defined "storm mode," which includes a number of system settings and process changes that are invoked in preparation of a large storm. In addition:

- 1. **Put a human manager in the loop during emergencies**. At the beginning of storm planning and throughout the storm, designate a system data administrator dedicated to monitor, on a continuous basis, the timeliness, accuracy, and integrity of the information coming from the OMS to Kubra.
- 2. **Prepare back-ups.** If performance issues occur and cannot be promptly remediated, as part of contingency planning, institute the process of moving the lookup requests to an alternate data file to relieve congestion on the normal data transmission path.
- 3. **PSEG Long Island personnel should prepare to intervene and take charge.** Empower the administrator to take measures to adjust the Outage Map if the timeliness and accuracy of data becomes faulty due to file processing delays or inaccurate restoration times coming from the OMS. This person should also monitor data timeout potentials. This will allow them to place the Outage Map into Storm Mode to lengthen the time between Outage Map updates to give the OMS and Kubra time to complete data uploads and reduce any data quality problems caused by data transfer delays.
- 4. **Communicate proactively with individual customers.** In cases where customers may need repairs to more than one type of equipment to be restored, continue to use a text option to ask "are you still out" to get confirmation.
- 5. **Communicate proactively with customers collectively.** Assign a data administrator to work with Corporate Communications to use banner alerts and other widely applicable messages. When wide-scale text messages need to be sent because the restoration effort is not yet precise enough to give property-specific updates, include a periodic reminder text every few hours to let the community know when more informative updates will be available instead of providing inaccurate OMS-generated ETRs.
- 6. **Expand the communication code vocabulary.** Evaluate the feasibility of creating a new notification type/ outage code to be used when a previously restored or unaffected customers who needs to be temporarily disconnected to provide repairs to another customer. If possible, send these out in advance with an ETR for the expected temporary interruption and an apology for the inconvenience.

B. Municipal Portal Failed to Perform

PSEG Long Island's Municipal Portal is a specialty version of the larger outage map built and supported by Kubra. The Municipal Portal was implemented four years ago to better serve local municipal government officials and major account consultants, giving them a tool to help report and respond to their particularized needs of supporting outage restoration. The Municipal Portal provides the following functions and features:

- Password-protected restricted access to key information about critical facilities within an authorized user's community.
- An ability to enter outage information which flows directly to the OMS when the outage affects a "make safe to clear" condition, such as wires down, public safety condition, or a critical facility need.
- The ability to add detailed information about an outage they report.
- •An ability to see their community's critical assets on a map and any outages affecting them.
- •The ability to use selected condition codes to flag certain conditions about a reported situation to inform PSEG Long Island's dispatch and restoration teams about the need to potentially escalate a response or direct certain resources to a particularized need.
- The ability to receive updates by email, text, or phone as the condition they reported is addressed and resolved.

Until Tropical Storm Isaias, the Municipal Portal was reported to work consistently and reliably. Although not all communities use it, the limitation was on the part of the local communities. We observed in the municipal update conference calls that PSEG Long Island representatives consistently and positively encouraged the use of this tool.

In this storm, the map and its functions suffered the same data latency and data accuracy problems as the other communications and reporting tools. **Municipal officials trying to use the Municipal Portal could not reliably enter information and were often timed out.** ETR restoration estimates were often late or inaccurate. Once data was entered through the tool, or updates requested from the tool, the data processing delays and interruptions made the tool inconsistently available in the early days of restoration. Coordinating emergency conditions became more manual. Automated updates for estimated restoration or service completion were less reliable.

The Municipal Portal relies on the same data integration capacity and reliability with the OMS as the other Kubra-based notification and text solutions. It shares the same technology integration design and data flow. For this reason, it must be included in the overall mitigation and remediation plan for OMS related data integration.

In addition to resolving the data integration and capacity problems with the OMS, we recommend PSEG Long Island develop and execute an emergency communication plan with local emergency and municipal response officials to describe what has been fixed and confirm municipalities' knowledge about and access to the Municipal Portal. We recommend PSEG Long Island provide support in helping municipal officials understand and use it. We recommend PSEG Long Island periodically use the analytics tools provided with the software to observe how municipal officials are using it and seek their advice for improvements and enhancements. Finally, one of the project leaders in implementing this tool has ideas for additional codes and data displays that could be added to improve the usefulness of the tool. We recommend that these be prioritized and implemented.

Recommendation 4.07: Ensure that the Municipal Portal is more Resilient and prepare a backup Mode of Operation in case of OMS failure.

Recommendation 4.08: Execute a communications plan with local emergency and municipal response officials to confirm municipalities' knowledge of the Municipal Portal and describe efforts to fix its operation from what they experienced during Isaias.

C. Social Media Messaging Was Overwhelmed and Many Customer Inquiries Went Unanswered

For PSEG Long Island, social media includes Facebook, Twitter, Instagram, and banner alerts on PSEG Long Island's website and YouTube. Facebook, Twitter, and Instagram are used as two-way tools, while the website and YouTube are outbound communication. PSEG Long Island also includes LinkedIn under the banner of social media, but it is not a communication tool used during outages.

During Isaias, the social media staff were hampered by the same lack of timely and accurate information from the OMS as the other communication channels. The volume of social media posts generated because the other communication channels were down overwhelmed the staff. We estimate fewer than 10 percent of the social media contacts received a direct response. The social media channels themselves did not fail and there were no perceived technology issues.

Social media is used as more than an outbound information tool. A dedicated social media team handles customer inquiries and serve customers on Facebook, Instagram, and Twitter. Facebook and Twitter are the most active platforms used by PSEG Long Island's customers, with 67,000 and 15,000 followers respectively. PSEG Long Island's Instagram account currently has approximately 1,000 followers. PSEG Long Island also maintains informational videos on their website and on their YouTube channel and used the YouTube channel for replaying media briefings during the storm.

In reviewing the repository of social media exchanges, we observed the proactive postings and reactive responses from PSEG Long Island were consistently polite and courteous. The offers for community support with ice and water were detailed and accurate. However, there were times in which the proactive posts indicated overly optimistic ETR times, which resulted in frustrated responses back from customers when the ETRs were not met. And, the sheer volume of posts meant some serious safety hazard posts for fires, wires down, and other dangers did not appear to receive a response. Customers reporting personal safety hardships such as those relying on oxygen or other LSE equipment also did not receive consistent and timely replies.

Fixing the inbound call and text message capabilities will help reduce the burden on social media interaction. Notwithstanding, we recommend PSEG Long Island consider adding artificial intelligence filters to the incoming posts to identify and flag safety and personal safety/personal health related concerns and give those concerns priority in responding to social media posts.

Recommendation 4.09: Better prepare social media staff to handle a barrage of posts using modern artificial intelligence tools.

4.4 OMS Failure Crippled all Digital Customer Communication Channels and Degraded Service Restoration

PSEG Long Island provides multiple channels to customers and stakeholders for both routine and storm and outage related communications. Routine communications include account, billing, and energy usage information. Storm and outage communications include downed wire and outage reporting, customer status and estimated restoration times, overall system status and service restoration activities, and pre-storm notifications.

The service restoration process, whether for routine "blue sky" outages or in the aftermath of major storms, requires the coordinated action of numerous utility staff, relies on information from customers as well as multiple utility operating systems, and when well executed, provides customers with useful expected restoration time information.

At the center of the customer service restoration process is PSEG Long Island's OMS. The OMS, in turn,



depends on timely and accurate information from several other systems. The OMS is also responsible for supplying data, in real time, to other "downstream" systems such as PSEG Long Island's outage map or its outbound texting service to ensure that customers receive prompt status notifications. Figure 3 shows PSEG Long Island's OMS and the ancillary systems that it connects to and feeds.

The OMS did not operate as expected during the storm. While PSEG Long Island has not yet identified the root cause of the OMS failure, PSEG Long Island and the vendor CGI have been able to reproduce the system malfunctions by simulating initial Isaias storm conditions. Now that the technical team has been able to replicate a failure model, the underlying root cause will hopefully soon be identified.

The normal standard for operating technology solutions in a production environment includes monitoring and control for all operating applications and their related infrastructure components. The control action for failure or incipient failure at a minimum is to automatically alert IT support to take corrective or preventative action. Typically, this process is documented, well characterized through testing, logged, and trained for. This level of preparation allows failure conditions to be detected and acted upon before they impact operations users. **PSEG Long Island does not meet this industry standard for monitoring and control of operating applications.**

The OMS receives automatic reports of T&D system damage from sensors in the field that are part of a twoway communication system known as Supervisory Control and Data Acquisition (SCADA), which is also used to send instructions to remote switches in substations and along the distribution system. When the OMS receives damage information from SCADA, it infers that all customers served by the damaged element (e.g., a feeder, transformer or fuse) have experienced an outage. The OMS also receives customer outage information directly when customers call in to report an outage. The OMS system at PSEG Long Island is also capable of processing customer reported outages sent via text messages or using an application on the customer's mobile phone. At present, AMI data is not utilized in the currently-running OMS, only SCADA and customer reports. During Isaias, AMI data was used outside the OMS to confirm restorations.

A. Making OMS Work Right

Multiple failures were found in the OMS system that were related to the processing of customer reported outages whether through telephone, text messages, or website reporting. These failures started early in the storm and continued throughout the storm. In response to these failures, the OMS should be able to transition to storm mode of operation, either automatically or through manual intervention. The capabilities needed for this mode of operation were:

- Operator Control of ETRs during storms. Management can and should control the frequency, accuracy, and content of ETR messages so that consistent customer communications can be achieved across all channels, including "null" ETRs that allow for messages such as, "We are currently assessing damage. PSEG Long Island will update expected restoration times in 24 hours." ETRs are an output of the OMS; when OMS issues automated inaccurate ETRs they must not be sent out to customers.
- Isolate field recovery operations from OMS when it fails. The OMS and Computer Aided Dispatch (CAD) can operate in a way that prevents OMS unresponsiveness from affecting field management activities

A key component of that mode of operation is to manage customer reports, both incoming and outgoing. Presently, PSEG Long Island has configured the OMS to provide a near real-time response to any customer outage report, where every customer report is routed as a message to the OMS and a response is provided to the requestor. **It has been demonstrated through testing that high levels of customer reports, experienced** during Tropical Storm Isaias, caused performance failures within the OMS, with consequent failures in field management activities. An alternative solution is required, where customer reports are decoupled from OMS operation. There are many potential solutions available that deliver this level of decoupling.

Recommendation 4.10: Implement a solution that allows the OMS to decouple customer reporting from field management activities.

There has been discussion with PSEG Long Island of a proposed course of action that would shut off or tune down SCADA events arriving at the OMS. The rationale for this being that increased SCADA activity apparently causes overload conditions within the OMS.

Given that SCADA is the most reliable and important source of information for any OMS, this course of action would seriously compromise OMS functionality and should be avoided, if at all possible.

Recommendation 4.11: Ensure SCADA sensor reports have priority over other outage reports arriving to the OMS.

OMS Version 5.5, which is currently deployed in production-mode by PSEG Long Island, continues to display symptoms of instability when subjected to SCADA stress loads. Version 6.7, which is the latest version, and currently being tested, continues to fail various stress tests. Without a fully developed and tested BCP in place, PSEG Long Island customers remain in risk of another botched response to a new storm event.

Recommendation 4.12: Systematically test the OMS system to ensure that concrete root causes are identified and remedied. If the errors are due to system defects, then demand accountability from the system vendor for timely fixes. Ensure that root causes, not just symptoms, are addressed.

Beyond the failure of the core OMS, users of the CAD system also suffered great disruption. These failures of the CAD system may have just been secondary effects of the failure of the OMS, but this theory needs to be tested. The Enterprise Service Bus (ESB), which serves as the main data highway for all the interconnected systems, should continue to be stress tested to ensure reliability.

Recommendation 4.13: After the OMS faults are diagnosed and repaired, thoroughly stress-test the CAD system and the ESB to ensure there are no independent defects affecting either system.

The mobile application was conceived to enable foreign crews to receive, update, and complete work assignments, thus making it a critical component for an effective large-scale restoration. Yet, while PSEG Long Island earned a performance incentive for initially developing the application, there has not been sufficient urgency to deploy this across PSEG Long Island. It needs to be thoroughly tested at "Sandy plus" scale, using the restoration procedures used on a major event, and procedures should be fully documented in the ERP and tested during exercises.

Recommendation 4.14: Accelerate the deployment of the mobile application for foreign crews and/or their crew guides ensuring that procedures are integrated into the ERP.

Recommendation 4.15: Performance test OMS and "feeder" systems to establish peak capacity.

While establishing software performance limitations, PSEG Long Island IT management should also aim to understand the OMS sensitivity to the addition of hardware resources. Accordingly, standby resources should be provisioned for deployment during extreme storm events.

Recommendation 4.16: Install standby hardware resources for use during peak demand.

- Install standby backup hardware resources, which can be made to join the processing cluster in a load balanced configuration should there be a need for additional processing. Ideally this transition should take place automatically based on threshold but at the very least an IT operator should be able to make it happen either via a few clicks or through a command line script. Similarly, one should be able to take it off the cluster.
- 2. Alternately work with a cloud service provider such as AWS or Azure, to provision an autoscaling system for automatically provisioning additional processing capacity (autoscaling) wherever there is a need and de-provision it when the need goes away. This would be the most cost-effective way to access almost unlimited additional capacity as the additional cost during normal days would be very low.

At present, the PSEG Long Island IT team does not have the ability to modify the timeout values programmed at various inter-system interaction points. If they were able to do this, several complications observed during Isaias, such as duplicate requests being added to the system, could have been avoided.

Recommendation 4.17: Re-architect the inter-system message queuing applications for greater dynamic stability under highly demanding workloads.

- 1. Work with various sub-systems providers such as Intrado, Kubra, CGI, OSI, Mobile Application vendor etc. to implement timeout thresholds that dynamically self-adjust.
- 2. For the long run, work with the above vendors to make their products work asynchronously such that the need for such timeout values goes away. Most modern, high volume systems (Facebook, LinkedIn, etc.) work asynchronously to give the best user experience possible without overwhelming the backend systems. The load on the OMS during storm situations resembles that of a high-volume system and hence such an approach would certainly help.
- 3. Implement either a queue-based system or an alternate throttle enabled way for submitting requests to the OMS.

B. Planning for OMS Performance

At present the PSEG Long Island IT team does not know what the current capacity of the OMS is for handling incoming requests. This is very alarming considering the OMS is a critical piece of backend system infrastructure which connects every other sub-system either directly or via the ESB.

OMS capacity requirements are being formulated by PSEG Long Island staff based on its current configuration. We have seen little forethought to how the load model will change when the AMI system is integrated to the OMS.

It also appears that arriving at peak capacity parameters is not part of the conversation with the system vendors. Given that the OMS is battle-tested only during a storm, understanding performance and capacity limits is a critical part of system acceptance. It will be important to:

1. Realistically model future storm scenarios considering bleak climate projections. Ensure the storm models are correctly translated into simulation parameters.

- 2. Beyond modeling the storm, the test design should consider planned enhancements to the system that would significantly change the load model (AMI integration, for example).
- 3. Do thorough stress testing of the OMS to estimate its raw capacity with the currently deployed hardware infrastructure.
- Repeat the test for each external sub-system which the OMS interacts with in order to estimate the capacity for that interaction. This would include each of the digital channels (HVCA-IVR, My Account/ Mobile App, Kubra Outage Map, iNotify, Muni Portal, Texting + Email, pWeb, SCADA, etc.)
- 5. Define threshold levels for each of the above channels of interaction. Configure monitoring and notification alarms to alert personnel ahead of reaching the thresholds. Train the staff on how to handle the situation for each of these breaches.

C. Monitoring OMS

The PSEG Long Island 2020 ERP states, "Given the critical nature of the OMS and the ancillary systems that support and interface to OMS, system monitoring and automatic error alerting is necessary on a day to day basis and this monitoring activity becomes even more important during high volume storm events. There are processes and tools in place to perform system monitoring, health checks, and automatic alerts for the OMS and its critical interfaces." Our review of PSEG Long Island's system monitoring practices revealed that real-time monitoring is largely limited to infrastructure events and not sufficiently focused on OMS application errors and alerts.

The current practice of monitoring and alerting for just infrastructure issues is not sufficient. **Prudent IT management requires monitoring and generating appropriate alerts for key systems so that errors or incipient failures can be proactively managed**.

Recommendation 4.18: Monitor application performance and error logs of all mission critical application systems, such as OMS, CAD, SCADA, ESB, etc.

We have observed from the OMS logs that certain OMS debug log settings were turned on before and during the storm. While it is occasionally necessary to turn on these settings in a live system but only for a very short time. Prolonged debug logging activity will detrimentally affect system performance.

Recommendation 4.19: As part of storm preparation ensure that all application error and debug conditions have been cleared and the system is operating normally.
4.5 Advanced Metering Infrastructure

At the beginning of 2019, PSEG Long Island began a full-scale deployment of AMI. AMI is an integrated system that includes the smart meters, the communications networks used by the meters to send and receive data, and the computer systems installed to manage communications, store meter data, and interface with other utility systems. The term "smart meters" is often used synonymously for the larger, integrated AMI system.

The rationale for PSEG Long Island's AMI deployment has been detailed in its Utility 2.0 Plan,⁴ first submitted in 2014 including annual updates and reflects PSEG Long Island's project plans and goals with respect to AMI deployment, among other programs. Smart meters serve as an important element in the future smart grid. Among other benefits, **by integrating AMI with OMS, utilities can get a much clearer "picture" of outages during an emergency and should be able to dispatch repair crews more efficiently where they are most needed**.

To date, more than 700,000 meters have been installed on Long Island and the Rockaways. Figure 4 depicts areas of deployment.



FIGURE 4: Percentage of Smart Meter Installations by Zip Code

⁴ http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=45709

A. PSEG Long Island's AMI – OMS Integration is Not Complete

In its July 1, 2020, Utility 2.0 Annual Update, PSEG Long Island reported that "On November 15, 2019, PSEG Long Island successfully launched the integrated AMI-OMS solution, allowing operators to see AMI-reported outages."⁶ **Our investigation revealed that the integration that PSEG Long Island described was a pilot integration for the OMS in version 5.5 and was never fully operational.** PSEG Long Island initially represented that one of the reasons for upgrading the OMS to version 6.7 was to provide additional benefits in the ability to integrate AMI meter outage information but they have not been able to support that claim and later indicated that they were unsure of specific AMI related benefits.

PSEG Long Island failed to complete the integration of AMI data with the OMS. Moreover, on the day that the Utility 2.0 Update was issued, it was no longer accurate for PSEG Long Island to represent that its OMS had any integration with AMI. Whatever benefits were gained from the 2019 pilot integration with OMS, they were lost on June 28, 2020, as a result of the upgrade to OMS version 6.7. For reasons unexplained, PSEG Long Island failed to deploy the integration of AMI outage information as a component of the OMS 6.7 upgrade. If PSEG Long Island had integrated meter outage and restoration information with a functional OMS, its ability to localize outages, avoid unnecessary dispatches of repair crews where power had already been restored and restore all customers' electric service would have been greatly improved.

