

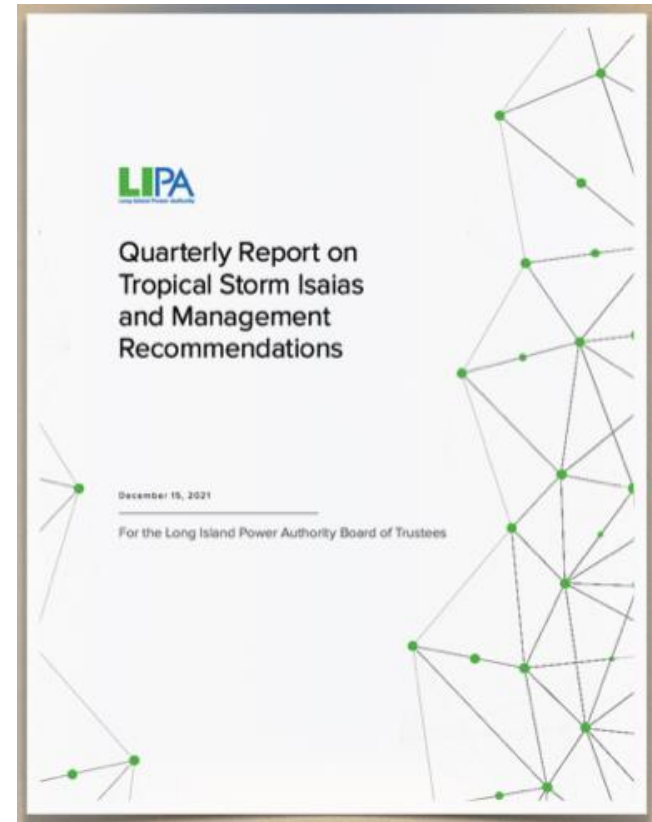


QUARTERLY REPORT ON TROPICAL STORM ISAIAS AND MANAGEMENT RECOMMENDATIONS

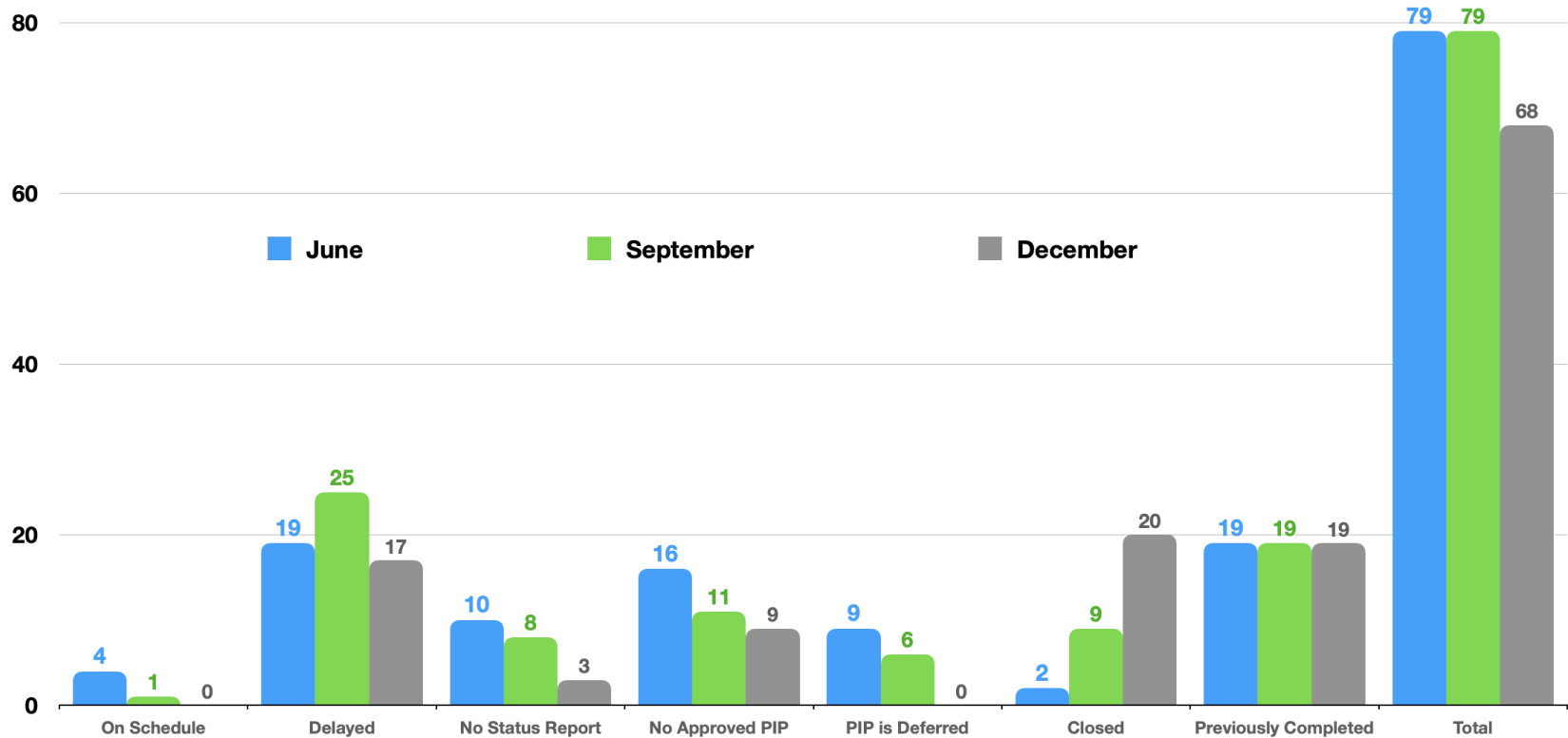
DECEMBER 15, 2021

OVERVIEW

- Quarterly Report provides the status of:
 - **78 Isaias Task Force Project Implementation Plans (PIPs)**
 - **68 Management PIPs** to correct other PSEG Long Island operational deficiencies
- The Board has directed LIPA staff to:
 - Monitor PSEG Long Island's execution of the PIPs
 - Independently verify and validate (IV&V) the remediation of each recommendation
 - Report to the Board Quarterly until all PIPs are complete



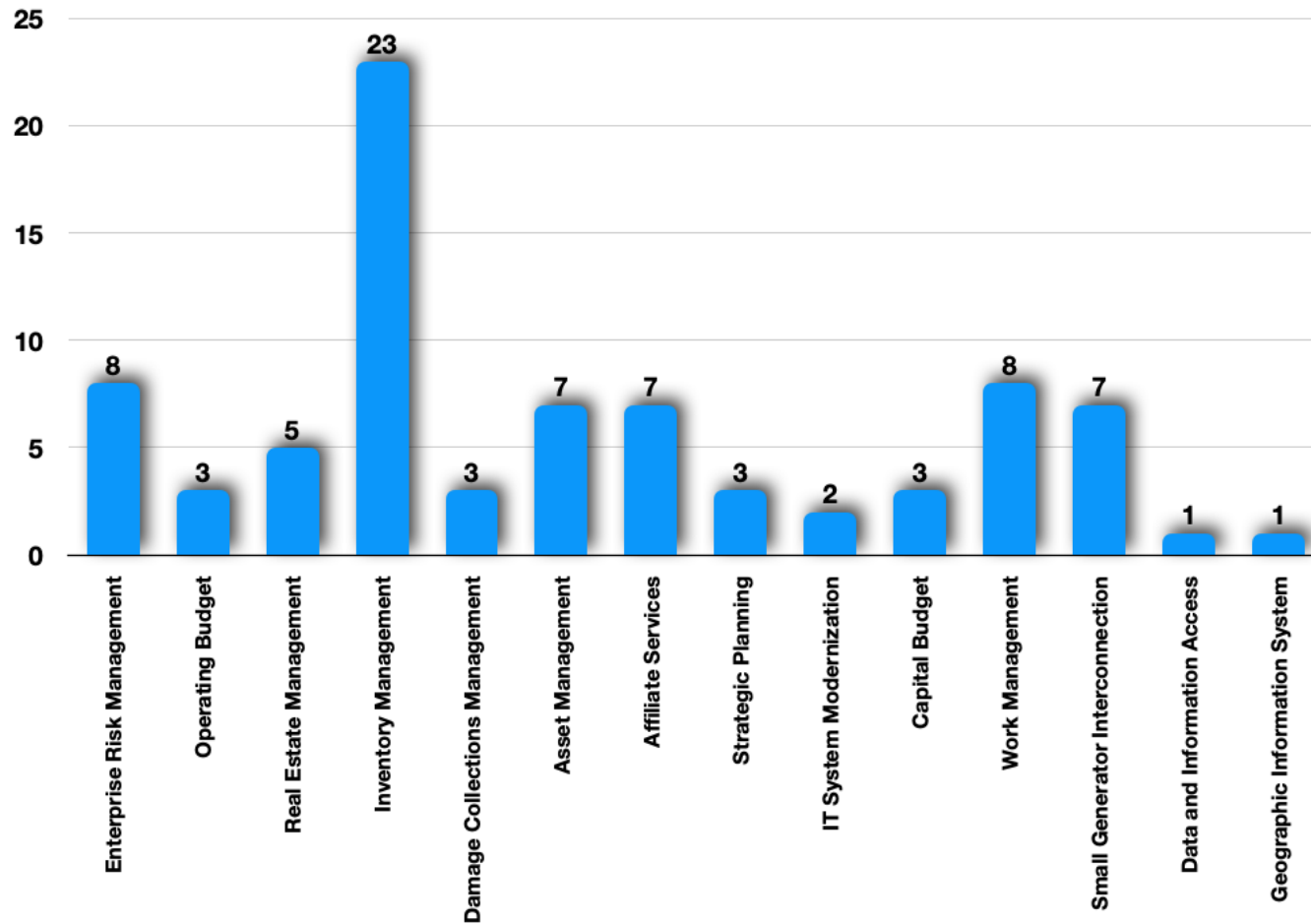
ISAIAS TASK FORCE PIP STATUS



10 of the recommendations have now been incorporated into the 2022 OSA Performance Metrics with new negotiated dates and targets; and will be reported on with respect to the terms of the relevant metrics starting in 2022, contingent on OSA approval. These recommendations are not included in the statistics in this chart.