B. Optimize Smart Meters Configurations to Improve Quality of Outage Information

One benefit that smart meters can provide to utilities and customers is an improved awareness of power outages. The smart meters have the capability to remain powered for a short period of time when an outage occurs and to transmit an alert message (a last gasp message) back to the utility that the power has gone out. The alert messages are transmitted through the AMI communications network and passed to the Meter Data Management System (MDMS).⁷ The MDMS can then provide information about the meters which have lost power to the OMS. There are three different strategies for doing so integrating AMI with the OMS:

- Provide all meter outages to the OMS in a manner similar to customers calling to report an outage. This
 strategy's downside is that in large outages the OMS can be overwhelmed with messages and take longer to
 process all the information.
- The MDMS can filter outage messages based on the meters' location or association with transformers or circuits. The MDMS can be provided with information that allows it to group multiple reported meter outages and then report an outage to the OMS for individual transformers or circuits. This method reduces the number of messages provided to the OMS and prevents data overload, but it does require maintaining data in the MDMS to associate the meters with circuits or transformers.
- The MDMS can monitor and report specific bellwether meters that are at known areas of interest (e.g. near the substation, at the end of the feeder, at the connection point of a distribution lateral, etc.). This method does not provide as much information as the second method but can be easier to maintain and prevents data overload in large outages.

Recommendation 4.20: Accelerate the testing and integration of AMI data into the OMS.

⁷ Meter Data Management System (MDMS) – a database and management system which stores meter data and event information and provides pertinent data to other utility systems. For example, the MDMS provides meter readings to the billing system and the customer portal (MyAccount). It also is the system which passes meter outage information to the Outage Management System.

C. Restoration Management is Not Yet Part of The OMS Integration

Restoration management is another benefit to integrating smart meters with the OMS. During outages caused by storms, it is typical to have multiple outage locations and some of these can be "nested," where the existence of a downstream outage is hidden by an outage upstream. When the upstream outage is repaired, some customers will be restored but those impacted by the downstream outage will remain without power. When power is restored, smart meters report that they have power through the AMI mesh network back to the utility. The MDMS can relay that information to the OMS and allow operators to determine if all expected customers have been restored or use the information about meters that have not reported power restoration to determine the location of nested outages.

During Tropical Storm Isaias, PSEG Long Island sometimes used a manual process to check the power status of meters during restoration work. In these situations, PSEG Long Island was able to confirm the power status of the customers being checked. However, **PSEG Long Island reported more than 8,000 instances of 'OK on arrival' or similar. A full deployment of smart meters and a systematic use of AMI meter power status checks would have greatly reduced the number of wasted crew deployments, accelerating restoration efforts for customers.**

As soon as there is some clarity on the root causes of OMS system failures, PSEG Long Island should complete the integration of the MDMS and OMS to report the meters' power restoration events and verify that all customers expected to have been restored have power and reduce the instances where restoration crews are deployed and find the power restored.

Recommendation 4.21: Complete the integration of the MDMS and OMS to report the meters' power restoration events.

SECTION 5 EMERGENCY RESPONSE PLANNING AND PREPARATION



5.1 Emergency Response Exercises and Training

PSEG Long Island conducts several exercise sessions of its ERP each year covering (1) tabletop exercises of ERP elements, (2) customer communications, (3) certain operational components (e.g. damage assessment and crew dispatch), and (4) alternate transmission control center operations.

A. Exercises Are Formulaic, Providing Little Preparation for Contingencies

The annual "tabletop" emergency response exercise is overly scripted. It glosses over the real challenges of a true event. The exercise tests routine activities and does not adequately consider all of the emergency contingencies that might arise during a storm.

The tabletop exercise uses very basic injects that only test for process type knowledge, not decision-making skills. No depth chart exists for key positions such as the incident commander, section chiefs, or other key officers. It is not a tabletop exercise consistent with industry norms.

Benchmarked against peer utilities, PSEG Long Island's emergency training and exercises are less thorough and lack breadth compared to other peers. It appears that PSEG Long Island relies more on institutional knowledge from participating in prior storms than skills developed through trainings and exercises.

B. Emergency Response Training Lacks Organization and Governance

There is no strong governance around the training and exercise programs. There are no centralized records or tracking systems. Each instructor keeps their own records of attendance and maintains and updates their

own materials. Trainings are mainly task-focused information dissemination sessions. They provide trainees with basic skills needed to perform their storm roles, assuming all supporting systems are functional. Training does not address abnormal conditions, such as loss of OMS, or down communication systems that require dispatching of crews by radios.

Training for employees who do similar duties in day-to-day routine operations and storm duties (e.g. troubleshooters and call center agents) fall under their own organizations, and not under the Emergency Planning organization. ERP trainings should be specialized. All ERP training should be coordinated by one organization, and should be received by all employees, regardless of their traditional roles. The Emergency Planning organization should be in charge of ERP training for the entire organization.

Individual exercises, both tabletop and functional exercises, are adequate to test information flows within each function. But they are seriously lacking in assessing how information passes between different functions. They do not use complex injects, and do not test decision-making capabilities at an organizational level. And PSEG Long Island does not run exercises to test information flows between groups.

However, in and of itself, the ERP does not take the place of detailed procedures nor does the ERP reference any BCPs. ERP protocols should be rigorously tested and trained on, and regularly drilled to ensure performance. Where a system is critical to storm response, such as OMS, the BCP should be tightly integrated with the ERP and its associated training and drills. Every BCP should also contain appropriate guidance on who in Long Island will have the authority to activate and under what circumstances.

Recommendation 5.01: Improve Emergency Planning governance so that utility-wide Emergency Training is under one Emergency Planning Team and not dispersed among various departments.

Recommendation 5.02: Develop more rigorous ERP training and exercises to (a) test decision making, decision paths, and how information passes between functions, and (b) exercise well-developed BCPs.

Recommendation 5.03: Develop simulations of emergencies and war-gaming exercises so that the response team can be challenged with realistic scenarios.

Recommendation 5.04: Create BCPs for all mission critical systems and processes.

C. PSEG Long Island's Incident Command Structure Should be Strengthened

PSEG Long Island uses a form of an Incident Command Structure (ICS). **Opportunities exist to strengthen PSEG Long Island's ICS structure and some roles within it.** Most ICS structures rest beneath a broader Crisis Management System that has an "All Hazards" focus. For large-scale restorations, a Crisis Management Team (CMT) deals with political, government, financial and other roadblocks to relieve the ICS of high-level strategy development. This allows the ICS to have laser-like focus on situational awareness and decision making related to operations and customers. This is essentially a "delegation of duties" construct.

PSEG has a CMT in New Jersey, but it was not activated during Isaias, despite the significant IT system failures on Long Island. Invoking the CMT likely would have been helpful to the Long Island ICS during the storm. It also begs the question: If there were simultaneous emergencies in New Jersey and Long Island would Long Island operations receive sufficient attention from the New Jersey based CMT?

Given the unique governance structure of the LIPA/PSEG Long Island relationship there should be a purpose-built LIPA CMT. LIPA must be made routinely and continually aware of the "state of the system"

by PSEG Long Island. This should encompass all major risks, out of service functionality and resources, and applicable contingency plans. Had a Long Island CMT been in place before Isaias, routine crisis preparedness communication would have ensured that LIPA was aware of PSEG Long Island's OMS performance issues in June when they were initially identified, rather than learning about the consequences after Isaias.

Recommendation 5.05: Establish a CMT made up of PSEG Long Island and LIPA executives to ensure focus on Long Island operations and sufficient information flow to LIPA to conduct oversight.

PSEG Long Island utilizes components of FEMA's National Incident Management System (NIMS) in its storm response process. NIMS serves a guideline for all levels of government, including the private sector, to work together to prevent, protect, mitigate, respond to, and recover from emergencies and/or incidents. However, situational awareness is the key to any effective ICS. While the general structure of PSEG Long Island's ICS is consistent with NIMS, failures of technology were exacerbated by lack of visibility and some adjustments to the ICS could have mitigated the situation. Given the ever-growing dependence on technology a technology officer should be established within the ICS as a direct report to the Incident Command leader.

Recommendation 5.06: Modify the ICS to provide better visibility to the performance of mission critical technology.

D. PSEG Long Island Missed an Opportunity to Use Resources Available from National Grid

PSEG Long Island's damage prediction model determined that an additional 1,500 high voltage Full-time Equivalents (FTEs) and 300 tree-trimmer FTEs were necessary to supplement the internal workforce before Isaias. That number was eventually increased to 2,500 based on an updated forecast. In total, the forecast model estimated that 3,611 FTEs were needed for this event.

PSEG Long Island acted on the damage prediction model to secure crews and continued to accept mutual aid crews as they became available through August 12. Eventually, approximately 4,500 mutual aid FTEs were deployed during the storm.

PSEG Long Island could have obtained, but did not, the services of the nearby National Grid Gas employees under an existing Emergency Assistance Agreement intended particularly to support damage assessment and materials handling. They could also have looked for support from National Grid Generation employees who had been available to support storm restoration under prior agreements with National Grid. PSEG Long Island does not have an ongoing training program for the National Grid resources, which is a missed opportunity.

While the line resources acquired were adequate during Isaias, there was also an opportunity to better utilize tree trimmers and acquire off-island tree resources. More tree resources trained in the same work practices as on-island resources would have accelerated the restoration. For example, some of the off-island sustaining tree resources would not remove limbs when a circuit was energized.

Recommendation 5.07: Expand the Emergency Assistance Agreement with National Grid to include Generation employees.

Recommendation 5.08: Institute a program to train National Grid Gas and Generation resources to support damage assessment and materials handling work during major storms.

Recommendation 5.09: Work with off-island sustaining tree contractors to develop consistent work practices, especially for removal of trees from energized lines ("working hot").

5.2 Storm Management and Restoration

A. Damage Assessment Operations were Slow

PSEG Long Island's damage assessment was slow and became a major hurdle in storm restoration and providing accurate ETRs to customers, as noted in PSEG Long Island's draft CATRR. **We observe that damage assessment crews were deployed all the way to the end of the storm, rather than the normal profile of damage assessment activity being frontloaded in a storm**.

As noted in the storm meeting notes of August 7, PSEG Long Island "did not know how many damage locations [were] associated with [the reported] incidents". On August 9, storm meeting notes indicate that "survey personnel are in the field giving us details on the work [to be done] out there" and PSEG Long Island reported that they were still seeking an additional 30 damage assessors through mutual assistance. As late as August 10, PSEG Long Island reported that they continued to find downed trees that had caused customer outages. None of this is consistent with a robust damage assessment plan and process.

Damage assessment was also hindered by OMS. Without the ability to enter damage information into the mobility solution the process was completely manual and unpredictable. Again, a robust BCP would have accelerated the assessment. Moreover, since the mobility application was first developed it has not been subjected to a full-scale test or any regular testing by sustaining contractors or PSEG Long Island personnel. No testing also means a lack of training in this context. Also, PSEG Long Island missed an opportunity to make use of National Grid resources to assist in the damage assessment as noted in the prior section.

Recommendation 5.10: Undertake a thorough review of damage assessment crew management processes and especially performance shortcomings during Isaias. Ensure that the damage assessment protocols are optimized and that they leverage modern field management technology (e.g. mobility app).

B. Field Restoration did not Implement Circuit Sweep Protocols

For circuit sweeps, crews get assigned to a circuit, or segment of a circuit, and complete all the repairs necessary to restore all customers on that circuit or segment before moving on to the next job in the restoration. PSEG Long Island had this concept in its playbook but did not have a plan for how to decide when to use it. Nor had they ever tested its use.

This caused customer frustration. Customers without power who had been out for a long time saw crews leaving their neighborhoods to restore larger blocks of customers elsewhere. Beyond customer frustrations, it is also likely that keeping foreign crews on one circuit, and one neighborhood allows the utility to break the crews up into smaller numbers and speed restoration. When crews leave a neighborhood, the re-mobilization causes lost time, because circuit and equipment familiarization are lost in the move.

This approach is best used later in a storm, when the impact on the overall storm restoration time of crews continuing to work in a single area on repairs that impact ever smaller groups of customers (and eventually many single customers) is worthwhile for the customer perception benefits and the re-mobilization time savings.

Recommendation 5.11: Create criteria to guide implementing circuit sweeps during long outages whenever customers have been out for more than 3-4 days and enough line resources are available.

C. Decentralized Remote Dispatch Authority and Remote Command Authority could have improved PSEG Long Island's Isaias Restoration Efforts

Given the number of outages and incidents during Isaias, PSEG Long Island appropriately activated Remote Dispatch Authority (RDA). RDA was implemented because it was clear that off-island resources would exceed dispatch capability of the existing OH/UG divisional or area consoles. However, **as stated by PSEG Long Island in its draft CATRR, the RDAs were not appropriately staffed, trained, or prepared to function in a world without OMS**. Employee team storm assignments should also seek to balance knowledge levels across the RDAs.

At the same time, Remote Command Authority (RCA), which gives substation operators the authority to control circuits and dispatch work in their areas, could have been activated at the dispatch area level because of the extensive damage and the presence of so many outside utility crews and contractors. This local control, if well executed, could have expedited repairs during Isaias and restored service sooner.

Recommendation 5.12: Improve Training for Remote Dispatch Authority, including on BCPs. Prepare to implement Remote Command Authority, when advantageous.

D. Parallel Restoration Processes Need Improved Planning and Optimization

The ERP allows for the use of low voltage technicians to restore local damage (principally pole to house) beginning as soon as such resources are available. This technique was not used in any great measure during the restoration. Many service drops and secondary work waited until later in the storm for attention. **Effectively using non-high voltage utility personnel trained to execute service work and low voltage electricians early in the restoration requires a deliberate effort in planning, training, refresh training and exercises.** But the practice can be highly effective at "clipping the tail" of the restoration curve. These smaller, high volume repairs can be completed in advance while the high voltage distribution circuitry is repaired.

PSEG Long Island should explore the ability of National Grid Gas and Generation employees to provide low voltage mutual aid, including any necessary training obligations.

Local electrical contractor personnel offer another local resource pool for this de-energized service repair work. Contractual arrangements, deployment plans, and some advance training all need to be in place in advance of a storm event in order to effectively utilize these resources.

Recommendation 5.13: Explore using National Grid resources and local electrician resources for emergencies. Work with National Grid and local electrical contractors to train a workforce to make repairs to low-voltage service drops.

E. ETR Philosophy and Management Needs to be Revised

Absent power restoration, ETRs are the most essential element of a restoration from a customer's perspective. Given ever-increasing weather impact and the numerous channels by which ETR's are delivered to customers, full end-to-end quality monitoring of ETR accuracy is critical to each customer's own contingency plans.

ETR philosophy and restoration philosophy need to go "hand in glove." In a fully decentralized restoration operation, a tiered restoration approach should be an option for ICS to implement if the restoration is large and focused enough. This begins with a Null ETR (no ETRs given during initial damage assessment and transmission restoration), then moves to global, regional, substation and circuit based and finally individual

ETRs. As explained in the *30-Day Report*, **PSEG Long Island failed to develop, test, and train on the necessary processes to use a Null ETR as the starting point**. They did issue a global ETR at 9:45 a.m. on Thursday, August 6, approximately 38 hours into the restoration.

As described in PSEG Long Island's draft CATRR, PSEG Long Island staff apparently referred to the ERP matrix (see Figure 5) in issuing the Global ETR. They noted that they had more than the threshold of 115,000 customers out. So, Isaias qualified as a "Red" event and they then applied the ERP guideline of "4+ days" to justify a Global ETR of four days. To complete the restoration by Saturday night, 58 hours hence, required restoration of somewhere between 110,000 and 240,000 customers, based on the range of customer outages estimated by various means in the draft CATRR. That would have been a Herculean accomplishment, given that restoration of area and neighborhood outages impacting ever smaller blocks of customers was just beginning.

All of this demonstrates how Long Island customers need PSEG Long Island to have all the ETR and restoration strategy tools in their toolkit. And PSEG Long Island needs to have tested, trained, and be prepared to use each of these tools. During Isaias, the ERP provided references to a form of tiered restoration but provided no detail as to when and how to implement the approach.

Additionally, the OMS needs to be managed during large-scale events, and this requires good real time performance monitoring on a system level. PSEG Long Island should create an ETR manager with staff that reports to the ICS.

Recommendation 5.14: Develop a backup plan for tiered restoration in large-scale events. Train and exercise for tiered restoration operations.

Recommendation 5.15: Create an ETR Manager with staff to monitor OMS systems and ETR quality. The ETR Manager should report to the planning chief within the ICS.

FIGURE 5: ERP Storm Classifications

_	Storm Level Emergency Classification	Condition I "White"	Condition II "Blue"	Condition III "Red"
Weather	Weather Conditions	Normal Weather Minor/Moderate Lightning Light/Moderate Snow Light/moderate Winds	Tropical Storm, Nor'easter Sever Lighting Heavy Snow >6" with SLR<8:1; Ice Accretion >3/8"	Cat. 1-3 Hurricene, Tropical Storm, Nor'easter, Major Ice Storm, Heavy Snow >6" with SLR <5:1; Ice Accretion >1"
	Sustained Wind Speeds (months)	<30 MPH (4/1-10/31) <45 MPH (11/1-3/31)	30-65 MPH (4/1-10/31) 45-75 MPH (11/1-3/31)	>65 MPH (4/1-10/31) >75 MPH (11/1-3/31)
Outages	Expected Customers Interrupted	<5,000	5,000-115,000	>115,000
	Expected Damage	Minimal to Minor	Moderate; Isolated	Severe; Widespread
	Expected Restoration Days	N/A	1-3 Days	4+ Days
	Outage Management System (OMS) Incidents*	Up to 75 per Division	75-475 per Division	>475 per Division

F. Restoration Verification Performed Poorly During Isaias

Work force efficiency largely depends upon the ability of the utility to identify primary outages (main line etc.) but also to identify underlying outages (nested and individual) in a timely fashion. During Isaias this was a major problem for PSEG Long Island. This inefficiency offset the advantages of the considerable work force that was available for restoration operations.

For example, over the three-day period August 11 through 13, 3,995 work assignments were recorded as "OK on arrival," compared to only 1,974 work assignments completed that actually restored customers. This means that for every job site where a crew completed repairs to serve customers, that crew visited two other locations where no repairs were needed. In total over 8,000 truck rolls resulted in "OK on arrival." This is a waste of resources that could have instead sped restoration.