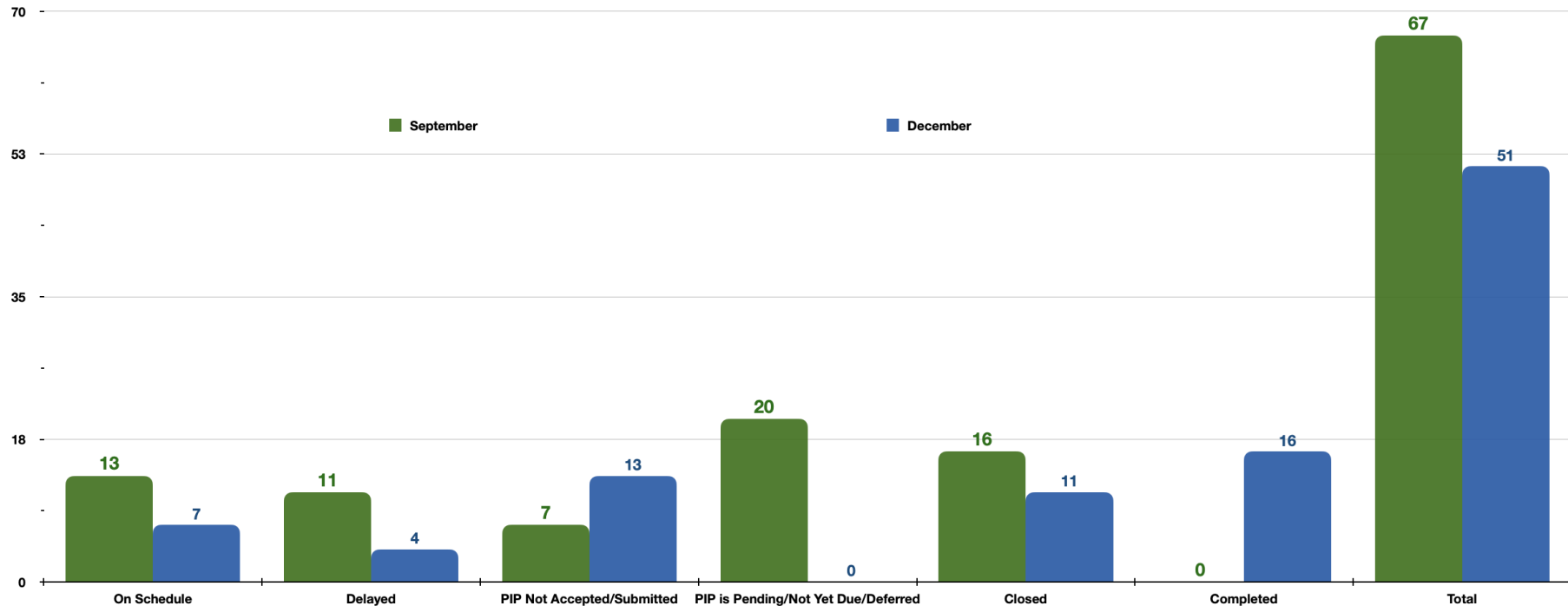
MANAGEMENT RECOMMENDATIONS

In addition to the 78 Task Force projects, the LIPA Board has adopted **83 Management Recommendations** addressing deficiencies in 13 non-storm operational areas



MANAGEMENT PIPS STATUS

83 Management recommendations have resulted in **68** PIPs. Most of these PIPs are still in the early stages of execution.



17 of the recommendations have now been incorporated into the 2022 OSA Performance Metrics with new negotiated dates and targets; and will be reported on with respect to the terms of the relevant metrics starting in 2022, contingent on OSA approval. These recommendations are not included in the statistics in this chart.

STATUS OF REMEDIATION OF PSEG LONG ISLAND COMMUNICATIONS AND OMS

- **Communications systems and OMS are in significantly better shape than last year.**
- **However, PSEG Long Island still needs to complete the necessary remediations, particularly for the OMS, which remains on an out-of-date out-of-general-use version (v5.5) of the software.**
 - OMS v 5.5 is only used by two utilities – PSEG Long Island and PSE&G in New Jersey – and is running on 7-year-old hardware on an operating platform that the vendor has retired.
- LIPA's recommendations to PSEG Long Island had the following key requirements:
 - Systematically analyze and test the failure modes of the system to **identify the true root causes of the observed defects**
 - Ensure that your test designs **comprehensively and completely exercise all end-to-end processes** (across each channel) as might be encountered in a future storm scenario like Isaias or worse
 - **Focus on fixing OMS version 6.7 or later** and not the now obsolete (and unsupported) version 5.5 of the system
 - **Build robust Business Continuity Plans** as a contingency measure