In every major storm, nested outages result in complications. As OMS algorithms group outage reports based on network topography to identify likely outage locations, the identification of additional outages downstream of the identified failure location is beyond traditional OMS capabilities. Instead, utilities have come to rely on a combination of damage assessment surveys, customer reports, and outbound "power restored" confirmatory phone calls to identify where there are additional nested outages.

As discussed earlier, PSEG Long Island is implementing AMI technology, which offers a robust tool to rapidly verify both potential outages and the extent of restoration achievements. The integration of the AMI outage notification and power on verification features with the OMS provides a powerful tool to both proactively identify customers who continue to be out of service and to reduce "OK on arrival" outage tickets. **PSEG Long Island** should accelerate both the AMI deployment and the integration of the AMI data feeds into the OMS to better identify nested outages. Even a 50 percent reduction in these unnecessary truck rolls through the use of AMI could significantly reduce the overall restoration time for the next storm.

Recommendation 5.16: Review restoration verification protocols under "no-OMS" scenarios and ensure that they function efficiently. Leverage the AMI data in OMS to efficiently identify nested outages.

5.3 Life Support Equipment Customers

PSEG Long Island has a number of obligations to customers who notify the utility that they or someone in their household uses electrically powered Life Support Equipment (LSE), and who therefore may require assistance from local or county emergency services agencies during an outage. PSEG Long Island's ERP spells out the procedures for contacting LSE customers in the wake of an emergency. A detailed description of the LSE program is included in the *30-Day Report*.

LIPA Audit of Life Support Equipment Customer Process

LIPA previously found significant weaknesses in PSEG Long Island's process for maintaining the LSE customer list. A December 2018 Internal Audit of PSEG Long Island's processes noted that PSEG Long Island reported roughly the same number of LSE customers as Con Edison, which has roughly three times the number of electric customers.

The audit found that PSEG Long Island's process for maintaining the LSE customer list in 2018 consisted of a single letter sent annually, with only a 43 percent response rate. Prudent utility practice is to make multiple attempts to reach LSE customers, reconfirming their continuing use of LSE each year, as well as updating their contact information. The audit noted that "during a storm event, unnecessary calls and field visits may be made to LSE accounts, where the LSE customer may not qualify for an LSE designation, thereby risking the LSE customer that may truly require help and may not be reached."

In addition to the LIPA audit, the 2018 Winter and Spring Storms Investigation by DPS, which was issued in February 2020, had three recommendations for all New York State utilities to follow related to LSE customer lists due to issues experienced by utilities in those storms, including **"all utilities certify that the LSE customer lists and information have been updated and verified at least twice per year."**

In response to the December 2018 audit, PSEG Long Island submitted a management action plan to LIPA to implement LSE process changes and improvements.

Based on reports of inaccurate customer lists during Isaias, LIPA launched a re-audit of PSEG Long Island's process for maintaining the customer list in September 2020. The audit currently underway determined that 6,983 annual LSE certification letters were sent out for the 2019 mailing and 2,660 responses were received, resulting in a 38 percent response rate, which was actually worse than the finding in the 2018 audit. The mailing requested the LSE customer to self-certify their LSE status and did not include a request for a recertification from a medical professional. In addition, there was no second mailing or third certified return receipt mailing for the non-responses.

PSEG Long Island formed a Customer Safeguard Solutions (CSS) organization in January 2020, over a year after LIPA's audit. CSS is a team of five dedicated to maintaining the LSE customer list. However, **only after the failed response to Isaias did CSS initiate a call campaign to contact LSE customers to determine whether the LSE account designation was still required and to update customer contact information.** CSS made 6,363 calls resulting in contact with 2,851 (44.8 percent) LSE customers. As a result of Isaias, the Call Campaign and other LSE update activities, CSS determined that a significant number of customers designated as LSE no longer required nor qualified for the LSE designation.

On October 8, 2020, the 2020 annual LSE recertification mailing began. At LIPA's insistence, this mailing included a separate form for a medical professional to certify the LSE customer's need. CSS has committed that if the LSE customer does not respond to the first mailing, a follow-up second letter will be sent. If no response

is received from the second letter, a third certified return receipt letter will be sent. On a case-by-case basis, field visits may be conducted. The 180-day Report will include the results of the 2020 annual LSE recertification mailing.

Even after LIPA's 2018 Audit revealed shortcomings in maintaining the LSE customer list, as well as the DPS recommendations from the 2018 Winter and Spring Storms, it took PSEG Long Island management nearly two years and a poor storm response to take steps sufficient to the scale of the problem.

Recommendation 5.17: Benchmark the PSEG Long Island process to maintain the LSE customer list to the best practices used by other New York utilities. Evaluate the success of the 2020 LSE recertification and implement corrective actions so that 95 percent or more of LSE customers recertify their needs and update their contact information each year.

SECTION 6 PSEG LACKS TRANSPARENCY

6.1 Facts LIPA Learned from Discovered E-mails

LIPA's investigation has uncovered poor preparation before Isaias and management actions during Isaias and the recovery period afterwards that exacerbated the poor storm response. Major systems were not working, and PSEG was not able to shut down or isolate malfunctioning systems from other interconnected systems.

In addition to technical and management failures, **the Task Force has found instances where PSEG Long Island and PSEG staff in Newark have been less than fully transparent with LIPA before, during, and after Isaias**. For example, below are facts that LIPA uncovered from "discovered" emails and interviews:

For example:

- •Following a poorly implemented software upgrade in June, OMS exhibited instability during July, as well as lags in transactions.
- On July 16th, PSEG Long Island employee emails stated: "we are NOT even managing a day by day basis and we definitely are NOT prepared for a weather event. Management needs to know this is no closer to being resolved after 3 weeks."
- •OMS crashed on July 17th. PSEG Long Island management considered reverting to an earlier version of OMS.

Despite PSEG Long Island's full knowledge that OMS was not working before the storm:

- •Before Isaias hit, at 11:30 a.m. on August 4, CAD was already suffering a bottleneck "again" of 2.5 hours of unprocessed jobs. This meant OMS was not working before the storm hit.
- On August 6, a manager states: **"Maybe one of our LL (lessons learned) is that we cannot go live on a** system before storm season."
- •Another internal email on August 7 notes that OMS still was not working.
- \cdot Yet another email on August 8 states that the system is "2 $\frac{1}{2}$ hours behind on jobs."

OMS did not crash because of Isaias. The systems exhibited serious problems before Isaias. And despite a poorly functioning system during storm season, when Isaias hit, PSEG Long Island had no manual workarounds or BCPs in place.

Importantly, at no time did either PSEG Long Island management or PSEG IT management in Newark inform LIPA of the challenges with the OMS, hindering LIPA's ability to exercise oversight on this mission critical system. In fact, even after the storm and the catastrophic crash of the OMS, LIPA had to learn about the problems with the upgrade to OMS version 6.7 from reading PSEG's emails.

Transparent organizations are open and honest about problems with their key business partners. PSEG staff appear to report what they wish to whom they wish. They do not always report critical information to LIPA.

In at least some instances, this lack of transparency appears to have been directed by PSEG management in Newark. For example, a text message at 10:34am on August 5, 2020 from his Newark boss to PSEG Long Island's Director of IT states: "And make sure you are on the phone with LIPA and dps today. Again, we should always assume that detailed info about our systems will go to [Mark] Harrington [a Newsday reporter] so a measured response is appropriate. We need to say that we developed work arounds and we will be monitoring our Systems through the day."

The lack of transparency also extended to PSEG's public messaging. On August 4th, PSEG in New Jersey drafted a public statement that blamed Verizon for its woes: "The storm affected communications systems, creating challenges in getting information to our customers. PSEG Long Island is reliant on Verizon for its internet and telecommunications systems. Without reliable support from Verizon, our systems cannot perform the as they should."

PSEG's public statement did not mention the OMS that was "again" suffering a bottleneck of 2.5 hours of unprocessed jobs before the storm hit that day, or three weeks earlier was "NOT prepared for a weather event." The statement elicited the following uncomfortable reaction from a senior leader in Long Island: **"I feel we may be a little too heavy on Verizon. Just my take."**

Undaunted, a news article critical of PSEG Long Island prompted the following response on August 5 from a senior PSEG New Jersey official: **"we need to figure out how to make Verizon the lead. Let's talk in the morning."** This statement came after an email the previous evening that stated: **"Heads up – we're experiencing a series of IT issues here with our OMS and call center. Customers cannot currently call, text or use website to report an outage. Our outage map is down."**

6.2 PSEG's Root Cause Analysis is Incomplete

PSEG's root cause analysis is another example of a lack of transparency.

On August 12, LIPA requested that PSEG Long Island share their root cause analysis of the issues experienced during Isaias, even if preliminary. This request was formally reiterated on October 20, after the Task Force was repeatedly told for weeks that such analysis remained under review.

On October 27, PSEG Long Island provided the "Tropical Storm Isaias Causal Analysis Team Review Report" or CATRR marked "Draft for LIPA Review." The CATRR incorporated three IT related reports dated September 11 that were provided previously as well as an additional fourteen-page analysis. PSEG asked LIPA to comment on the CATRR by October 29, after which time it was expected that the CATRR would be released to the public.

Due to its ongoing, independent investigation, LIPA declined to markup PSEG's October 27 CATRR, other than to provide the verbal feedback that the report stopped well-short of a root cause analysis.

On November 12, PSEG informed LIPA that "in part based on LIPA's reaction to the draft [CATRR], and based on LIPA's 90-Day Report draft, we will not be issuing the report [to the public] in that form, or with the findings/ conclusions contained therein." However, the October 27 draft remains the only root cause analysis that has been provided by PSEG to the Task Force as part of this investigation, and while PSEG may now wish to revisit it based on the Task Force's 90-day Report, the draft is an input into the Task Force's oversight of PSEG operations.

The draft CATRR provides a window into PSEG management's response to the numerous failures during **Isaias**. The draft CATRR states "it's important to determine accurately root causes so effective preventative and corrective actions can be implemented" and that the CATRR will present a "thorough, self-critical, and exacting assessment."

In PSEG's draft CATRR, Isaias was described as the worst weather event since Superstorm Sandy in 2012, causing an unusually large amount of damage in a short period of time. This led to an "unprecedented" volume of calls and messages that exceeded the telephone system's communications-handling capacity, losing numerous calls, and flooded the OMS, causing the OMS to crash. With OMS failing, PSEG stated it was unable to support the management of recovery and sent customers over-optimistic inaccurate ETRs.

The message: Isaias was unusual, the resulting volume of calls was unprecedented, and so systems crashed. However, **PSEG's statements throughout the draft CATRR either leave out or are inconsistent with other known facts.** For example:.

- •PSEG reports that they tested OMS, suggesting that it was ready for a major weather event (Page 6 of CATRR). PSEG further states that they tested the OMS systems at 90 percent customer outages, in accordance with DPS guidance, but that DPS guidance does not provide details on the rate or time period to test over. What is left out is that the DPS guidance is the minimum standard. **PSEG is responsible for adequately designing the tests of the OMS, not DPS**.
- The draft CATRR points to vendors wherever possible. For example, it attempts to lay the blame for communications failures on Verizon: "The apparent cause of the issue according to Verizon is that call patterns and technology have changed over time and PSEG LI customers are no longer using Verizon plain old telephone (POTS) lines as they had in the past." But it was PSEG Long Island's job to establish telephony capacity requirements, design an adequate telephone system, and periodically test it, not

Verizon's responsibility. There is no evidence that PSEG had tested or exercised this system at all at the required high volumes.

- PSEG briefly acknowledges that OMS was not working well before the storm following an upgrade to version 6.7 of the software. PSEG explains that it did not roll back the OMS to the earlier version because PSEG "expected that the vendor would implement fixes for the identified issues within a short period of time" (i.e. the failure was the vendor's fault). PSEG glosses over the fact that it apparently did not adequately test the OMS 6.7 before rolling it out. If PSEG appropriately tested the system, why did it not realize the system had issues before it rolled it out? Did PSEG knowingly roll out a system with issues at the beginning of the Atlantic Coast hurricane season? Why did management stick with a non-functioning system during the hurricane season? According to emails produced to LIPA, PSEG Long Island's Chief Operating Officer suggested rolling back to version 5.5 of the OMS software in mid-July but that was not acted on by PSEG IT.
- •PSEG does not acknowledge that even the prior version of the OMS (version 5.5) failed under more rigorous stress testing conducted following Isaias. PSEG was apparently operating an inadequately designed and tested OMS system for several years without knowing it. The draft CATRR does not explain why.
- On Page 7, PSEG references the DPS NorthStar management audit. In 2013, NorthStar recommended PSEG test the call center and plan capacity on an ongoing basis. In 2018, NorthStar reviewed its 2013 recommendations and marked the item complete in a table summarizing the recommendations. PSEG states in its draft CATRR that NorthStar "determined that PSEG LI had completed every communications recommendation that NorthStar had recommended," although we can find no such statement in NorthStar's report. **PSEG also fails to mention that there is no evidence that it had reviewed the capacity of the system in anything other than a cursory way at any time and at no time did PSEG stress test the call center. It is possible NorthStar relied on statements by PSEG that the capacity of the system had been reviewed. There is no evidence that NorthStar independently assessed PSEG Long Island's testing or capacity planning during the 2018 audit. At the very least, PSEG did not review capacity on an ongoing**

FIGURE 5:

ERP Storm Classifications

	Storm Level Emergency Classification	Condition I "White"	Condition II "Blue"	Condition III "Red"
Weather	Weather Conditions	Normal Weather Minor/Moderate Lightning Light/Moderate Snow Light/moderate Winds	Tropical Storm, Nor'easter Sever Lighting Heavy Snow >6" with SLR<8:1; Ice Accretion >3/8"	Cat. 1-3 Hurricene, Tropical Storm, Nor'easter, Major Ice Storm, Heavy Snow >6" with SLR <5:1; Ice Accretion >1"
	Sustained Wind Speeds (months)	<30 MPH (4/1-10/31) <45 MPH (11/1-3/31)	30-65 MPH (4/1-10/31) 45-75 MPH (11/1-3/31)	>65 MPH (4/1-10/31) >75 MPH (11/1-3/31)
utages	Expected Customers Interrupted	<5,000	5,000-115,000	>115,000
	Expected Damage	Minimal to Minor	Moderate; Isolated	Severe; Widespread
ō	Expected Restoration Days	N/A	1-3 Days	4+ Days
	Outage Management System (OMS) Incidents*	Up to 75 per Division	75-475 per Division	>475 per Division

basis, as recommended.

- PSEG Long Island management did not extend ETRs or issue "null" ETRs, despite extensive storm damage and failing IT systems. When the OMS was overwhelmed, PSEG Long Island management simply did not execute a response commensurate to the magnitude of the problem. Instead, in PSEG's draft CATRR account, PSEG Long Island simply followed the ERP (which they note was approved by LIPA and DPS) in assigning a 4-day restoration period because "4+ days" was the guidance for a "red" storm in the ERP, as illustrated in Figure 5. As described in Section 5, this ETR was unreasonable based on the information PSEG Long Island had at the time.
- On two issues, the draft CATRR does state at page 12 that there were inadequacies on PSEG Long Island's part:
 - o Training PSEG basically admits training of staff was inadequate when they discuss RDAs.
 - o The Incident Command System did not work. Leaders were diving down into "lower level issues."

The draft CATRR provides insight into PSEG's depth of review. It lists corrective actions, some already undertaken, some underway and others recommended for future. **The corrective actions mostly focus on operations and systems, but management failures are resolutely ignored**.

Self-criticism is difficult under even the best of circumstances. Unfortunately, the outages from Isaias were high, the failings were major and obvious, and the track record is not good. Notwithstanding PSEG's apparent conclusions in its draft root cause analysis, PSEG failed, among other things, to adequately train and prepare for weather events; to adequately design and test systems; to build BCPs in the event of system malfunctions; to intervene when systems failed; and to implement an effective CMT.

Second, in blaming vendors for management shortcomings and name dropping DPS, LIPA, and NorthStar in rationalizations, it is unlikely PSEG will identify the management inadequacies that must be addressed to avoid a repeat of its Isaias mistakes.

Finally, management in Newark, responsible for convening the "Causal Analysis Team" and reviewing the report before it was issued to LIPA did not correct the inconsistencies with known facts before sending its "root cause" explanations to the Isaias Task Force.

The inconsistencies and omissions in the draft CATRR reinforce LIPA's conclusion that it cannot rely on PSEG's statements without independently and objectively verifying the facts and validating all findings and conclusions.

Recommendation 6.1: PSEG should review the Isaias Task Force's 90-day Report and issue a CATRR that fully addresses the root causes of its failed storm response, including the management shortcomings documented in this Report. PSEG should implement an improved after action review process for future storms that has greater rigor.

LEADERSHIP AND MANAGEMENT

In the three previous chapters we present technology and service restoration findings that are inevitably linked to the overall leadership, management culture, and the organizational structure of PSEG Long Island. In this Chapter, we consider leadership and management issues that led to the Isaias failures and recommend corrective measures.

7.1 PSEG Long Island IT Management Weaknesses

While the Isaias Task Force has been driving the PSEG Long Island technical team to urgently diagnose and fix the OMS, a number of management weaknesses within the PSEG Long Island IT technical team, including its management in Newark, have emerged. They include:

- **Project execution needs improvement**. Lack of organization and poor planning in initiating and driving projects to resolution Work plans lack goals, structure, organization, and well-thought-out pathways to success.
- Lack of technical depth within internal PSEG Long Island, PSEG IT in Newark, or consulting staff. While there are some very strong individuals organizationally PSEG Long Island is over-dependent on the OMS vendor (CGI) technical support and does not have a strong technical oversight team.
- Weak vendor management skills in the organization. PSEG IT management have not demonstrated their ability to align vendors to their technical objectives. This has resulted in long, drawn-out project cycles, inter-vendor finger-pointing, and resultant project risk.
- Ineffective risk management approach. For example, we learned that the OMS 6.7 version was already failing during blue sky days a month before the storm. Despite these ominous warnings, PSEG IT management continued with this version into storm season.
- Lack of transparency. PSEG Long Island and PSEG IT management in Newark did not disclose the string of system failures of OMS 6.7 to LIPA management. Without honest disclosure, LIPA was limited in its ability to exercise its oversight role.
- Playing the blame game. PSEG Long Island has been slow to own up to its neglect of the telephone system and OMS, as discussed in Chapter 6, deflecting responsibility on to vendors, the DPS, LIPA, NorthStar, and the "unprecedented" storm.

The above shortcomings can only be resolved with a complete restructuring of PSEG Long Island's IT organization. To begin with, PSEG Long Island should appoint a qualified "turnaround" CIO responsible for PSEG Long Island who reports directly to PSEG Long Island's Chief Operating Officer and has budgetary control of PSEG Long Island IT investments. Given the current cybersecurity climate, a Chief Information Security Officer (CISO) dedicated to Long Island is also called for.

Remote management of the PSEG Long Island IT function from Newark has resulted in loss of ownership and accountability to LIPA customers. In 2014, when the OSA was instituted, PSEG Long Island had a dedicated Vice President located on Long Island with actual management control in the areas of IT and Finance. PSEG Long Island veered away from this by restructuring its contract with Lockheed Martin. The new matrixed structure may have financially benefited PSEG but has been detrimental to LIPA and Long Island **customers.** Under the current structure IT services provided to LIPA report to three different organizational silos in New Jersey, as illustrated in Figure 6.

FIGURE 6:

Matrix Organization Structure Providing Information Technology to PSEG Long Island



LIPA is being poorly served by the existing IT structure that reports to Newark, which lacks accountability to LIPA or Long Island operations. Long Island IT should be centralized under one Enterprise PSEG Long Island IT organization with separate LIPA IT systems from those in New Jersey.

Recommendation 7.01: Appoint a dedicated "turnaround" CIO at PSEG Long Island.

Recommendation 7.02: Appoint a dedicated CISO at PSEG Long Island.

Recommendation 7.03: Centralize Long Island IT under one PSEG Long IT organization with separate LIPA IT systems from those in New Jersey.

Lack of strong project management and project execution culture in the IT area is another dimension of lack of accountability and another reason to demand stronger oversight. IT projects are worked on with insufficient documentation of project objectives and well-thought-out project plans. Despite repeated requests, the Task Force have not been able to elicit documentation on project plans and system requirements from any of the IT systems that have been subject of investigations. This lack of project management focus has contributed to the fact that 90 days since Isaias PSEG Long Island there are no fully tested and accepted solutions to the telephony issue nor the OMS problem. It is also disappointing that, to date, PSEG Long Island IT management has not been able to extract guaranteed performance assurances from any of the relevant vendors. Recent failures of several performance and load tests further erodes confidence in management's ability to deliver successful projects and solutions.

Recommendation 7.04: Initiate programs to develop stronger project management capability in PSEG Long Island's IT practice areas.

7.2 PSEG Long Island Management Needs an Ownership Mentality.

Not everything that needs to be done to deliver great value for Long Island electric customers is or can be quantified in a Balanced Scorecard. Owners worry about what risks, large and small, can go wrong. Owners attract, develop, and retain the best talent in order to deliver customers with the best value both now and in the future. Owners take accountability for things that go well and for things that fail to meet expectations. Owners are transparent and open with their key business partners. Owners complete critical reviews and implementation items because it is the right thing to do for customers, without regard to their scorecard status or lack thereof.

PSEG Long Island's willingness to expose LIPA's customers to inappropriate levels of risk is illustrated by the OMS failings identified in June 2020 or earlier, and perhaps identified in an overall product context by PSEG IT in Newark a year or more ago in deciding to move to a new OMS vendor only for New Jersey operations.

Throughout this report there are several examples of failures that could have been mitigated had recommendations from prior audits been promptly and thoroughly acted on. This includes ERP enhancements from the NorthStar audits of 2013 and 2018, LIPA internal audits of the LSE process, and lessons learned from the after-action reports of Hurricane Irene and Superstorm Sandy.

The Task Force recommends that LIPA and PSEG Long Island alter the service contract incentive structure to drive change in the PSEG Long Island culture, organizational structure, and contractual relations. LIPA needs a dedicated PSEG Long Island management team that is responsive to the utility owner's objectives and perspectives on risk, and acts on behalf of the owner and customers. The current contract, as well as PSEG's management culture, encourages tunnel vision on a limited set of Balanced Scorecard metrics.

Recommendation 7.05: LIPA and PSEG Long Island need to restructure their contract to provide holistic accountability to the LIPA Board of Trustees and Long Island customers. Absent such changes LIPA should terminate the contract.

7.3 PSEG Long Island Needs Senior Leadership Dedicated to Emergency Management

Emergency restoration processes for utilities constantly evolves with rapid introduction of innovative technologies. While PSEG Long Island participates in NAMAG as part of the national mutual assistance program, there is more to best practices than acquiring access to mutual assistance crews. **PSEG Long Island emergency management and operations personnel should actively participate in industry best practices and benchmarking groups at a senior level**. The fundamentals of a large-scale restoration have not changed significantly but the technology of tools and approaches have greatly improved. Moreover, best practices groups often share their experiences, which can help emergency responders avoid other's mistakes and improve their storm response.

PSEG Long Island staff reported being unaware of recent developments in storm management and restoration techniques, an indication of a lack of exposure to industry best practice forums and development opportunities. While PSE&G may or may not do this well, it is not clear that PSEG Long Island staff have adequate exposure to "best practices" or opportunities to grow professionally and bring new industry ideas into the PSEG Long Island ecosystem.

We note that the OSA mandates that PSEG Long Island's performance during each major event meet at least a minimum standard established using the Storm Scorecard based on criteria developed by the DPS. **LIPA has rated PSEG Long Island's performance during Tropical Storm Isaias using the Storm Scorecard and has determined that PSEG Long Island's failed to meet the OSA minimum criteria for Isaias**. The results of LIPA's ratings of PSEG Long Island's storm performance during Isaias are provided in Appendix 4. The LIPA Board of Trustees retains certain termination rights to end its contract early with PSEG Long Island. With five years remaining on the OSA contract, it is also obvious that PSEG Long Island's cooperation to implement the recommendations within this report will be a key criterion in the LIPA Board's consideration of any contract renewal. There is a limited window for PSEG Long Island to demonstrate an improved commitment to LIPA's **customers**.

Recommendation 7.06: Appoint a dedicated PSEG Long Island Vice President for Emergency Management. PSEG Long Island staff should actively engage in best practice peer groups on a wide range of important topics, including emergency planning and management. PSEG Long Island staff should not be reliant on their Newark counterparts to share such practices.

7.4 PSEG Long Island Needs Strong Independent Oversight

In another part of this report, we recommend including preparedness metrics and other factors in a revised Balanced Scorecard under a renegotiated OSA. Improved scorecard metrics are always good, but there is a big danger that they will be rubber stamped or ignored entirely. LIPA needs vigorous and diligent oversight of those better performance metrics to make a difference. And it needs independent inspection and quality control under those metrics.

IT staff on Long Island nominally report to two senior executives: the PSEG corporate CIO in New Jersey and the Chief Operating Officer of PSEG Long Island. In reality, this is a matrix in name only, and IT staff reports to New Jersey, which provides inadequate oversight of local operations.

Staff can easily be confused about whom they report to and what they should report. There is clearly a problem of accountability and communications. Meanwhile, as described elsewhere, PSEG Long Island and IT management in Newark do not acknowledge management shortcomings and failures, and so take no corrective action.

The various corporate units of Public Service Enterprise Group have demonstrated they are not suited to perform vigorous quality control and oversight. For one, their New Jersey units do not effectively monitor performance remotely and cannot be on site in Long Island for most crises as they have their own to attend to. They have not provided effective oversight so far from across the river and cannot be expected to do so in future.

Recommendation 7.07: The OSA contract between LIPA and PSEG Long Island needs to be restructured to eliminate matrix management structures, ensure accountability for Long Island operations, and provide full and complete transparency to LIPA in its oversight function.

SECTION 8 CONCLUSION

8.1 What Happened? Isaias Had Major Consequences

In August 2020, a tropical storm hit Long Island, which led to a major and protracted disruption of power service. PSEG Long Island failed to anticipate the impacts of such a threat, failed to transition to OMS storm mode, and failed to implement back-up plans to mitigate the threat promptly. Management actions and inaction exacerbated the impact of Isaias and the duration of the outage. **Since Isaias, some steps have been taken to strengthen certain IT systems, although these systems remain fragile. However, little or nothing has been done to address management deficiencies**, the lack of a crisis response strategy, the lack of BCPs, the inability to switch OMS to storm mode, or the possibility of other different threats.

The hurricane threat is increasing. Climate change has led to an ever-increasing number of tropical storms, many of greater intensity. Yet a relatively modest, well-anticipated, tropical storm caused unnecessary havoc and protracted loss of service for many customers on Long Island. Future hurricanes are inevitable and are likely to be worse: higher winds, longer storm duration, widespread impact, and significant precipitation. We should expect to endure multiple hurricane strikes within a short period, as recently experienced on the Gulf Coast. The next hurricane may cause significant damage throughout the entire New York City-New Jersey Metropolitan Area, reducing area emergency resources available to PSEG Long Island and distracting PSEG's New Jersey corporate management from crises on Long Island.

Other threats may exacerbate hurricane threats and complicate effective emergency response, creating complex crises when combined with hurricanes. Many are stand-alone threats, themselves capable of causing extensive damage and protracted outages. A tsunami or storm surge could cause flooding and wave damage. Security emergencies or natural disasters could disrupt communications. We are not just waiting for the next Isaias, which in retrospect was a relatively mild, tropical storm. **We must prepare for a serious set of hurricanes, any number of other serious emergencies, and for multiple and complex emergencies**.

8.2 The Symptoms: Fragile Failure-Prone IT Systems and Slow Reaction

One common narrative might go as follows: "A big storm caused a lot of trees and lines to go down, denying power service to many customers. Their calls into the utility overloaded the IT systems, causing them to crash and send out false estimates of time-to-repair. This prolonged recovery. So the storm caused the IT crash and protracted the power outage. We are strengthening the IT system so the problem will be solved for next time."

This rationalization is evident in PSEG's draft after action CATRR analysis. The implication is that now all is under control and the crisis will not be repeated. This false narrative confuses symptoms with causes. The IT problems were the symptom of lack of long-term emergency planning and preparation and the absence of BCPs, not the prime causes of PSEG Long Island's problems during the storm.

Nor can IT failures be blamed entirely for PSEG's disaster response. **The failure to deploy PSEG's CMT during Isaias is a feature of PSEG's lackadaisical leadership of PSEG Long Island**. The absence of proactive forward planning for natural disasters is a result of the lack of a strategy and preparedness for emergency response before the event. An eventual failure to respond effectively to an emergency was inevitable. It took only a tropical storm to cause a protracted but avoidable crisis.

8.3 The Root Cause: Broken Management Structure and Misaligned Incentives

To mitigate the consequences of natural disaster threats requires imaginative forward planning and diligent advance preparation. Neither has been present at PSEG Long Island in the years leading up to Isaias. The fact that the telecommunications systems, managed by IT leadership in Newark, had insufficient capacity to handle external call volume shows that no accurate estimate had been made of emergency call volume. The fact that the IT systems failed to communicate internally shows a lack of stress testing and faulty system integration and configuration. The fact that PSEG IT staff went into the storm season knowing that OMS was not working demonstrates a lack of accountability and foresight as well as a lack of preparation and planning. The fact that during Isaias a small percentage of outages were then addressed with a disproportionately large percentage of repair resources shows faulty forward planning before the event and lackadaisical operational leadership during the event. The fact that patently false ETRs were not corrected or overridden shows that operational management was paralyzed by the OMS failure during the crisis. **No doubt the IT systems need to be strengthened and improved, but just tweaking the IT systems will not prevent future crises**.

PSEG has a CMT, but it is located in New Jersey. Tellingly, this CMT was never activated during Isaias. What good is a capability that sits remotely and does not get activated when it is needed? **If failed communications systems and half of customers losing power does not constitute a crisis, then what does constitute a crisis?** PSEG Long Island also lacks systematic BCPs, and so cannot isolate affected systems, take them down, and switch to manual operations. Fixing the OMS problems will not fix all the other systems that need BCPs. **Competent managers need to take charge of recovery operations during a crisis when situational awareness is required and standard operating procedures are doomed to fail.** In this case, senior PSEG leadership let their underlings flail without guidance, on the automatic pilot of standard operating procedures rendered inappropriate by the scope of the storm damage and response and IT failures. **Isaias was a strategic management failure for PSEG, not an operational systems failure for PSEG Long Island**.

8.4 Could It Have Been Prevented? The Answer is Yes.

No earthly authority controls the weather, and PSEG management could not prevent Tropical Storm Isaias from striking Long Island and bringing down lines and trees. However, meteorologists track and forecast hurricanes very well, and senior utility management had advance warning that Isaias might hit Long Island. They could have activated their CMT in anticipation if the CMT was ready and prepared to enact BCPs, if they had them.

The crash of communications and the OMS during Isaias was entirely preventable before Isaias, had the systems upgrades been properly designed, well integrated with each other, checked, thoroughly tested, and debugged. PSEG IT staff, managed remotely from Newark, knew in July that these systems had serious problems, as the OMS was not working in "blue-sky conditions." They knew the OMS could not handle a weather event and that the entire network was vulnerable. Newark IT management appears to have reacting casually to this mission critical risk, largely relying on local IT staff without providing any significant management oversight, and neither PSEG Long Island nor PSEG IT in Newark alerted LIPA. Management's lack of action before Isaias made IT system failure during Isaias inevitable.

Furthermore, **if BCPs had been in place before the storm, management would have had back-up alternative options available if IT systems did crash. But there are simply no BCPs in place at all.** PSEG Long Island does not train management and staff to operate in storm mode under a valid functional ERP, and they cannot be trained to use nonexistent BCPs.

Had the CMT and BCPs been mobilized, when OMS started to fail the first day of Isaias and the faulty ETR problem arose, operational leadership could have gone to "Null ETRs" or manual operations for sufficient time to get a handle on the problem, reducing or eliminating the confusion and lack of trust that arose from the faulty ETRs. Communication with the public could easily have been much improved – no estimated repair time at all is better information than a faulty ETR. At the same time, operational leadership could have streamlined, decentralized, and correctly prioritized repair and recovery operations in the first few days of Isaias, reducing overall recovery time and reducing many of the very long outages. Most of the ETR communications problems and related loss of credibility could have been avoided, and the suffering caused by protracted power interruptions could have been reduced.

The answer is that decisive leadership could have greatly mitigated the negative impacts of Isaias on the public of Long Island. Modest improvements to OMS, telecoms, Internet connectivity, and ETR formulation will help a bit next time and are necessary, but if corporate leadership once again does not mobilize in the face of a crisis to ensure oversight, there will be little improvement in the outcome. PSEG Long Island must have an on-Island CMT that is prepared to switch PSEG Long Island operational management from "routine operations mode" to "emergency response mode" when natural disasters loom. PSEG Long Island must take the strategic load off of operational managers by activating their CMT to back up the ICS when disaster strikes.

8.5 What is Needed? Better Management, Planning, Preparation, Oversight & Accountability

PSEG Long Island needs long term crisis planning and preparation to anticipate numerous and various threats and to painstakingly prepare to act in crisis mode when systems fail. **Management needs to take charge of crisis operations when routine operations are no longer possible. This did not happen during Isaias**. Now they are just tinkering with systems, ignoring a major and obvious PSEG corporate management failure.

If the right changes are not made, this is setting us all up for a repeat of history in the next crisis. On-site oversight with real-time feedback is required, to provide oversight input on a timely basis. Competent on-site oversight can help utility management to take the right actions on a timely basis, but those exercising oversight need the tools and authority to provide strategic discipline.

8.6 Long Island Needs Its Own Chief Information Officer

Prudent utility practice includes mobilizing senior executives on site during a weather event, to mobilize external assistance and provide guidance and support to operating managers. The mobilization of senior executives facilitates real-time strategic and operational decision making and is the hallmark event that marks the shift from blue-sky routine "white" decision making to weather event "red" storm mode decision-making. With more executive talent on-site, operators are better able to make important decisions such as shifting systems from automated mode to work-around or manual mode when a system crashes or isolating a malfunctioning system from interconnected systems to prevent multiple system failures. We live in a computerized age, and most, if not all, of the utility systems subject to weather event stress are IT systems in one form or another.

PSEG Long Island's "matrix" IT organization chart and command-and-control structure is broken by design. Matrix management can amplify lack of coordination and communication and did so in this case. PSEG Long Island's IT assets and managers do not report to Long Island management even though they are a core part of utility operations. PSEG Long Island IT staff report to PSEG executives in New Jersey. There is no Long Island CIO to take ownership of and full responsibility for Long Island IT performance or lack thereof. One implication of IT matrix command structure is that PSEG Long Island simply cannot mobilize senior IT executives to support Long Island IT operations in "storm mode" through its ICS, because there are no PSEG senior IT executives located geographically on Long Island to mobilize. The PSEG corporate CIO is across the river in another state. Face-to-face real-time emergency decision making by top IT management is physically impossible. The Isaias weather event demonstrates that at a minimum the Long Island utility network needs to be able to stand up a senior CMT during weather events.

Another implication of the broken command structure is that the PSEG corporate CIO in New Jersey has other more pressing responsibilities that take precedence over Long Island IT. His or her primary responsibility are the New Jersey systems, and the Long Island systems and networks are, necessarily, a secondary consideration. In a major weather event, the PSEG corporate CIO will almost always be unavailable to focus on Long Island problems, regardless of his or her physical location.

Yet another implication of the broken IT command structure is that the PSEG IT staff do not take full ownership and responsibility for Long Island IT operations and IT system failures. There are numerous indications that this was the case before and during Isaias. Evidence has emerged that OMS was failing well before Isaias; internal staff members located on Long Island sent emails in July that they were not prepared for a weather event and they should so inform IT senior management. In other words, the most important Long Island IT system for an emergency was already failing in the month before Isaias during blue-sky conditions. Not only did PSEG Long Island IT fail to fully test the new OMS upgrade, it knew the new upgrade was already failing and that it had no way to easily switch back to the old version nor did it have any backup at all. Under these circumstances, the OMS failure during Isaias was inevitable, and the neglect of PSEG is apparent. Newark management's jobs and bonuses do not depend upon IT performance on Long Island.

When one compares the OMS in New Jersey with that on Long Island, there is further evidence that PSEG corporate does not take full ownership. First, the two separate systems employ different versions. Why are the two systems different if the best possible OMS system is deployed? Second, PSEG had already decided to replace its OMS vendor in New Jersey, presumably because better options are available. Why then is the presumptively suboptimal OMS vendor retained on Long Island? At a very minimum, PSEG provides different IT systems to Long Island versus New Jersey. **Recent events, especially the OMS failures during Isaias, provide evidence that the attention paid to and the standard of IT systems deployed by PSEG on Long Island are of lower quality than those provided to New Jersey.**

Virtually all the operational corrective actions recommended for the Long Island systems involve IT upgrades and BCPs to cope with system stress or failures. They deserve the focused attention of a Long Island CIO with staff, who has full responsibility for IT system upgrades and any future IT system failures. We need a Long Island CIO right now, to take ownership of rebuilding OMS and fixing the malfunctioning failure-prone family of IT systems on Long Island.