STATUS OF REMEDIATION OF PSEG LONG ISLAND COMMUNICATIONS AND OMS

- **PSEG Long Island is now preparing to deploy a remediated OMS version 6.7 on new hardware in January 2022**, with performance testing currently in progress.
- PSEG Long Island had initially planned to deploy OMS 6.7 in June 2021 but was unable to meet their proposed timeline. The current planned deployment in January 2022 is also a further delay from the previously reported planned deployment date of November 2021.
- The recent delay was necessitated by issues that surfaced during initial performance testing, which PSEG Long Island has made good progress in addressing.
- Delaying the deployment in order to address critical issues is undoubtedly preferable to deploying defective software, as occurred prior to Tropical Storm Isaias, and we are encouraged by the efforts of PSEG Long Island and the software vendor (CGI) in identifying and resolving the issues once they occurred.
- However, PSEG Long Island must remain cognizant of the risks of remaining on the unsupported OMS 5.5 version and move forward with urgency.

BUSINESS CONTINUITY PLANS

- The 90-Day Report identified the **lack of adequate Business Continuity Plans (BCPs)** as a significant management failure and recommended the development of comprehensive BCPs for all mission-critical systems and processes to enable graceful recovery from technology failures
- In response, PSEG Long Island submitted a “Restoration Contingency Plan for Critical System Failures.” A major deficiency was that it focused on the last incidence of failure (OMS and telephony) and did not take a broader view of the potential failures of many other mission-critical systems.
- PSEG Long Island has performed:
 - A tabletop drill of OMS and telephony failures (January 2021)
 - A functional Exercise of BCP Work-Around (April 2021)
 - Emergency Scenario Exercises (May 2021)
 - The annual Hurricane Tabletop Exercise (June 2021)
 - Review sessions with LIPA on proposed work-arounds for system failures (continuing)
- While PSEG Long Island has made progress on the BCPs, there is still significant work to be done. LIPA continues to review PSEG Long Island system workarounds, provide feedback, and encourage them to conduct real-world exercises; and has been assured that PSEG Long Island's 2022 workplan will continue to refine the BCPs and undertake real-world exercises that validate the plans.



Discussion

FOR CONSIDERATION

December 15, 2021

TO: The Board of Trustees

FROM: Thomas Falcone

SUBJECT: Consideration of Adoption of the Isaias Task Force Quarterly Report

Requested Action

The Board of Trustees (the “Board”) of the Long Island Power Authority (“LIPA”) is requested to approve a resolution adopting the third Isaias Task Force (the “Task Force”) Quarterly Report (the “Quarterly Report”), which resolution is attached hereto as **Exhibit “A.”**

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 investigation 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.

The Task Force presented a 30-Day Report to the Board on September 23, 2020, and a 90-Day Report to the Board on November 18, 2020. As set forth in Appendix 2 and Appendix 3 of the 90-Day Report, the Task Force provided actionable recommendations for the Board’s consideration (the “Task Force Recommendations”).

Between November 2020 and this Board meeting, the Board adopted various Project Implementation Plans (PIPs) for the Task Force Recommendations and directed PSEG Long Island to resubmit certain PIPs to address the Board’s objectives better.

Additionally, between December 2020 and this meeting, the Board adopted recommendations covering operational areas, including risk management, budgeting and reporting, real estate, asset management, inventory management, collections, affiliate services, strategic planning, information technology, small generator interconnection, workforce management, and data access, among others (the “Management Recommendations”).

In total, the Board has adopted 168 recommendations resulting in 146 PIPs, which are in various stages of implementation by PSEG Long Island. The Board has directed LIPA Staff to submit quarterly status updates on the implementation of each of these PIPs in the form of Quarterly Reports. The Board adopted the first Quarterly Report on June 23, 2021, and the second Quarterly

Report on September 22, 2021. The Quarterly Reports address the status of each recommendation based on PSEG Long Island's monthly status reporting to LIPA. The reports also describe the status of LIPA's independent verification and validation of the remediation of each recommendation.

The Third Quarterly Report

The third Quarterly Report, attached hereto as **Exhibit "B,"** summarizes the status of each of the Task Force and Management Recommendations. The Quarterly Report pays particular attention to describing the progress made since September 2021.

Recommendation

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" Quarterly Report

RESOLUTION ADOPTING THE ISAIAS TASK FORCE QUARTERLY REPORT

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, 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, on August 5, 2020, 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 (“Task Force”) that was charged with both providing actionable recommendations and overseeing PSEG Long Island’s remediation activities; and

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

WHEREAS, on November 18, 2020, the Task Force presented the 90-Day Report, which provided 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, the Board has adopted additional recommendations since December 2020 to address management deficiencies outside the scope of the Task Force review; and

WHEREAS, the Board has requested written Quarterly Reports with a comprehensive summary of the status of the implementation of all of the Board-adopted recommendations until all such recommendations have been completed; and

WHEREAS, on June 23, 2021, the Board adopted the first Quarterly Report; and

WHEREAS, on September 22, 2021, the Board adopted the second Quarterly Report; and

WHEREAS, LIPA Staff has submitted to the Board the third Quarterly Report for the Board's approval.