8.7 Vision of a New PSEG Long Island

Imagine that yet another hurricane is threatening Long Island, perhaps complicated by another emergency. Imagine that LIPA and PSEG Long Island now have their own dedicated CMT based in a "Command Center" located physically on Long Island. Imagine that PSEG Long Island has conducted intensive emergency response training and has well-practiced BCPs facilitating manual operations for all its systems. Watching the weather forecasts, the CMT activates even before the hurricane arrives, providing strategic leadership to the operational ICS. When storm damage impacts customers and starts to stress recovery operations, operational management is well able to isolate affected systems, continue manually if necessary, and prevent a crashing system from bringing other systems down. When repair and recovery requirements stress organic capability, or even before, the CMT is able to reach out and import foreign crews and resources to minimize outages. **This is a very realistic and attainable vision, not just a dream. Many utilities operate at this level of disaster preparedness**.

There is no CMT for Long Island at present and no dedicated Vice President of Emergency Management. PSEG apparently does not mobilize its New Jersey CMT for disasters on Long Island, and its CMT may not be ready and able to provide emergency strategic leadership for Long Island. Indeed, its CMT is no doubt focused on its extensive New Jersey operations. For PSEG, Long Island problems are perhaps a distraction from its prime management responsibilities on the other side of the Hudson River.

LIPA oversight can help ensure its Long Island utility operations effectively prepare and train for emergency scenarios on the Island.

8.8 Moving Forward

The findings from this report beg the question of what structural or operational corrective actions can be instituted to (1) prevent a failed response similar to what we encountered with Isaias, and (2) ensure stronger accountability from PSEG Long Island to its customers and stakeholders in Long Island.

It is evident that LIPA's reliance on much of PSEG Long Island's representations that it was meeting its contractual obligations is not sufficient to ensure that LIPA's customers' risks are being prudently managed. For example, LIPA was told that the OMS was designed, and stress tested regularly to withstand Superstorm Sandy-like conditions (i.e. nearly all customers losing power during a storm). LIPA had not independently verified the system design or validated the testing. Moving forward, this trust model is no longer tenable, and LIPA will be independently reviewing, verifying, and validating PSEG Long Island's plans, system designs, testing, and deployment of systems. The Task Force has uncovered significant deficiencies in PSEG Long Island's management of its IT.

Second, **LIPA discovered during this investigation that PSEG Long Island was not transparent about problems**. For example, after Isaias, LIPA learned that PSEG in New Jersey had decided over a year ago to replace the same OMS system it had recommended to LIPA. We also learned that there were significant performance issues with the Long Island OMS that began in July that were not disclosed to LIPA. The information technology leadership, which is based in Newark, inexplicably did not feel obligated to alert LIPA to these high-risk system issues during storm season.

Moving forward, LIPA will independently oversee IT system implementation, IT testing, BCP formulation, and provide CMT executive support during weather events.

And third, LIPA missed what in hindsight were warning signs about the quality of information technology services being provided to LIPA, including the impact of the matrix information technology management structure, high levels of turnover of consultants and staff serving Long Island, and frequently changing priorities and delayed information technology projects. The entire information technology organizational structure and management serving Long Island needs a reboot, and a turnaround CIO is required on Long Island to remedy these deficiencies.

The Long Island CIO will be accountable for owning and testing all mission critical systems, overseeing IT planning, implementation and testing, helping formulate BCPs, and serving on the Long Island CMT during weather events.

More broadly, we expect this accountability model to extend to every other critical function performed by PSEG Long Island on behalf of LIPA. Specifically, we will be looking to apply the same model and performance standards to planning, finance, legal services, and operations. Accordingly, LIPA will be seeking organizational and contractual changes to remedy these flaws in its relationship with PSEG Long Island. The goal is to ensure that this partnership is able to better serve the interest of Long Islanders and spare our customers further undeserved hardship as a result of PSEG Long Island's failed and irresponsible response to another major storm.

APPENDIX

Appendix 1 Isaias Task Force Team Bios

LIPA

Mujib Lodhi* is LIPA's *Chief Information Officer*. Mr. Lodhi is responsible for managing LIPA's information security and technology, including business applications, computing infrastructure, networks, and cybersecurity, as well as oversight of PSEG Long Island's information technology platforms. Mr. Lodhi joined LIPA in October 2018 and previously served as Interim Chief Financial Officer. Prior to LIPA, Mr. Lodhi spent over two decades as a Chief Information Officer for large utilities across the United States, including Riverside Public Utilities, Washington Suburban Sanitary Commission, and District of Columbia Water and Sewer Authority (DC Water). Mr. Lodhi has extensive experience in managing complex IT/OT infrastructure, cybersecurity, and business operations. He provided leadership for enterprise technology strategy, implementation, and support for three leading public utilities to enhance business performance and customer service. Mr. Lodhi has numerous awards, including seven (7) CIO 100 Awards, Computerworld's Premier 100 IT Leaders - lifetime achievement award, several other awards as Laureate in the Computerworld Honors Program and several GIS/ESRI Special Achievement awards among others.

Rick Shansky* is LIPA's *Senior Vice President of Operations Oversight* and directs LIPA's oversight of its primary contractor PSEG Long Island, as well as its contractor engaged in power and fuel procurement. Mr. Shansky also manages LIPA's participation in wholesale power markets. Mr. Shansky has over 35 years of electric utility experience and has held a number of management positions since joining LIPA in 2008. Previously, Mr. Shansky held positions at Consolidated Edison Company of New York and the Long Island Lighting Company in the areas of energy management, resource planning, fuel and purchased power, and generation planning. Mr. Shansky is also a licensed Professional Engineer in the State of New York.

Kenneth Kane is LIPA's **Senior Advisor for Oversight** and leads LIPA's implementation of a new oversight framework for its service providers, including Chairing LIPA's management committee for Oversight and Metrics. Mr. Kane joined LIPA in 1999 as Director of Financial Reporting and previously served as Controller, Managing Director of Finance, Vice President of Financial Oversight, and most recently as Interim Chief Financial Officer. Mr. Kane has 36 years of experience in the electric utility industry, beginning in 1984 with Ernst & Young's utility practice. Mr. Kane joined the Long Island Lighting Company in 1988. Mr. Kane is a Certified Public Accountant in the State of New York.

Michael Deering is LIPA's *Vice President of External Affairs*. Mr. Deering joined LIPA in 2007 with over 25 years of environmental and energy experience having worked in both the private and public sector. Mr. Deering is responsible for LIPA's oversight of PSEG Long Island's customer service, energy efficiency, renewable energy and environmental programs.

James Miskiewicz is LIPA's *Deputy General Counsel*. Mr. Miskiewicz joined LIPA in January 2016 after being appointed by Governor Cuomo as part of a state-wide initiative to encourage best practices across state agencies. At LIPA, Mr. Miskiewicz is responsible for managing legal and regulatory compliance, training and

^{*} Member of the ITF Steering Committee

reporting requirements under State law as well as LIPA's Code of Ethics and Conduct. He oversees LIPA's procurement function, including compliance with State vendor diversity programs for women, minority and service-disabled veteran-owned businesses. Before joining LIPA, Mr. Miskiewicz was a federal prosecutor in the Eastern District of New York and in Washington, D.C. Winner of several awards, he investigated and led trials against corporate fraud, public corruption, international narcotics trafficking, homicide and racketeering.

NYS Department of Public Service

Joseph Suich* is the NYS *DPS Director of the Office of Investigations & Enforcement (OIE)*. The OIE conducts investigations and enforces against violations of the Public Service Law and its associated regulations and orders on behalf of the Public Service Commission. Mr. Suich joined DPS in 2020. Prior to joining DPS, Mr. Suich worked at General Electric from 2005-2019 in various US and international roles including Global Chief Compliance Officer, General Counsel and other legal positions in the energy, water, nuclear, renewables and oil and gas sectors, including oversight of investigations. Mr. Suich also worked in Albany and Syracuse, New York as an energy and environmental lawyer from 1997 to 2005.

Kevin E. Wisely* is the NYS *DPS Director Office of Resilience and Emergency Preparedness* and and is responsible for the oversight of DPS and Utility resilience, emergency preparedness and utility security (including physical and cyber) programs and initiatives. Mr. Wisely joined DPS in April 2019 and previously served the State of New York as the Director Office of Emergency Management. Prior to NYS, Mr. Wisely spent over twenty years with Niagara Mohawk (National Grid) in various nuclear, electric and gas roles, including system dispatch and control center operations.

tieBridge, inc.

Osman Ahmad – IT, Management and IV&V

Mr. Ahmad is a senior IT professional advising utilities on their IT turnaround strategies. He has authored IT strategic plans for water and electric utilities and has provided program management support to ensure their proper implementation. Mr. Ahmad has over 35 years of information technology and business management experience, including 20 years in senior IT technical leadership roles. He was the Chief Information Officer for District of Columbia Water and Sewer Authority and the Chief Business Officer for the Transportation Technology Center in Pueblo, Colorado. Mr. Ahmad has a BA in Chemistry and an MBA in Finance both from the University of Chicago.

Dr. John Noer – Subject Matter Expert and IV&V

Dr. Noer is a Program Manager and Senior Consultant at tieBridge. He has 30 years of program management, logistics, transportation, and utility experience. Dr. Noer has written extensive analysis and policy papers for the Center for Naval Analysis, World Bank, and the Department of Defense. He also served in Afghanistan and Iraq as an advisor to the Department of State and to the US Army and later oversaw the development of the internal logistics program at DC Water and drafted WSSC Water's first procurement regulations. Dr. Noer has an MBA in Finance and a Ph.D. in Economics from the University of Chicago.

^{*} Member of the ITF Steering Committee

Shonali Wadhwani – Program Management and IV&V

Mr. Wadhwani is a Project Manager and Senior Consultant at tieBridge. She has 25+ years of technology analysis, project management, and software life cycle experience; and combines project management skills with strong functional and technical understanding to design and deliver solutions focused on meeting business needs, system optimization and process improvement. Mr. Wadhwani has a BA in Mathematics from Smith College and an active PMP.

Manoj Srivastava – Subject Matter Expert and IV&V

Mr. Srivastava is a Technology Architect at tieBridge. He has over 30 years of experience architecting and managing design, development and delivery of complex distributed systems for use in industrial and corporate environments. His expertise covers technology management, product strategy, infrastructure planning and software development. Mr. Srivastava has a B.Tech. from IIT, Kanpur and an MBA from Santa Clara University Manoj has active CISSP and ITIL certifications.

PA Consulting Group

Derek HasBrouck – T&D Engagement Lead

Mr. HasBrouck advises senior utility industry clients on topics ranging from corporate strategy to operations improvement. He is an expert in benchmarking electric and gas utility businesses, utility regulation, network reliability, and customer service. Mr. HasBrouck has benchmarked electric reliability and improvement programs for 30 years. He is the creator of PA's ReliabilityOne[™] program, which annually certifies and recognizes the most reliable electric utilities nationwide. Mr. HasBrouck has worked with both LIPA and PSEG Long Island on electric reliability issues, having led PA's 2017 review of the reliability performance metrics.

Mike Sullivan – Emergency Management and Storm Response

Mr. Sullivan has over 35 years of broad utility leadership experience first as a Senior executive for Pepco Holdings Inc (PHI) (now part of Exelon) and then as a management consultant with PA. At PA he has worked on several strategic and operational consulting engagements including an assessment of the Puerto Rican electric system following hurricane Maria and smart grid technology assessments. At PHI (Pepco, Delmarva Power, and Atlantic City electric), Mr. Sullivan's was responsible for all aspects of designing, testing, and executing the Incident Command System (ICS). He was the PHI Incident Commander for more than 15 years.

Stephen Kerr – Technology and Data

Mr. Kerr specializes in analytics and internet of things technologies to improve and modernize electric utilities' grids, helping clients manage their portfolio, innovate, architect, and deliver solutions. He is a seasoned project leader, frequently called upon to organize large programs and turn around underperforming ones. Mr. Kerr is a Chartered Engineer and is a leader within our Delivery Assurance service. His technical expertise is in enterprise architecture, analytics, data management and integration with 20+ years of experience across the system lifecycle. Mr. Kerr's experience covers research and development, infrastructure, smart devices, enterprise packages, integration, utility operational systems and multiple frameworks and standards. His utility clients include the New York Power Authority and National Grid.

May Li -Telephony and IT

Ms. Li has over 25 years of experience in Information and Communication Technologies (ICT), and has worked with some top communication companies, service providers, transport organization, government, and regulators in various global locations. Specialized in network architecture design, technology strategy advisory, network assurance, digital services enablement, and ICT solution implementation, Ms. Ki studied powerline line communication and did her internship with one of China's national grid regional offices before she started working as a network integration and troubleshooting engineer for a major telecommunication equipment provider, her career developed to holding board-level responsibility for managing and delivering major ICT transformation programs in both communication and enterprise network.

EnerNex, a CeSI company

Ben Rankin – SmartGrid and Customer Communications

Mr. Rankin specializes in smart grid systems and advanced metering infrastructure (AMI) including the integration of meter data management systems, advanced distribution management systems including outage management, and distributed energy resource management systems. Mr. Rankin was a member of the team that developed the advanced metering use cases and architecture for Southern California Edison in 2006 which have been foundational documents used by many other utilities for their own smart metering projects. He has worked with many other utilities and vendors on advanced metering projects including planning, integration, and communications. In addition to smart metering, Mr. Rankin has been involved as a facilitator on two state utility commission sponsored stakeholder collaboratives for smart grids and advanced meter planning.

Utilligent

Lauren Preston – Customer Communications

Ms. Preston has more than 25 years of experience leading consumption to cash and customer care call center functions for natural gas, electric and water utilities at both investor owned and municipal organizations. Her experience includes leading people and customer services through significant changes of systems, customer expectations, regulations and vendor relationships. Ms. Preston has more than 15 years experience leading electric and gas utilities in storm-prone service areas through major outages. She served as the customer service committee chairman for the American Gas Association and as an advisor to industry peers throughout the US. She has an MBA from Boston College and is a Certified Internal Auditor.

Appendix 2

List Of 90-Day Report Recommendations			
	No.	Recommendation	Tier
	Section 4:	Customer Communications and Outage Management Systems	
	4.01	PSEG Long Island should develop and execute a comprehensive strategic technology plan for outage reporting and communications.	3
	4.02	PSEG Long Island needs to urgently engage qualified expert consultants to guide them through the telephony redesign process.	1
	4.03	For the long term, PSEG Long Island needs to strengthen its voice communications engineering and project management staff.	2
	4.04	Explore integrating the high-volume voice communications design into a more powerful all-encompassing call center design.	2
	4.05	Develop a more scalable Inbound Contact Center.	2
	4.06	Configure Kubra to Leverage Kubra's "Storm Mode."	
	4.07	Ensure that the Municipal Portal is more resilient and prepare a backup Mode of Operation in case of OMS failure.	2
	4.08	Execute a communications plan with local emergency and municipal response officials to confirm municipalities' knowledge of the Municipal Portal and describe efforts to fix its operation from what they experienced during Isaias.	2
	4.09	Better prepare social media staff to handle barrage of posts using modern artificial intelligence tools.	3
	4.10	Implement a solution that allows the OMS to decouple customer reporting from field management activities.	3
	4.11	Ensure SCADA sensor reports have priority over other outage reports arriving to the OMS.	1
	4.12	Systematically test the OMS system to ensure that concrete root causes are identified and remedied. If the errors are due to system defects, then demand accountability from the system vendor for timely fixes. Ensure that root causes, not just symptoms, are addressed.	1
	4.13	After the OMS faults are diagnosed and repaired, thoroughly stress-test the CAD system and the ESB to ensure there are no independent defects affecting either system.	1
	4.14	Accelerate the deployment of the mobile application for foreign crews and/or their crew guides ensuring that procedures are integrated into the ERP.	1
	4.15	Performance test OMS and "feeder" systems to establish peak capacity.	3
	4.16	Install standby hardware resources for use during peak demand.	1
	4.17	Re-architect the inter-system message queuing applications for greater dynamic stability under highly demanding workloads.	1
	4.18	Monitor application performance and error logs of all mission critical application systems, such as OMS, CAD, SCADA, ESB, etc.	1

4.19	As part of storm preparation ensure that all application error and debug conditions have been cleared and the system is operating normally.	1
4.20	Accelerate the testing and integration of AMI data to the OMS system.	3
4.21	Complete the integration of the MDMS and OMS to report the meters' power restoration events.	2
Section 5:	Emergency Response Planning and Preparation	
5.01	Improve Emergency Planning governance so that utility-wide Emergency Training is under a single Emergency Planning Team and not dispersed among various departments.	3
5.02	Develop more rigorous ERP training and exercises to (a) test decision making, decision paths, and how information passes between functions, and (b) exercise well-developed business continuity plans.	3
5.03	Develop simulations of emergencies and war-gaming exercises so that the response team can be challenged with realistic scenarios.	3
5.04	Create BCPs for all mission critical systems and processes.	3
5.05	Establish a Crisis Management Team made up of PSEG Long Island and LIPA executives to ensure focus on Long Island operations and sufficient information flow to LIPA to conduct oversight.	1
5.06	Modify the Incident Command Structure to provide better visibility to the performance of mission critical technology.	3
5.07	Expand the Emergency Assistance Agreement with National Grid to include Generation employees.	1
5.08	Institute a program to train National Grid Gas and Generation resources to support damage assessment and materials handling work during major storms.	3
5.09	Work with off-island sustaining tree contractors to develop consistent work practices, especially for removal of trees from energized lines.	3
5.10	Undertake a thorough review of damage assessment crew management processes and especially performance shortcomings during Isaias. Ensure that the damage assessment protocols are optimized and that they leverage modern field management technology (e.g. mobility app).	3
5.11	Create criteria to guide implementing circuit sweeps during long outages whenever customers have been out for more than 3-4 days and enough line resources are available.	3
5.12	Improve training for RDAs including on BCPs. Prepare to implement RCA, when advantageous.	3
5.13	Explore using National Grid resources and local electrician resources for emergencies. Work with National Grid and local electrical contractors to train a workforce to make repairs to low-voltage service drops.	3
5.14	Develop a backup plan for tiered restoration in large-scale events. Train and exercise for tiered restoration operations.	3

- 5.15 Create an ETR Manager position with staff to monitor OMS systems and ETR quality. The 1 ETR Manager should report to the planning chief within the ICS.
- 5.16 Review restoration verification protocols under "no-OMS" scenarios and ensure that they 2 function efficiently. Leverage the AMI data in OMS to efficiently identify nested outages.
- 5.17 Benchmark the PSEG Long Island process to maintain the LSE customer list to the best practices used by other New York utilities. Evaluate the success of the 2020 LSE recertification and implement corrective actions so that 95% or more of LSE customers re-certify their need and update their contact information each year.

Section 6: Leadership and Management

6.01 PSEG should review the Isaias Task Force's 90-day Report and issue a CATRR that 1 fully addresses the root causes of its failed storm response, including management shortcomings documented in this Report. PSEG should implement an improved after action analysis process for future storms that has greater rigor.