NOW, THEREFORE, BE IT RESOLVED, that the Board adopts the Quarterly Report.

Dated: December 15, 2021



Quarterly Report on Tropical Storm Isaias and Management Recommendations

December 15, 2021

For the Long Island Power Authority Board of Trustees

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EXECUTIVE SUMMARY

The Board of Trustees (Board) of the Long Island Power Authority (LIPA) has directed PSEG Long Island to file Project Implementation Plans (PIPs) to implement 168 recommendations to cure deficiencies in management, emergency management, information technology, and other operational areas. The PIPs define the objectives, deliverables, and scope of the remediation projects as well as the major milestones.

These 168 recommendations have resulted in 146 required PIPs, including:

- 78 PIPs to address shortcomings that turned Tropical Storm Isaias into a hardship for Long Island and Rockaways electricity customers (the “Task Force Recommendations”); and
- 68 PIPs to correct other PSEG Long Island management deficiencies and process improvements unrelated to the storm (the “Management Recommendations”).

The Board has directed LIPA staff to monitor PSEG Long Island’s execution of the PIPs, to independently verify and validate (IV&V) the remediation of each of the recommendations, as necessary, and to provide a quarterly report to the Board on the status of the PIPs until all such projects are complete.

This Quarterly Report is the third such report and summarizes the status of each PIP. The report separately describes the Task Force Recommendations and the Management Recommendations, given the particular emphasis placed on defects that affect emergency response. Note that some of the PIPs have now been incorporated into the Second Amended and Restated Operations Services Agreement (OSA) Performance Metrics for 2022, with new negotiated due dates and targets that allow for performance measurement against achievable 2022 targets; and moving forward, contingent on OSA approval, will be reported on with respect to the terms of the relevant metrics.

Update on Isaias Task Force Recommendations

The 85 Isaias Task Force recommendations resulted in 78¹ projects requiring PIPs, of which:

- 20 projects (26%) are either reportedly on schedule or already closed.
- 19 projects (24%) were previously reported completed by PSEG Long Island, without a PIP having been submitted to the Board. LIPA will independently assess whether the projects achieved the objectives of the Board recommendations.
- 39 projects (50%) are either delayed, no monthly status report was submitted by PSEG Long Island in the reporting period (October – December), or PSEG Long Island has not yet submitted an acceptable PIP to address the Board’s recommendations.

10 of the above projects have now been incorporated into the OSA 2022 Performance Metrics with new negotiated dates and targets; and will be reported on with respect to the terms of the relevant metrics starting in 2022, contingent on OSA approval. Five (5) of those projects were Delayed against the original approved end dates, four (4) were pending acceptable PIPs, and one (1) had No Status Reported. These projects are not included in the statistics in this report.

Table 1 summarizes the status of the 68 Non-Metric recommendations.

¹ The number of projects requiring PIPs may vary over time as recommendations are combined or split into implementation projects.

FIGURE 1:
Status of Isaias Task Force Recommendation Project Implementation Plans (Non-Metric)

As of	On-Schedule	Delayed ²	No Status Reports ³	No Approved PIP ⁴	PIP is Deferred	Closed ⁵	Previously Completed ^{5,6}	Total ⁷
Dec. 2021	0 (0%)	17 (25%)	3 (4%)	9 (13%)	0 (0%)	20 (29%)	19 (28%)	68
Sept. 2021	1 (1%)	25 (32%)	8 (10%)	11 (14%)	6 (8%)	9 (11%)	19 (24%)	79
June 2021	4 (5%)	19 (24%)	10 (13%)	16 (20%)	9 (11%)	2 (3%)	19 (24%)	79

² December number excludes five recommendations that are incorporated into OSA 2022 Performance Metrics.

³ In some cases, a status report may be absent because a PIP was submitted or accepted after the status report due date.

⁴ December number excludes four recommendations that are incorporated into OSA 2022 Performance Metrics.

⁵ Subject to IV&V by LIPA staff.

⁶ "Previously Completed" refers to recommendations for which PSEG Long Island represented that the work had already been completed prior to institution of the PIP process, and therefore a PIP was not submitted to the LIPA Board for consideration.

⁷ December number excludes recommendations that are incorporated into OSA 2022 Performance Metrics.

PSEG Long Island has made progress in closing Task Force projects this quarter. However, all Active projects are delayed, and most of the delayed projects have seen further schedule slippage since the previous Quarterly Report.

It should be noted that delays are relative to the PIPs PSEG Long Island submitted to the Board to address each recommendation and the reported status is based on PSEG Long Island's monthly status reporting to LIPA. This reporting does not require subjective assessments by LIPA staff.

PSEG Long Island's implementation of the PIPs has fallen short in several ways:

- There are many delays in completing the milestones called for in the PIPs, and some projects are getting further delayed over time.
- Monthly status reports are inconsistent, incomplete, delayed, or missing.
- In some areas, there is insufficient focus on functional and technical requirements, and design efforts are contributing to the inability to maintain a schedule.

In addition to the monthly status reports provided by PSEG Long Island, LIPA staff also regularly meets with PSEG Long Island staff and consultants to monitor and assess progress on the PIPs.

Status of Remediation of the Communication and Outage Management Systems

The communications systems and Outage Management System (OMS) are in significantly better shape than during Tropical Storm Isaias, particularly the telephony systems. However, PSEG Long Island still needs to complete the necessary remediations for the current version of OMS, and already delayed critical projects continue to experience further schedule slippage.

PSEG Long Island continues to use an out of date, out-of-general-use version of the OMS. Among other things, this system lacks the desired capabilities for important initiatives such as smart meter integration and the field mobile app for foreign crews. Business Continuity Plans (BCPs) to ensure critical operations in case of system failures are also still not sufficiently robust. These projects continue to be hampered by deficient initial planning, assessment, and design efforts, which is resulting in schedule delays, avoidable rework, and increased risk of customer-impacting system issues.

Since completion of the end-to-end system test of the communications and OMS version 5.5 systems in late May 2021, PSEG Long Island and its consultants have shifted focus to redeploying the OMS version 6.7 that was in use during Tropical Storm Isaias. To date, **the cost of remediating the communications and OMS has exceeded \$35 million** (through October); however, OMS version 6.7 is now scheduled to be in production in January 2022, a further delay from the previously reported planned deployment date necessitated by issues identified during initial performance testing. Until PSEG Long Island deploys OMS Version 6.7, PSEG Long Island continues to bear the risk of operating this critical system under the unsupported OMS 5.5 version. It is essential that the OMS redeployment of version 6.7 continue to be addressed with both urgency and care as performance testing and issue remediation continue, and that PSEG Long Island is vigilant about preventing any avoidable delays.

LIPA is continuing to conduct IV&V of the OMS version 5.5 end-to-end system test run by PSEG Long Island in late May, an effort that was delayed significantly by PSEG Long Island's inability to provide requested documentation in a timely manner. LIPA is now evaluating the optimal path to completion considering the current status of OMS 6.7 upgrade efforts. LIPA's current plan is to refocus its IV&V efforts on the soon-to-be-deployed OMS 6.7 version as that will become the production system.

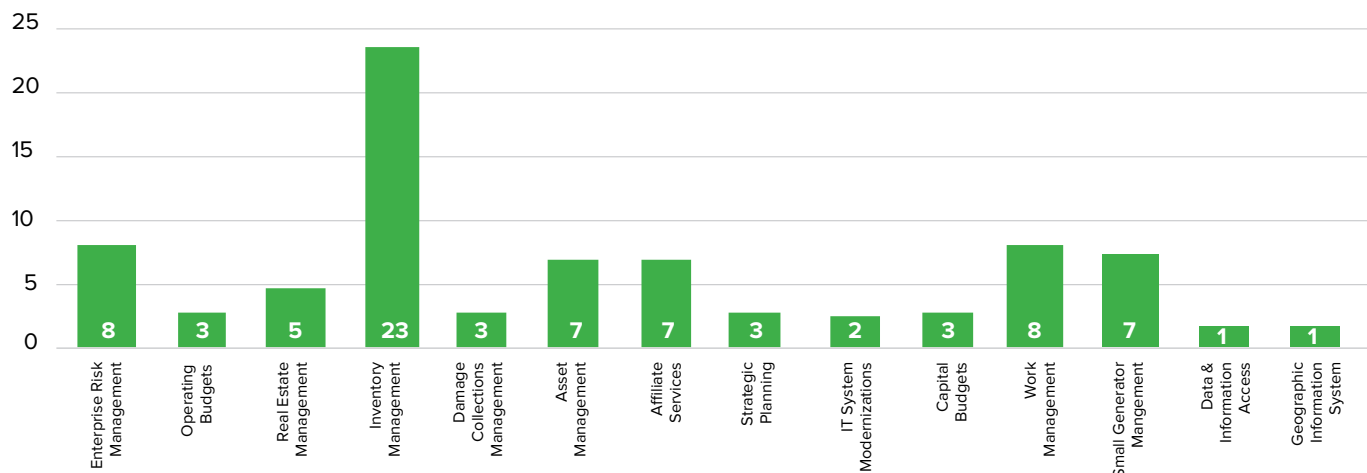
The Isaias Task Force has continued concerns about PSEG Long Island's over-reliance upon vendors; weak project management and oversight; and inadequate in-house technical expertise. As critical projects such as the OMS version 6.7 redeployment proceed, the Task Force also again notes the importance of well designed and developed test plans, models, and scripts to ensure that potential impacts of system design changes are comprehensively addressed in testing.

A summary of the status of each of the Task Force PIPs is included in Section I.

Update on Management Recommendations

Beyond the Task Force recommendations to address emergency response, the LIPA Board has adopted 83 recommendations addressing deficiencies in 13 non-storm operational areas. These Management Recommendations are summarized in Figure 2.