Section 7: Leadership and Management

7.01	Appoint a dedicated "turnaround" CIO at PSEG Long Island.	1
7.02	Appoint a dedicated CISO at PSEG Long Island.	2
7.03	Centralize Long Island IT under one enterprise PSEG Long IT organization with separate LIPA IT systems from those in New Jersey.	3
7.04	Initiate programs to develop stronger project management capability in PSEG Long Island's IT practice areas.	3
7.05	LIPA and PSEG Long Island need to restructure their contract to provide holistic accountability to the LIPA Board of Trustees and Long Island customers. Absent such changes, LIPA should terminate the contract.	3
7.06	Appoint a dedicated PSEG Long Island Vice President for Emergency Management. PSEG Long Island staff should actively engage in best practice peer groups on a wide range of important topics, including emergency planning and management. PSEG Long Island staff should not be reliant on their Newark counterparts to share such practices.	3
7.07	The OSA contract between LIPA and PSEG Long Island needs to be restructured to eliminate matrix management structures, ensure accountability to Long Island operations, and provide full and complete transparency to LIPA in its oversight function.	3

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Appendix 3

List Of 30-Day Report Recommendations

No.	Recommendation	Tier
Sectio	on 3: Customer Communications and Outage Management Systems	
3.2.1.1	PSEG Long Island should complete implementing the planned design changes and conduct additional capacity testing as soon as possible.	1
3.2.1.2	Improve the pre-storm planning process and include specific communication, coordination, and escalation with the communication service carriers and the HVCA provider before and during the storm.	1
3.2.1.3	The existing infrastructure for handling calls within the PSEG Long Island Call Center should be upgraded to a more recent version. PSEG Long Island should modernize its call center infrastructure to a technology that uses the newer "SIP Trunking" technology.	1
3.2.1.4	PSEG Long Island should redesign their communications system so that its Billing Line can also be used to receive outage calls in case of a storm emergency. PSEG Long Island has advised us that this recommendation has already been implemented.	1
3.2.1.5	PSEG Long Island should develop appropriate capacity monitoring and management processes to support evidence-based demand forecasting and capacity planning.	1
3.2.1.6	PSEG Long Island should review the service operation process between PSEG Long Island and Verizon to understand how the major issues as identified are handled.	1
3.2.2.	Complete the design, implementation, and testing of a comprehensive "OMS Storm Mode" of operation for OMS and CAD. Implementing the "Null ETR" functionality for major storms is a first step. Codify this approach and the necessary supporting processes and responsibilities in the Emergency Restoration Plan.	1
3.2.2.	Speedily complete the implementation and testing of "Null ETR" for PSEG Long Island's OMS and connected systems (including HVCA, IVR, Kubra and My Account tools) to enable the use of a Null ETR.	1
3.2.2.	Work with CGI to obtain and implement fixes for identified application defects, which could include upgrading to a more recent version of the OMS software.	1
3.2.2.4	4 Automate monitoring of OMS and CAD performance at the application level to detect application failures and give administrators an opportunity to adjust the configuration settings that affect performance.	1
3.2.2.	5 Automate monitoring of the OMS and CAD at the infrastructure level to detect infrastructure failures and give administrators an opportunity to restore normal operating conditions.	1
3.2.2.	Automate monitoring of inbound SCADA events to the OMS, to be able to detect events or event volumes that cause unresponsiveness and allow operators to restart failed services.	1
3.2.2.	Automate monitoring of inbound outage reports to the OMS, to be able to detect and eliminate erroneous reports that may arrive from any source.	1
3.2.2.	8 Irrespective of whether the failure mode is corrected within the IVR, the OMS should have automated monitoring of data quality arriving from IVR to detect potentially duplicate or otherwise bad information.	1

3.2.2.9	The IVR and OMS communication protocol should be reviewed in detail and redesigned so that all messages between the two components are agreed, understood, verified to be operational and tested against error conditions such as sending duplicate outage reports.	1
3.2.3.1	At the beginning of storm planning and throughout the storm, designate a system data administrator dedicated to monitor, on a continuous basis, the timeliness, accuracy, and integrity of the information coming from OMS to Kubra.	1
3.2.3.2	If performance issues occur and cannot be promptly remediated, as part of contingency planning, institute the process of moving the lookup requests to an alternate data file to relieve congestion on the normal data transmission path.	1
3.2.3.3	Empower the administrator to take measures to adjust the Outage Map if the timeliness and accuracy of data begins to be faulty due to file processing delays or inaccurate restoration times coming from OMS. This person should also monitor data timeout potentials.	1
3.2.3.4	In cases where customers may need repairs to more than one type of equipment to be restored, continue to use a text option to ask "are you still out" to get confirmation.	3
3.2.3.5	Assign a data administrator to work with Communications to use banner alerts and other widely applicable messages. When wide-scale text messages need to be sent because the restoration effort is not yet precise enough to give property-specific updates, include a periodic reminder text every few hours to let the community know when more precise estimates will be available instead of providing inaccurate OMS-generated ETRs.	2
3.2.3.6	If OMS-generated ETRs are not accurate because there are extenuating circumstances in a particular area, the Outage Map data administrator should work with a restoration coordinator to override the information in the OMS.	2
3.2.3.7	Finish testing and implementing Null ETRS in OMS and move to regional ETRs for large storms.	1
3.2.4.1	Review the storm-oriented customer journey maps implemented within the mobile and web-apps so that customer transactions are directed to the externally hosted infrastructure rapidly.	3
3.2.4.2	Monitor system logs and health alerts to proactively detect incipient failures within the system or the infrastructure, especially during a storm.	1
3.2.4.3	Introduce the capability to quickly decouple the web and mobile apps from the OMS, so that when unresponsiveness is detected, alternate messaging can be provided to the customer and the OMS can be relieved of incoming transactional pressure.	1
3.2.4.4	Model storm scenarios and conduct thorough stress testing on the website for all customer journeys and ensure that the infrastructure has sufficient capacity for high activity periods.	3
3.2.5.1	Review ETR strategy and revise it to allow for suspending ETRs while damage is being assessed and relevant information to estimate an ETR is still being gathered.	1
3.2.5.2	Prioritize completion of the 'null' ETR implementation effort. In the absence of deploying this functionality, if a major storm event occurs, the ETR coordinator and leadership should set a global ETR at the storm outset rather than employ a multiplier approach.	1

- 3.2.5.3 PSEG Long Island should also work to install end-to-end quality control measures for communication of ETRs. Consistency across communications channels is critical in developing confidence in the restoration effort.
- 3.2.6.1 Test and deploy the mobility application to enable foreign field crews, or their PSEG Long 2 Island crew guides, to receive restoration work assignments and report the completion of restoration orders electronically. Update the ERP to document the work processes required to dispatch work to foreign crews electronically and train the involved staff in this updated work process.
- 3.2.8.1 PSEG Long Island reconfigured the MDMS to present zero usage to customers through the 1
 My Account website when there is missing data. This will be done regardless of the MDMS awareness of the meter's power status. This change was implemented on September 11, 2020.
- 3.2.8.2
 PSEG Long Island is evaluating turning off some MDMS data processing sub-functions
 2

 during recovery from a large storm to improve data processing capacity and reduce or
 eliminate the delay in updating the My Account system.
- 3.2.8.3 PSEG Long Island is evaluating having the MDMS incorporate time stamped meter event 2 messages for power off and power on when performing data validation to correctly assign usage to the actual interval.

Section 5: Storm Resiliency

5.4.1	Selective undergrounding of main or branch lines in areas with difficult access;	3
5.4.2	Accelerating the deployment of smart meters and the full integration of smart meters with OMS so that outage reports will be available to OMS more rapidly and embedded outages (i.e., small-scale outages downstream of larger-scale outages) will be more readily identified, thus enhancing the efficiency of job dispatch.	1
5.4.3	Investigating the use of electricians for low-voltage service restoration.	3
5.4.4	Increasing the utilization of local National Grid gas and generation system employees for wire down and damage assessment.	3
5.4.5	Revisions to the current vegetation management program to shorten the 4-year cycle across the system or in selected areas with denser vegetatio.	3
5.4.6	Increase use of drones and other technologies to improve damage assessment.	3

2

Appendix 4 STORM SCORECARD

7.1 Major Storm Performance Metric

LIPA's Amended and Restated Operations Services Agreement (OSA) contract with PSEG Long Island has a Major Storm Performance Metric based on a modified version the Storm Scorecard used by the Department of Public Service (DPS). The Major Storm Performance Metric establishes objective performance measures to evaluate PSEG Long Island's storm preparedness, operational response, and communications activities.

The Major Storm Performance Metric is based on a 1,000 point maximum score, spread across the dimensions of Preparation (100 possible points), Operational Response (600 possible points), and Communications (300 possible points). Consistent with the Public Service Commission Order in Case 13-E-0140, within each dimension, the component measures are each scored on a satisfactory/unsatisfactory basis, as measured against the established criteria within the context of the approved Emergency Response Plan (ERP), with no partial credit scoring, unless provided within the criteria.

7.2 PSEG Long Island's Major Storm Performance During Isaias

PSEG Long Island's response to Tropical Storm Isaias earned 260 out of a possible 1,000. This unsatisfactory score is below the Minimum Performance Level of 410, as illustrated below.

Measure	Points Available	Points Earned
Preparation		
Employee Contractor Planning	10	10
Outbound Proactive Communications	15	15
Municipal Conference Calls	15	15
LSE Customers Alerted	10	0
Critical Customers Notified	10	10
Company Compliance with Training Program	10	0
Participation in Mutual Assistance Calls	10	10
Materials Availability	20	20
Operational Response		
Down Wires	60	0
Preliminary Damage Assessment	30	30
Crewing	30	30
ETR made available	180	0
ETR Accuracy	120	0
Municipality Coordination	20	20
County EOC Coordination	20	20
Utility Coordination	20	20
Safety	100	0
Mutual Assistance	20	20
Communication		
Call Answer Rates	30	0
Municipal Calls	40	0
Web Availability	40	0
LSE Customer Communication	50	0
DPS Reporting	40	40
Customer Communications	60	0
Outgoing Message on Telephone Line	20	0
DPS Complaints	20	0
	1,000	260

7.3 Summary - PSEG Failed the Isaias Performance Evaluation

PSEG failed to perform to minimum contractual standards during Isaias by a wide margin. No reasonable revision of the Major Storm Metric grading will change the result.

A second failure over the next two years will provide LIPA with the right to terminate the OSA contract for poor storm performance without penalty. LIPA may also terminate the OSA for other reasons.

Additionally, the OSA with PSEG Long Island is up for renewal at the end of 2025, and PSEG Long Island's satisfactory implementation of the Isaias Task Force recommendations will be a key component of the LIPA Board's decision on whether to renew.

APPENDIX 1 STORM SCORECARD

I. Preparation Storm Scorecard Measure Results

The preparation measures are intended to score utility performance with respect to activities and communications performed prior to forecasted storms and in response to alerts from the National Weather Service or a utility's private weather service.

LIPA's assessment is that PSEG Long Island earned 80 of the 100 points available for Preparation.

Employee Contractor Planning

Scorecard Measure & Points

Planning for employees and contractor resources. 10 points available.

Scorecard Criterion

Evaluation of compliance includes a review of steps taken to comply with approved ERP and communicate with employees and contractors regarding activation, including storm duty assignments and mobilization requirements.

Assessment

LIPA has assessed PSEG Long Island's performance with each relevant component of its approved ERP, through a review of storm meeting minutes, other available documents, and PSEG Long Island's Storm Scorecard filed with the DPS.

There was a strategy call on Friday, July 31 and 2 anticipation calls, Sunday, August 2nd and Monday, August 3rd. In addition to these pre-storm calls, the Resource Coordination Unit (a unit within the Planning Section), distributed various notification e-mails to PSEG Long Island employees with mobilization details and requirements. The meetings and content are in-line with the scorecard requirements.

PSEG Long Island also successfully mobilized external resources in advance of the storm. Nearly 1,500 external electrical and tree workers, as shown in Figure 3.10.1 of the Storm Scorecard, were in place prior to the start of the restoration.

For Employee Contractor Planning, LIPA has determined that PSEG Long Island's performance in notifying and mobilizing its employees and contract resources in advance of the storm consistent with the ERP was satisfactory.

Outbound Proactive Communications

Press Releases, Text Messages, Email, and Social Media

Scorecard Measure & Points

Outbound, proactive pre-storm communications through Press Releases, Text Messaging, E-Mail, and Social Media. 15 points available.

Scorecard Criterion

Utilities issue pre-storm messages through the stated communications vehicles to alert customers of the potential for loss of service. Text messages and/or emails should be issued daily to all customers for whom company has customer addresses on file. Compliance includes a review of the information contained in press releases, emails, text messages and the use of Facebook, Twitter, and other means of social media during the restoration. Contents of the communications should include the type and severity of the storm, the affect it may have on the utility, action being taken to prepare for the event, and available methods to contact the company (phone, web, e-mail, social media, text messaging, etc.). This includes providing a link to information on the company's website to manage character limit restrictions.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

The PSEG Long Island assessment in section 2.2 of the DPS Scorecard Submission is in-line with their approved 2020 ERP. In preparing for Tropical Storm Isaias, the Communications Section held a pre-storm communications strategy call and sent out press releases posted on the company website and emailed to local and regional media, notifications to customers via e-mail and text message, e-mails to internal employees and updates to social media accounts. Notifications through these media channels were revised and updated as Tropical Storm Isaias progressed toward the service territory.

LIPA has determined that PSEG Long Island's performance of pre-storm outbound communication activities was satisfactory.

Municipal Conference Calls

Scorecard Measure & Points

Pre-storm call held and determined to be highly effective or effective. 15 points available.

Scorecard Criterion

Municipal call will be held prior to the storm and provide information relating to the type and anticipated severity of the storm, the affect it may have on the utility and expected level of system damage, activities being taken to prepare for the event, and processes for communicating with companies throughout the event. To determine call effectiveness, consideration will be given to whether the time of the municipal call was communicated to all stakeholders, whether the previously stated information was communicated, how the call was managed, and whether the call allowed for sufficient Q&A and how the utility responded to questions posed.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

The PSEG Long Island Liaison Organization initiated an island-wide municipal conference call on August 3, 2020 at 1500 hours. The date and time were communicated to all applicable stakeholders and attendees were notified of the call through New York Alert. The conference call was hosted by Intrado. A follow-up e-mail was sent to all invitees with FTP log-in information to access a recording of the call. Additional call information was provided in Appendix C in the DPS Scorecard Submission. PSEG Long Island met the scorecard requirements.

LIPA has determined that PSEG Long Island's performance of pre-storm municipal conference call activities was effective.

LSE Customers Alerted

Scorecard Measure & Points

All LSE customers alerted. 10 points available.

Scorecard Criterion

Execution of an outbound call attempt to all customers who the utility knows are Life Support Equipment (LSE) customers prior to the expected onset of an outage event. The companies should also use text messages/ emails for those customers who have provided such contact information.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

On August 3rd, PSEG Long Island initiated auto-dial campaigns in its attempt to reach all known LSE customers. There were 6,434 customers on PSEG Long Island's list of LSE customers and a total of up to seven call attempts made to individual customers by 1530 hours on August 3.

The results of this effort, as reported in Appendix D in the DPS Scorecard Submission, were that 77.7% of known LSE customers were reached with either a completed call or an answering machine message left. However, these results also identified 618 numbers that were invalid and 729 customers who did not answer, representing almost 21% of the known LSE customers. This level of unsuccessful calls indicate that the LSE customer list and the associated contact details were not up to date.

Issues of the accuracy and the currency of LSE customer identification and contact information were known issues. The December 2018 Internal Audit of PSEG Long Island raised concerns about the number of LSE customers, the appropriateness and effectiveness of the annual certification process, and effective maintenance of contact information for these customers.

This issue was also raised in the DPS audit report for the 2018 winter storms, where the following recommendations were made for all New York utilities to follow:

Recommendation 78:

All utilities ensure procedures direct CSRs who speak with an LSE customer to update the customer's contact information, after addressing their concern.

Recommendation 79:

All utilities should strive to have a minimum of two alternate emergency contact telephone numbers for each LSE customer account.

Recommendation 80:

All utilities certify that the LSE customer lists and information have been updated and verified at least twice a year.

If PSEG Long Island had made the changes necessary to fully implement these recommendations, many, if not all, of the 1,347 known LSE customers who were not contacted in advance of the storm would have been contacted.

Further, PSEG Long Island has provided no information demonstrating that it made any attempt to use text or email communications to reach these customers as suggested in the scorecard criterion.

LIPA has determined that PSEG Long Island's pre-storm LSE customer communication effort was unsatisfactory.

Critical Customers Notified

Scorecard Measure & Points

All critical facilities notified. 10 points available.

Scorecard Criterion

Utilities must make an outbound call attempt with all critical facilities managers prior to the onset of an outage event. The companies should also use text messages/emails for those customers who have provided contact information.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

PSEG Long Island identifies in Appendix E of their DPS Scorecard Submission the outbound e-mails and phone scripts used to contact all managed accounts and managed critical facilities. The information provided in these notification calls are forecasted weather description and timing, safety tips and reminders on how best to prepare for the forecasted conditions and potential outages, PSEG Long Island storm preparedness actions, and directions on reporting outages via phone, web, or text. Based on the information in Appendix E, PSEG Long Island met the scorecard requirements.

LIPA has determined that PSEG Long Island's performance of pre-storm critical customer notification was satisfactory.

Company Compliance with Training Program

Scorecard Measure & Points

Compliance with training program as specified in approved emergency plans. 10 points available.

Scorecard Criterion

All personnel identified for use during the utility restoration must be trained in accordance with the guidelines specified within the utility's emergency plan. Training provided prior to dispatch will qualify provided it meets the normal course curriculum.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

In 2020, portions of the training program were completed, while others were modified or postponed due to COVID constraints. In the required DPS Scorecard Submission, PSEG Long Island states that PSEG Long Island restoration personnel were trained on their assignment through completion of their training the previous year. An exercise and training schedule for 2020, including the COVID driven modifications, is listed in Figure F.2.

Specifically for the Tropical Storm Isaias response, in-person just-in-time training was conducted on-site during the onboarding of contractor Crew Guides. Contractor Damage Assessor and Wire Watcher personnel also received just-in-time training prior to deployment. In addition, all mutual assistance resources received a virtual safety briefing during their onboarding process.

However, the annual hurricane drill did not meet the ERP requirement to test participants ability to address problems in real time, and there are numerous deficiencies in PSEG Long Island's training and drills, as described in the Isaias Task Force report. LIPA has determined that PSEG Long Island's compliance with the ERP Training Program was unsatisfactory.

Participation in Mutual Assistance Calls

Scorecard Measure & Points

Participate in all pre-event mutual assistance calls. 10 points available.