FIGURE 2:
Management Recommendations By Area



The 83 Management Recommendations resulted in 68 required PIPs, with some PIPs covering multiple recommendations.

17 of the Management Recommendations have now been incorporated into the OSA 2022 Performance Metrics with new negotiated dates and targets and will be reported on with respect to the terms of the relevant metrics starting in 2022, contingent on OSA approval. These recommendations are not included in the statistics in this report.

Figure 3 summarizes the status of the 51 Non-Metric Management PIPs.

- 34 projects (68%) are either reportedly on schedule or already closed.
- 17 projects (32%) are either delayed or PSEG Long Island has not yet submitted an acceptable PIP to address the Board's recommendations.

FIGURE 3:
Status of Management Recommendation Project Implementation Plans (Non-Metric)

As of	On Schedule	Delayed	PIP Not Accepted /Submitted	PIP is Pending /Not Yet Due/ Deferred	Closed ⁸	Completed	Total ⁹
Dec. 2021	7 (14%)	4 (8%)	13 (25%)	0 (0%)	11 (22%)	16 (31%)	51
Sept. 2021	13 (19%)	11 (16%)	7 (10%)	20 (30%)	16 (24%)	0 (0%)	67

⁸ Subject to IV&V by LIPA staff.

⁹ December number excludes recommendations that are incorporated into OSA 2022 Performance Metrics

The Management Recommendations were adopted between December 2020 and October 2021, whereas the Task Force Recommendations were adopted in September 2020 and November 2020. Many of the projects are therefore in an earlier stage of project execution. A summary of the status of each of the Task Force PIPs is included in Section II.

SECTION 1

STATUS OF ISAIAS TASK FORCE RECOMMENDATIONS

On August 5, 2020, the day after Tropical Storm Isaias made landfall on Long Island, LIPA formed an Isaias Task Force to undertake a comprehensive and independent investigation into the failure of PSEG Long Island's communications and service restoration systems during the storm.

The Task Force issued two reports to the LIPA Board of Trustees and public following the storm — the [30-Day](#) and [90-Day Report](#). The Task Force presented the 30-Day Report to the LIPA Board and public on September 23, 2020. 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, presented to the Board and public on November 18, 2020, expanded on the findings of the 30-Day Report and concluded that **systemic management shortcomings were the root cause of PSEG Long Island's failures during the storm. All of the failures could and should have been prevented by management.**

In its 30-Day and 90-Day Reports, the Isaias Task Force provided 85 recommendations for the Board's consideration that were 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 Board, in November 2020, directed PSEG Long Island to implement the Task Force Recommendations, including the creation of PIPs to remediate each finding.

In addition to the review and evaluation of the submitted PIPs, the Board also asked LIPA staff to actively monitor each implementation effort and to independently verify and validate the work product and the effectiveness of the remediations. The Board asked LIPA staff to provide Quarterly Reports that (i) summarize the current state of remediations of the key deficiencies identified in the 30-Day and 90-Day Reports; and (ii) describe project status on each PIP, including LIPA's evaluation of the progress being achieved, open issues and concerns, and other relevant information. This December 2021 Quarterly Report to the Board is the third of a series of Quarterly Reports fulfilling this requirement.

Summary Status of Active Isaias Task Force Project Implementation Plans

PSEG Long Island was asked to submit Monthly Project Status Reports to the Task Force for each of the adopted and open PIPs¹⁰, tracking project progress against the schedules baselined in the approved implementation plans. Based on the most recent reporting by PSEG Long Island, submitted on December 3, 2021:

- 20 projects are reported as Closed by PSEG Long Island (subject to LIPA verification), including 10 closed in this reporting period.
- 17 projects are reported as Delayed.

In addition, LIPA notes that the following PIPs were not reviewed during this cycle for the reasons given below.

- PSEG Long Island submitted no status reports on 3 projects, in some cases because they were moved to the active category that requires reporting after the most recent reporting due date.
- PSEG Long Island identified 19 projects as Previously Completed – signifying that the work had been completed without an approved PIP (subject to LIPA verification).

¹⁰ PSEG Long Island was requested to report only on the open and active implementation plans.

- PSEG Long Island has not submitted acceptable PIPs for 9 projects, and therefore there is not an agreed upon implementation plan to report status against. In some cases, LIPA's concerns with PSEG Long Island's proposed project plans have been unaddressed for as many as six months.
- 10 of the recommendations have now been incorporated into the OSA Performance Metrics for 2022, with new negotiated due dates and targets that allow for performance measurement against achievable 2022 targets; moving forward, contingent on OSA approval, they will be reported on with respect to the terms of the relevant metrics.

The above statistics are based on PSEG Long Island's representation of the status of the PIPs; subsequent detailed LIPA review of project deliverables may determine that some projects were prematurely closed.

Overall, progress has been made, and PSEG Long Island is better positioned for storms than it was during Tropical Storm Isaias. However, LIPA is concerned that risks remain to customers that have not been fully mitigated. The pace of implementation of the recommendations has been too slow and the focus uneven, as evidenced by this Quarterly Report which details the significant number of recommendations delayed beyond PSEG Long Island's own proposed timetables.