Scorecard Criterion

Utilities are required to have at least one employee participate in all pre-event mutual assistance calls.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

PSEG Long Island's assessment in Section 2.7 and the information provided in Appendix G in the DPS Scorecard Submission are in-line with scorecard requirements. It is noted that there were 3 pre-storm calls and 12 in-storm NYMAG calls. In each call PSEG Long Island continued to request additional assistance with restoration crews. During the Storm Update calls, each of these NYMAG calls was identified and captured in the Call Notes.

LIPA has determined that PSEG Long Island's participation in Mutual Assistance calls was satisfactory.

Materials Availability

Scorecard Measure & Points

Insufficient material levels restocked within 24 hours of assessment or 36 hours of start of restoration. 20 points available.

Scorecard Criterion

Companies must verify whether storm stocking levels exist based on forecasted level. If materials are not on hand, the company has 24 hours or until the start of customer restoration, if sooner, to correct the situation.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

PSEG Long Island stated in the DPS Scorecard Submission that inventory levels for 148 of 158 critical line items were at or above storm inventory levels in advance of Tropical Storm Isaias. Additional quantities for the remaining 10 items were on order and PSEG Long Island took action to expedite delivery of these items in advance of the storm. Appendix H of that submission confirms key material quantities were in line with scorecard requirements. PSEG Long Island also notes in its assessment that there were no material shortages during the event.

LIPA has determined that PSEG Long Island's pre-storm material inventory preparedness was satisfactory.

II. Operational Response Storm Scorecard Measure Results

The Operational Response metrics are intended to score performance with respect to the utility's response and ability to effectively mobilize personnel.

LIPA's assessment is that PSEG Long Island earned 140 of the 600 points available for Operational Response.

Down Wires

Scorecard Measure & Points

Response to down wires as reported by municipal emergency officials. 60 points available.

Scorecard Criterion

For the purpose of this measure, Municipal Emergency officials will be defined as members of the 911 call center, police, fire, and office of emergency management (including Emergency Operations Center personnel). Response time will be measured from when the call is taken by the utility until the time it takes the utility to arrive at the location with the intent to fix, make-safe, or stand by a downed wire. Arrival of a supervisor or other personnel to assess the location and not perform one of the previous tasks does not meet these criteria unless the down wire is identified as a telecommunications, cable, or other non-utility owned equipment. In the event the call is taken before utility restoration has commenced, the start time shall be equivalent to start of the utility restoration.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

In their DPS Scorecard Submission, PSEG Long Island identified 775 wire down incidents reported by Emergency Officials. PSEG Long Island responded to 317 wire downs (41%) within the required 36-hour response time. PSEG Long Island acknowledged that their response to the downed wires did not meet the minimum threshold as described in the scorecard requirements.

LIPA finds PSEG Long Island's down wire performance unsatisfactory.

Preliminary Damage Assessment

Scorecard Measure & Points

Completion of preliminary damage assessment completed within 24 hours of the start of utility restoration. 30 points available.

Scorecard Criterion

For the purpose of the scorecard, preliminary damage assessment will be an initial assessment of mainline circuits considered to be heavily impacted based on SCADA readings and/or OMS predictions as well as circuits serving critical infrastructure known to be without commercial power. Evaluation will be based on the ability to mobilize and deploy assessors effectively and record findings in a manner that allows for the development of work packages and ETRs.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

In the DPS Scorecard Submission, PSEG Long Island reported that 20 Transmission circuits had locked out and that within 24 hours all damage assessment was complete on these circuits. Additionally, they identified 349 distribution circuits with 3-phase mainline outages. They were able to complete damage assessment of 348 of those distribution circuits within 24 hours. While the preliminary damage assessment met the ERP requirement, detailed damage assessment continued well into the restoration, hampering the efficiency of crew dispatch and the accuracy of ETRs. However, these are not Scorecard requirements.

Crewing

Scorecard Measure & Points

80% of the forecast crewing requirement is committed to the utility within 48 hours after the start of restoration. 30 points available.

Scorecard Criterion

For the purpose of this measurement a committed crew will be considered to be a utility, contractor, or mutual assistance crew on property or en route. There is no penalty for acquiring additional resources, above the forecast crewing requirement, to assist the restoration as they are released by other utilities.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

Based on these data, at the outset of the storm restoration PSEG Long Island forecast a need for 2,500 electrical workers and 300 tree workers after accounting for internal resources and on-Island contract resources. Per Table 3.3.1 of PSEG Long Island's Storm Scorecard, within 48 hours of the start of restoration (7 pm on August 6), PSEG Long Island had 2,105 committed electrical workers and 625 committed tree workers, almost all of which were actually on the property. In total, this committed external workforce was 97.5% of the forecasted need, and for electrical workers specifically was over 84% of the forecasted need. PSEG Long Island met the scorecard criteria of 80% of the forecasted FTEs being secured within 48 hours of the start of restoration.

LIPA finds PSEG Long Island's crewing performance was satisfactory.

ETR Made Available

Scorecard Measure & Points

Publication of global, regional, and local ETRs in accordance with the established protocols. 180 points available.

ETRs furnished by utilities should be appropriate to the distribution of the communication vehicle (ETRs in press releases should reflect the area where press releases are distributed, ETRs on municipal calls should be appropriate to the area where municipal call is held, etc.).

Scorecard Criterion

Time periods for evaluation will be measured from the utility restoration start time. Publication of ETRs in advance of guideline expectations will be awarded additional points.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

PSEG Long Island issued multiple global ETRs throughout the storm period. PSEG Long Island states in their DPS Scorecard Submission that they issued a global ETR for Saturday August 8th on Thursday, 8/6/30 @ 0945, which was between 36 and 48 hours since the storm. They stated that 85% of customers affected would be restored by the end of the day on Friday with the remaining customers restored by end of the day Saturday. The scorecard criterion for a global ETR should be applicable to 90% of the affected customers in the reported levels and should be accurate. The global ETR issued by PSEG Long Island did not meet the scorecard criterion for 90% applicability and was not accurate.

PSEG Long Island states in the DPS Scorecard Submission that the Global ETR served as the Regional/County ETR. Therefore, the same evaluation applies as stated above.

As for Local/Municipal ETRs, PSEG Long Island attempted to provide these to customers by individual job. However, as PSEG Long Island notes in their scorecard submission "many customers had their ETRs revised more than once." This does not meet the criterion for the publication of accurate Local/Municipal ETRs.

LIPA finds PSEG Long Island's publication of global, regional, and local/municipal ETRs unsatisfactory.

ETR Accuracy

Scorecard Measure & Points

Accuracy of ETRs published in accordance with guidelines. For the Global ETR, accuracy should be within +/- 24 hours, while Regional and Local ETRs should be within +/- 24 hours. 120 points available.

Scorecard Criterion

Accuracy of ETR will be determined based on the ETRs published closest to the expectation contained in the guidelines. For regional/county ETRs an evaluation will be made for each region/county affected by the event and points will be awarded on a pro-rated basis (e.g. if five ETRs are issued and four are within a timeband, the utility will score 4/5 of the available points).

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

The information provided in the PSEG Long Island DPS Scorecard Submission states that PSEG Long Island changed the Global ETR multiple times. Technical problems with the OMS system and delays in completing a comprehensive damage assessment further complicated their ability to accurately determine the Global ETR. PSEG Long Island failed to provide an accurate original Global ETR or accurate updated Global ETR to our customers. The performance in this measurement did not meet the scorecard requirements.

Based on information provided by PSEG Long Island in the DPS Scorecard Submission, LIPA concludes that the PSEG Long Island used the Global ETR as the Regional ETR. Therefore, for the reasons stated above, the performance in this measurement did not meet the scorecard requirements.

As per the PSEG Long Island ETR strategy for large storms, proactive notifications were turned off ahead of the storm. Local ETRs were not accurate and changed multiple times for individual customers. With multiple ETR changes only 78% were restored within 12 hours of the final ETR. 21% of the customers received no local ETR at all. The minimum requirements for this scorecard measure were not met.

LIPA finds PSEG Long Island's accuracy performance for Global, Regional, and Local ETRs unsatisfactory.

Municipality Coordination

Scorecard Measure & Points

Coordinate with municipalities regarding electric hazards or utility equipment impeding road clearing, down wires, critical facilities, etc. in accordance with approved emergency plans. The utilities are not expected to perform debris and/or snow removal activities that do not involve electric facilities. 20 points available.

Scorecard Criterion

Evaluation of compliance will include the review of steps taken to communicate with municipalities, the use and the effectiveness of liaisons, and the ability to integrate concerns raised into restoration activities.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

The DPS Scorecard Submission describes communications by Senior Leadership, District Managers and Municipal Liaisons. Figure 3.6.1 denotes communications by PSEG Long Island president and COO to local executives. Based on these data, LIPA's assessment is that PSEG Long Island implemented the necessary municipal contacts and liaison resources, consistent with its approved ERP, to ensure effective coordination with impacted municipalities on issues relating to road clearing, down wires, and critical facilities.

It is worth noting that while PSEG Long Island's municipal portal was not consistently functional during the restoration period. The outreach and liaison structure worked as a backstop.

It is also worth noting that there were numerous complaints by local officials about delays from coordination of Make Safe to Clear jobs.

LIPA rates PSEG Long Island's performance on the measure as satisfactory.

County EOC Coordination

Scorecard Measure & Points

Coordinate with County Emergency Operations Center (EOCs) regarding electric hazards or utility equipment impeding road clearing, down wires, critical facilities, etc. in accordance with approved emergency plans. The utilities are not expected to perform debris and/or snow removal activities that do not involve electric facilities. 20 points available.

Scorecard Criterion

Evaluation of compliance will include the review of steps taken to communicate with county emergency operation centers, the use and the effectiveness of liaisons, and the ability to integrate concerns raised into restoration activities.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

In the DPS Scorecard Submission, PSEG Long Island notes in Section 3.7 that liaisons that were assigned to work with the different agencies. EOC Liaisons were assigned to support Nassau, Suffolk, and NYC EOCs during Tropical Storm Isaias to assist with coordination efforts between PSEG Long Island and first responder organizations. PSEG Long Island EOC Liaisons supported EOC efforts remotely (COVID-19 precautions) and/ or in-person from activation prior to the arrival of the storm through deactivation at the direction of County and City Emergency Management leadership and activation staffing plans. These communication channels provided effective communication and coordination between PSEG Long Island and these regional EOCs throughout the storm period.

The Make Safe to Clear organization had crews working directly with Township Department of Public Work crews beginning on Wednesday, August 5, 2020.

LIPA rates PSEG Long Island's performance on the measure as satisfactory.

Utility Coordination

Scorecard Measure & Points

Coordinate with other utilities (electric, gas, communications, water) regarding critical infrastructure and efficient restoration in accordance with approved emergency plans. 20 points available.

Scorecard Criterion

Evaluation of compliance will include the review of steps taken to communicate with other utilities, the use and the effectiveness of liaisons, and the ability to integrate concerns raised into restoration activities.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

PSEG Long Island reports in their DPS Scorecard Submission that they proactively communicated with the LIRR and telecommunication companies. Appendix K identifies reports that were given to Verizon and Altice at least once per day to keep them updated. Additionally, Figure K.1 denotes a sample report given to Verizon and Altice that identifies jobs as Telco related.

Based on these data, LIPA concludes that PSEG Long Island effectively coordinated with the other utilities serving Long Island throughout the storm preparation and restoration period. LIPA notes this Scorecard element is unrelated to coordination with telecommunications associated with PSEG Long Island's own systems.

LIPA rates PSEG Long Island's performance on the measure as satisfactory.

Safety

Scorecard Measure & Points

Avoidance of any employee or contractor serious injury occurring during hazard storm/outage and restoration work. 100 points available.

Scorecard Criterion

For the scorecard purpose, hazard work is defined as any assignments that are directly related with restoration activities. Serious injuries are defined as injuries occurring while performing hazard work which result in hospitalization, medical treatment beyond first aid, or death.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

There were 3 electric shock incidents and 3 other in-line of duty injuries during the restoration. These incidents involved both PSEG Long Island personnel and contract resources, and each injury qualifies as a serious injury. PSEG Long Island reported a 1.54 OSHA incident rate for the storm in their DPS Scorecard Submission. This rate is comparable to, if not worse than PSEG Long Islands historic rate, especially during storms. The Scorecard requires safety performance to be at least 25% better than historical storm performance. LIPA determined that this criteria was not met.

Mutual Assistance

Scorecard Measure & Points

Request made through all sources of mutual assistance within 36 hours from the start of utility restoration for 3 to 5 day events and 48 hours from the start of utility restoration for events over 5 days. 20 points available.

Scorecard Criterion

Evaluation of compliance will include the review of mutual assistance request related to line workers, vegetation workers, damage assessors, wire guards in comparison to peak work levels and emergency plan requirements.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

PSEG Long Island requested and obtained mutual assistance resources in advance of the storm, beginning on July 31. Nearly 1,500 resources arrived in advance of the storm, as shown in Figure 3.10.1 of the PSEG Long Island Storm Scorecard. That Figure also shows that PSEG Long Island had requested, obtained, and processed into the on-Island restoration workforce 2,559 mutual assistance line and tree resources by 6 pm on August 6 (47 hours after the start of restoration). This compares to PSEG Long Island's initial estimated supplemental workforce requirement of 2,800. They continued to request and obtain additional mutual assistance resources through August 12, reaching a total mutual assistance workforce of 5,935.

LIPA rates PSEG Long Island's performance on the measure as satisfactory.

III. Communications Storm Scorecard Measure Results

The Communications metrics are intended to score performance with respect to the utility's ability to receive and disseminate information related to the impact of the storm/outage and restoration activities. The need for communicating with customers, public, news media, and local officials is very important during emergency conditions, such as storms. Therefore, the sharing of information will be measured with respect to several communication vehicles (calls, press releases, social media, etc.).

The Communications measures are intended to score utility performance with respect to its ability to receive and disseminate information related to the impact of the storm/outage and restoration activities.

LIPA's assessment is that PSEG Long Island earned 40 of the 300 points available for Communications.

Call Answer Rates

Scorecard Measure & Points

Percent of customer calls offered to and answered by a live representative within 90 seconds. 30 points available.

Scorecard Criterion

By properly staffing call centers, utilities should be able to answer over 80 percent of calls within 90 seconds. 20 points will be earned by achieving at least an 80% call answer rate. An additional 10 points will be given if the call answer rate is over 90 percent. The call answer time will be measured on a daily basis from the start of the event through customer restoration.

Assessment

LIPA has assessed PSEG Long Island's performance based on Section 4.1 and Appendix N of PSEG Long Island's Storm Scorecard filed with the DPS, and considered other information made available to LIPA through its ongoing Islaias investigation. LIPA accepts PSEG Long Island's estimate that approximately 56% of calls answered by a representative were answered within 90 seconds.

Based on this, LIPA finds PSEG Long Island's performance was unsatisfactory.

Municipal Calls

Scorecard Measure & Points

Municipal calls are held at least daily in compliance with the utility's approved Electric Emergency Plans and determined to be highly effective or effective. 40 points available.

Scorecard Criterion

Municipal calls should be held daily until at least 90% of the affected customers have been restored. An alternative municipal contact method should be in place to respond to questions and issues from officials regarding the remaining scattered single outages once the calls are no longer required. The first municipal call can be held at PSEG Long Island's discretion, but must be held within the first 36 hours from the start of restoration. To determine call effectiveness, consideration will be given to whether the time of the municipal call was communicated to all stakeholders, how the call was managed, if baseline information and status of road clearing activities were provided, whether the call allowed for sufficient Q&A and how the utility responded to questions posed, and the successful use of an operator assisted calling system to assist in managing the call.

Assessment

For example, the transcript from the Friday, August 7th, 3PM (Day 4 of restoration) Queens/Nassau Municipal call was evaluated for accuracy of information provided. During the call, it was stated that 75% of the 420,000 customers affected by the storm have been restored as of 12:30 pm. This would translate into 315,000 customers restored and 105,000 customers remaining without service.

A short time later another PSEG Long Island representative reported that there are 112,000 customers still out in Suffolk County and another 113,000 customers still out in Nassau County. During the question and answer period, one municipal representative noted that the outage count in Nassau County had more than doubled since the night before and remarked, "I'm getting a lot of conflicting numbers here." The PSEG Long Island representative answered that there were new outages that morning that were not related to Isaias. During that afternoon, the outage map reported over 200,000 outages, which included outages that were logged since August 5. This practice of reporting two different groups of outages – one, an extract from OMS of outages logged through August 5 and the other a current total – caused confusion among stakeholders.

Based on this sort of inaccurate and confusing baseline status information shared with government leaders, LIPA finds PSEG Long Island's performance was unsatisfactory.

Web Availability

Scorecard Measure & Points

Websites are accessible and contain appropriate storm related information. 40 points available.

Scorecard Criterion

During a storm event, utilities' websites must be available around the clock, and must be updated at least hourly, until restoration is complete. Consideration will be given for maintenance resulting in individual website applications being unavailable if downtime is reasonably short in duration and is performed during off-peak hours. The websites should include the baseline restoration information, all press releases issued during the event, a complete list of safety tips, an outage location map of affected areas, summaries of outages and ETRs by municipality and county, and the locations and times of dry ice distribution.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data. Because of the OMS failures during the event, the outage information posted to the outage map website and proliferated through other communication channels was wrong, out of date, incomplete, and/or stale. PSEG Long Island was slow to understand and react to the problems with the outage map website, thus exposing customers to these issues for most, if not all, of the restoration period.

Based on this, LIPA finds PSEG Long Island's performance is unsatisfactory.

LSE Customers

Scorecard Measure & Points

Percent of affected LSE customers contacted within 12 hours, if at least two attempts were made within 12 hours for those unable to be contacted, and whether all of the affected LSE customers were contacted or referred to an emergency service agency within 24 hours. 50 points available.

Scorecard Criterion

PSEG Long Island is evaluated on its ability to contact 80% of the affected LSE customers within 12 hours from the start of the event. A partial score of 15 points will be awarded for the initial attempt, provided all customers have received at least one phone call.

PSEG Long Island must make at least one additional attempt, within the same initial 12 hour period, to contact any LSE customer who was not contacted on the first attempt. Contact within 12 hours of all customers is worth 30 points.

Further, within 24 hours of the start of the event, LSE customers must have been either (a) directly contacted by the utility by phone or in person, (b) referred to an emergency services agency (e.g., police or fire department) for emergency assistance, or (c) have had their service restored. PSEG Long Island must maintain records of LSE customer contacts, including any customers who the utility was unable to reach. 20 points are available for completing this portion of the LSE measure.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

This measure evaluates PSEG Long Island on its ability to make contact with 80% of the affected LSE customers within 12 hours of the start of the event. Based on the data from Appendix Q of the Storm Scorecard, on August 4, PSEG Long Island only managed to contact 208 of 2,505 LSE customers affected (8.3%). This is unsatisfactory for the 15 points available for initial contact

While service was restored to 179 and emergency response personnel completed wellness checks for a further 204 on August 4, 1,914 LSE customers were remained to be contacted. PSEG Long Island only made a second attempt to reach 70% of those remaining customers within the first 12 hours. This is unsatisfactory for the 15 points available for attempting a second contact within the first 12 hours.

As discussed under LSE Customer Preparedness, PSEG Long Island failed to have an up to date list of its LSE customers, so it is impossible to assess whether PSEG Long Island contacted or referred 100% of its LSE customers impacted by the storm.

This is unsatisfactory for the 20 points available for achieving 100% LSE customer contact within 24 hours.

DPS Reporting

Scorecard Measure & Points

Reports to the PSC are complete and submitted on time. 40 points available.

Scorecard Criterion

Evaluation will consist of a review of the timeliness of the reports and the content therein provided to staff and outage submissions. Reports are due from each utility to DPS by 7am, 11am, 3pm, and 7pm or as defined by Staff. Based on the specific conditions of the event and the number of electric customer outages remaining, DPS Staff will notify each utility when reporting is no longer necessary. The reports should include, at a minimum, summary of outages, crewing information on site and en route, planned crew relocation and mutual assistance activity, discussion of major damage, estimated restoration times, summaries of work plans for restoring customers, listing of critical facilities and LSE customers affected, and a summary of dry ice/bottled water distribution activities.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

As PSEG Long Island demonstrates in its scorecard submission and as the DPS has confirmed, PSEG Long Island made all of the required reports during Tropical Storm Isaias.

Based on these, LIPA finds performance on this measure satisfactory.

Customer Communications

Scorecard Measure & Points

Daily communications through Press Releases, Text Messaging, E-Mail, and Social Media. 60 points available.

Scorecard Criterion

PSEG Long Island is required to issue daily messages through the stated communications vehicles for each day of the utility restoration. Text messages and/or emails should be issued daily to all customers for whom utility has customer addresses on file.

Evaluation of compliance will include a review of the information contained in press releases, emails, text messages and the use of Facebook, Twitter and other forms of social media as applicable, during the restoration. Contents of the communications should include baseline restoration information whenever possible and the character limitations of some communication vehicles will be taken into account when reviewed for content.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

PSEG Long Island did communicate frequently with its customers and the general public, using all of the communications channels covered by this measure. However, the accuracy of the content of these communications, especially in terms of the number of customers affected, the specific areas out, and general ETRs, was poor. This contributed to the customer feelings of confusion and frustration that grew as the restoration period lengthened.

For example, as shown in Appendix R, page 197, of the Storm Scorecard, PSEG Long Island communicated to its customers via Facebook at 1:35 pm on Friday August 7 that "Fewer than 105,000 storm-affected customers are w/o power. We estimate that 85% of those customers will be restored by the end of the day today."

To achieve that result – requiring 89,250 customers to be restored in the remaining 11 hours of Friday, August 7 - would require over 8,000 customers to be restored each hour. This would have been a very unlikely occurrence, given that PSEG Long Island publicized over on Twitter on August 6 that it restored slightly more than 2,000 customers per hour during that afternoon and early evening.

The frequent communication of inaccurate, confusing, and sometimes contradictory information contributed to widespread customer confusion and frustration.

Based on this, LIPA finds PSEG Long Island's performance on this measure to be unsatisfactory.

Outgoing Message on Telephone Line

Scorecard Measure & Points

Outgoing messages on telephone line must be updated within one hour following communication releases. 20 points available.

Scorecard Criterion

Evaluation for compliance will be determined based on whether messages were updated within one hour following communication release and the new message coincides with information contained in the releases.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available data.

As PSEG Long Island noted in its own assessment in section 4.7 of the DPS Scorecard Submission, "Due to the approval process, some IVR messaging was updated prior to publication of the press release, some within one hour and some within two hours afterwards."

The message content and timing was not consistently managed and this further contributed to customer confusion.

Based on this, LIPA finds the performance on this measure unsatisfactory.

DPS Complaints

Scorecard Measure & Points

Number of storm/outage related complaints received by the Department's call center per 100,000 customers affected. 20 points available for performance where complaints received are less than or equal to 20 per 100,000, while 10 points are available for performance where complaints received are less than or equal to 40 per 100,000.

Scorecard Criterion

Data from the Department's call center will be evaluated to determine the number of storm/outage related complaints received. Storm related complaints will also reflect complaint related to improper application of customer protection measures defined under Case 13-M-0061.

Assessment

LIPA has assessed PSEG Long Island's performance based on PSEG Long Island's Storm Scorecard filed with the DPS and other available information. As PSEG Long Island notes in its assessment in Section 4.8.3, the DPS received 1,084 complaints. Using total customers affected of 646,000, as now estimated by PSEG Long Island, the PSEG Long Island DPS Complaint performance for Isaias was approximately 168 complaints per 100,000 customers affected. This exceeds the minimum standard of 40 per 100,000.

Based on this, LIPA has assessed the performance on this measure as unsatisfactory.



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Exhibit "C"

Public Service Commission

John B. Rhodes Chair and Chief Executive Officer

> Diane X. Burman James S. Alesi Tracey A. Edwards John B. Howard Commissioners

Thomas Congdon Deputy Chair and Executive Deputy

Robert Rosenthal General Counsel

Michelle L. Phillips Secretary

November 13, 2020

Via Email and U.S. Mail

Honorable Ralph V. Suozzi, Chairman Board of Trustees Long Island Power Authority 333 Earle Ovington Blvd. Uniondale, New York 11553 boardoftrustees@lipower.org

Re: Matter No. 20-01764: In the Matter of DPS Investigation into PSEG Long Island's Preparation and Response to Tropical Storm Isaias.

Dear Chairman Suozzi:

By this letter the New York State Department of Public Service (the Department or DPS) provides to the Long Island Power Authority (LIPA) Board of Trustees the DPS recommendations to LIPA following the poor performance of its Service Provider, PSEG Long Island (PSEG LI) during Tropical Storm Isaias (TS Isaias or the Storm).

On the afternoon of August 4, 2020, TS Isaias struck New York, bringing strong winds and heavy rain that significantly impacted the Mid-Hudson Valley, New York City, and Long Island regions. The Storm caused extensive damage to electric distribution infrastructure that, in turn, led to lengthy outages for a substantial number of New York utility customers. Peak outages reached approximately 900,000 customers. The LIPA service territory had approximately 630,000 outages, and restoration was not complete until on or after August 12, 2020.

The day after Isaias struck, Governor Andrew M. Cuomo directed the DPS to investigate utility performance. In response, DPS Staff promptly initiated an investigation into New York



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electric service providers' preparations for and responses to the Storm, as well as launching similar investigative efforts into telecom services. This investigation includes PSEG LI.

On August 19, 2020, DPS issued a Notice of Apparent Violations and Direction of Prompt Remedial Action Letters (NOAV) in response to PSEG LI's apparent failures to properly anticipate and/or respond to the weather emergency and its effects on New Yorkers' access to essential utility services. The initial investigation undertaken by the DPS found PSEG LI in apparent violation of the State Public Service Law (PSL), the Public Authorities Law (PAL), and associated regulations, based on PSEG LI's wholly inadequate response to TS Isaias. The Department's initial investigation further revealed that PSEG LI failed to follow its Department-recommended and LIPA-adopted Emergency Response Plan's (ERP) requirements relating to PSEG LI's: (1) damage assessment responsibilities; (2) responsibility to maintain a functional Outage Management System (OMS); (3) responsibility for timely and effective communication and coordination (ETR) notices; and (4) responsibility for timely and effective communication and coordination with its customers, local municipal governments, and state agencies. The August 19 NOAV also provided a series of corrective actions that PSEG LI must implement immediately to mitigate the stillexisting severe threats to public health and safety resulting from PSEG LI's inactions and to prevent any potential failings in case of another significant storm event this year.

In addition, on September 23, 2020, the LIPA TS Isaias Task Force issued its 30-day Report. The 30-day report contained the following preliminary major findings: (1) many customer calls to report outages or to get outage status were unsuccessful due to overloaded inbound voice (telephony) infrastructure; (2) PSEG LI's OMS could not handle the high demand placed on it and could not meet its intended function and thereby negatively impacted communication channels and in-field restoration activities; (3) failures of the OMS prevented some customer text messages from being processed and the Outage Map from refreshing in a timely manner; and (4) the total restoration time of eight days substantially exceeded both the initial projected restoration time of up to 48 hours and the subsequently revised goal of Saturday midnight (four days). The failure of the OMS was a significant cause of the inaccurate ETRs, as were certain operational decisions in how to employ ETRs.

PSEG LI's Violations of its Emergency Response Plan and Department Regulations:

DPS Staff identified evidence relating to more than 70 potential violations of PSEG LI's ERP, which are summarized below. As further discussed in the DPS Preliminary Storm Report (to be provided separately), PSEG LI violated various aspects of its ERP as evidenced throughout Staff's investigation, its Scorecard report filed on September 13, its Part 105 Report filed on October 15, and extensive document review, issuance of interrogatories, and interviews and depositions of PSEG LI and Public Service Enterprise Group (PSEG) personnel conducted by DPS and DFS.

Regarding the critical Outage Management System, the Department finds that PSEG LI violated various sections, including §§ 7.1; 7.2; 7.3;7.4; and 15.5.6 of its ERP. PSEG LI deployed OMS version 6.7 in June, adding new programs and operational demands. This new version of the OMS failed to function properly before TS Isaias, and PSEG LI did not resolve these critical issues, which PSEG LI should have known would be exacerbated during a storm scenario. Leading

up to and more specifically on August 4 during the early onset of TS Isaias, the OMS encountered increasing difficulties that persisted during damage assessment and restoration. PSEG LI's lack of an operational OMS was the prime cause of delayed restoration, inconsistent and inaccurate ETRs, delayed storm response efforts including damage assessment and dispatching crews, and poor communications with customers and municipal officials. Following the storm, PSEG rolled back the OMS to Version 5.5, to ensure operability for potential storms this season. Stress testing conducted the week of August 31 also revealed functionality issues with Version 5.5.

It is further the Department's position that PSEG LI violated §§12.1; 12.3; and 12.10.2 of its ERP. The Department's investigation indicated that PSEG LI initiated a questionable and misleading public relations strategy immediately after the storm on August 4 stating that "IT system issues" were caused by its telephone network provider Verizon. Management from PSEG in New Jersey directed PSEG LI to perpetuate a stronger focus on Verizon in news and media coverage; however, this directed focus seems inconsistent with PSEG LI employees' initial concerns about failures with its OMS. Failure of the OMS was at the heart of PSEG LI's poor performance. While PSEG LI did encounter some limited issues with an overwhelming number of calls received in the early hours of the storm, the Department's investigation revealed that these issues were not directly caused by Verizon, a position the Department understood and then relayed to PSEGLI on August 4.

The DPS Preliminary Storm Report also identified evidence of other violations of PSEG LI's ERP. Specifically, §§12.5; 12.5.1; 12.5.2 and 12.5.2 regarding PSEG LI's Call Center, Call Center Staffing and IVR messaging; §§7.3.8 and 8.3 regarding to PSEG LI Website and its availability; and §§8.1; 8.3; 8.5; 17.2.2, and ERIP-OPS-006 §7 regarding ETRs. Regarding Life Saving Equipment (or LSE) customers, PSEG LI violated its ERP in numerous instances. As such, PSEG LI failed to comply with Commission regulation 16 NYCRR 105.4(b)(5); and violated their ERP §§12.4; 12.4.2, and ERIP-COM-002 §§5.3 and 5.4.

Moreover, the DPS Preliminary Storm Report provides evidence confirming the apparent violations identified in DPS' August 19 NOAV, such as §§8.4.3 and 13.1.2 regarding Damage Assessment. As noted in the NOAV, these lapses exacerbated the challenges of any restoration effort and may have led to the misapplication of resources, ultimately eroding customer confidence in the company's ability to provide safe and adequate service.

In addition, the Department's regulations include obligations that companies, including PSEG LI acknowledge that an "extraordinary volume of customer calls" will occur "during emergency events" and that companies' systems effectively handle such high volumes of calls during an emergency event. 16 NYCRR §105.4(b)(9). Companies must train on and integrate communication systems and test their functionality. 16 NYCRR §105.4(b)(4). PSEG LI's failures to accommodate such call volumes and to effectively test and implement systems necessary to conduct emergency response should also be considered violations, in accordance with ERP §§ 14.3.2; 18.1; 18.1.1; and 18.1.3.

The Department's investigation into this matter is continuing. The above-noted list of violations may be supplemented as the investigation continues.
The Department's Recommendations to the LIPA Board:

Based on the DPS Preliminary Storm Report and the identification of numerous violations of PSEG LI's ERP, and that these violations materially lengthened PSEG LI's emergency response, the Department provides the following recommendations to the LIPA Board.

Termination for Default/Breach of Contract:

DPS recommends that LIPA consider serving a notice that PSEG LI defaulted on material Contractual obligations and that LIPA seeks to terminate the Amended and Restated Operation Services Agreement (A&R OSA) (A&R OSA §8.1(A)(5)). Notice of default and claims for breach of contract should include failure to perform "Emergency Response" obligations and equipment and system maintenance obligations based on the following Contract provisions concerning Operations Services, *see* A&R OSA §84.2(A)(4) (b), (e), (q), & (t). These obligations include "implementing business continuity, disaster recovery and emergency response plans, and all necessary emergency response, reporting and communication functions relating to the T&D System," which encompasses inbound and outbound "customer communications," "conducting periodic drills (including as required by the LIPA Reform Act) to test the validity of emergency response plans," supporting and improving information technology systems, and deploying and maintaining tools and information systems necessary to perform all Operations Services. The inadequate telephone system and the nonfunctioning OMS system represent material defaults of PSEG LI's obligations.

Termination of PSEG LI as Service Provider:

DPS also recommends LIPA evaluate terminating PSEG LI as LIPA's Service Provider and consider alternatives to the management of the LIPA T&D system, including municipalization or, as appropriate, privatization.

Litigation to Compel Specific Performance of Contract Obligations – Outage Management:

DPS recommends that LIPA serve notice that PSEG LI defaulted on material Contract obligations and initiate the process to seek an order (1) declaring and establishing that PSEG LI defaulted on a material obligation and (2) compelling PSEG LI, at its own cost, to immediately deploy a fully functional Outage Management System that is proven to manage exceptionally high volumes of outages and calls.

Declaration re Storm Performance Metric Failures for 2020:

The A&R OSA Major Storm Performance Metric Failure provision requires two storm failures to occur within three years to trigger the Contract provision to terminate PSEG LI due to storm performance metric failures (See, A&R OSA §8.4(C) and Appendix 13).

DPS recommends that the LIPA Board formally declare that PSEG LI's poor performance during Isaias constitutes the first of the two necessary failures within three years for the purposes of initiating the termination of the Contract because of Major Storm Performance Metric Failure. DPS also recommends this failure be considered now, as part of any renegotiation, or in consideration of extension of the contract post 2025.

Renegotiation of the A&R OSA:

DPS recommends that PSEG LI's failures require renegotiation of A&R OSA to enable greater oversight by LIPA and DPS and provide stricter controls, metrics, and reporting, automatic financial penalties administered by LIPA, and ratepayer compensation remedies.

No Renewal of the Existing OSA Beyond 2025

The A&R OSA provides that the Contract may be renewed for an additional 10 years, *i.e.*, until 2035 (A&R OSA §2.1(B)). Given the deployment of the non-functional Version 6 OMS system, challenges with Version 5 OMS, lack of sufficient telephone trunk line capacity, the flawed and delayed restoration, and PSEG NJ intervention into PSEG LI operations, DPS recommends that the LIPA Board strongly consider affirmatively declaring that LIPA will not renew and extend the OSA beyond its current end date of 2025.

Initiate an Audit to Seek Costs Imprudently Incurred by PSEG LI

DPS recommends that LIPA convene a substantial audit to identify, evaluate, and seek costs incurred by PSEG LI for systems that did not function properly, did not benefit customers, or impeded restoration efforts. Ratepayers should not shoulder the burden for OMS version 5, flawed upgrades to OMS version 6, and expenses for related IT platforms.

Referral of Recommendations NJBPU:

LIPA should refer the results of its investigation to NJBPU. DPS is referring this matter, including its recommendations and Staff's Preliminary Report to the NJBPU for its review, and/or to conduct its own investigation into mismanagement by PSEG over PSEG LI. DPS is also referring the matter to PSEG for internal investigation as part of its own review and compliance policies.

Conclusion:

PSEG LI's failures to comply with its ERP and the Department's regulations evidence a serious lapse in the company's ability to provide safe and adequate service to customers on Long Island and the Rockaways. LIPA's customers are entitled to an electric service provider that can appropriately and effectively respond in the most severe emergency situations, including effective implementation of the day-to-day operations which underlie such a response. Customers should not bear the cost and risk of, nor be subject to, PSEG LI's poor performance, nor should the systems like OMS, which are funded by ratepayers, fail when needed most.

LIPA's customers are also entitled to honest and accurate communications from the Service Provider, and when the company encounters issues, those issues should not be laid at the feet of other utility providers. An essential part of storm response is providing timely, accurate, and informative direction to customers. Misleading customers through questionable communications exacerbates those issues, creates confusion, endangers customers, and adds to customer dissatisfaction.

The LIPA Board should take swift and appropriate action based on the Department's recommendations. These actions should rectify the failures by PSEG LI. PSEG LI's response was widely recognized by municipal and local officials, legislators in both the Assembly and Senate, and most importantly by the very customers PSEG LI has an obligation to serve, as totally unacceptable.

The Board's adoption of the Department's recommendations should make clear to PSEG LI that the company must do better, it must provide the level and quality of service expected, and that it faces serious consequences should it fail to meet these expectations and obligations. The Department believes its recommendations as adopted by the LIPA Board will compel PSEG LI to improve its performance for the remainder of its existing contract with LIPA or levy the appropriate consequences for the company's failures. In either case, the Department, in conjunction with the LIPA Board, will take the steps necessary to protect LIPA's customers on Long Island and the Rockaways.

Respectfully Submitted,

Joseph Suich, Director, Office of Investigations & Enforcement

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Rory Lancman Special Counsel for Ratepayer Protection

Copies to: John B. Rhodes, DPS Chief Executive Officer Thomas Falcone, LIPA Chief Executive Officer Thomas Congdon, DPS Deputy Chair and Executive Deputy Anna Chacko, LIPA General Counsel John Sipos, DPS Deputy General Counsel Bobbi O'Connor, LIPA Secretary to the Board of Trustees Guy Mazza, DPS LIO Director Kevin Wisely, DPS Office of Resiliency and Emergency Preparedness Director Nicholas Forst, DPS LIO Assistant Counsel