Remediation efforts appear to have been hampered by the same management weaknesses that contributed to the failures during Isaias, with areas of concern including:

- Too many improvements driven by Task Force oversight instead of internal PSEG Long Island processes.
- Weak Project Management.
- Internal technical teams lacking key skill sets, leaving PSEG Long Island overly reliant on vendors.
- Lack of mature program management and project oversight processes, leading to uneven efforts across the organization and gaps in remediation efforts.

Current Status: Communications and Outage Management Systems

The well-documented failures of PSEG Long Island's communications systems and OMS had severe consequences for LIPA customers. The PSEG Long Island communications systems failed in almost every aspect of delivering a customer outage report to the PSEG Long Island OMS and communicating accurate information back to customers. The OMS also became dysfunctional due to a combination of the system load and unresolved defects. There are a variety of channels by which customers can give and receive outage information. The multiplicity of channels is intended to meet differing customer needs and preferences. However, each channel has underlying and unnecessary interconnections with other communication channels, causing failures in one to cascade into system-wide failures. These systems were not realistically stress tested and there was no provision for the contingency of communication failures.

Problems with PSEG Long Island's flawed communications and OMS were at the heart of its failed response to Tropical Storm Isaias. Proper technical remediation of these systems is a key component of future storm readiness of PSEG Long Island. **Success in this area is defined by:**

- **Deployment of a stable, vendor-supported, industry-standard system that will provide the functionality demanded from an efficient and effective response plan.**
- **A fully tested system that will perform efficiently and effectively under load scenarios predicted in this new climate-challenged world.**
- **Well-designed, reliable, and thoroughly exercised Business Continuity Plans (BCPs) that can be put in motion if the primary systems fail.**

Over the last sixteen months, PSEG Long Island has been testing various fixes to its communications systems and OMS. LIPA's recommendations to PSEG Long Island had the following key requirements:

- Systematically analyze and test the failure modes of the system to identify the true root causes of the observed defects.
- Ensure that test designs comprehensively and completely exercise all end-to-end processes (across each channel) that might be encountered in a future storm scenario like Isaias or worse.
- Focus on fixing OMS version 6.7 or later and not the now obsolete (and unsupported) version 5.5 of the system.
- Build robust BCPs as a contingency measure.

PSEG Long Island has made progress on remediating the OMS, telephony, and associated systems, and they appear to be in significantly better shape than during Tropical Storm Isaias, especially the telephony system.

However, we remain concerned about the pace of activities, the level of attention and thoroughness given to system and test design efforts, and the gaps in the implementation of the Task Force Recommendations.

PSEG Long Island is Operating on an Obsolete Version of its OMS

PSEG Long Island remains on version 5.5 of the OMS. **The 5.x generation of OMS was first introduced in 2013, and only two customers remain on this version level – PSE&G (in New Jersey) and PSEG Long Island.** The approximately 16 other utilities using the system are on versions 6.x, and the vendor is about to release version 7.0. The 5.x versions utilize now-outdated technology and require obsolete infrastructure. The vendor is no longer making enhancements or maintenance patches to 5.x versions and provides support to PSEG Long Island only on a break/fix basis under a special support contract with a limited number of hours. The PSEG Long Island deployment is running on an outdated operating environment without support and regular security patches, and a large part of the complex software subsystems relies on 7-year-old hardware.

The system architecture, functional, and performance capabilities of version 5.5, for example, lacks built-in support for mobile applications for damage assessment. Version 6.7 also includes Smart Meter integration, enhanced Estimated Time of Restoration capabilities, and a web-based mobile client – features that are not available in the currently deployed version 5.5.

PSEG Long Island had previously upgraded the OMS from version 5.5 to version 6.7 in June 2020, but the system experienced instability and performance issues following the poorly implemented and tested upgrade, and ultimately failed completely under the load of Isaias. This led PSEG Long Island to revert to version 5.5 after the storm. PSEG Long Island's version 5.5 suffered similar issues as version 6.7 and through subsequent testing, we know that neither version 5.5 nor version 6.7 was configured by PSEG Long Island to appropriately manage Tropical Storm Isaias.

In addition to the inherent criticality of this initiative, several Task Force recommendations are dependent on the OMS, and consequently delays to this project cause cascading delays to multiple PIPs.

PSEG Long Island Is Now Focused on the OMS Version 6.7 Re-Platforming Project

PSEG Long Island initially planned to deploy a remediated version 6.7 on new hardware prior to the 2021 Atlantic Hurricane season; but was unable to complete the project along their original proposed timeline.

PSEG Long Island now plans to deploy OMS version 6.7 in January 2022, a further delay from the previously reported planned deployment date. This recent delay was caused by issues that surfaced during initial performance testing, which PSEG Long Island has now made good progress addressing. We are encouraged by PSEG Long Island's diligence in identifying and resolving the issues once they occurred, though we believe that at least some of the delay could have been avoided by more thorough planning, design, and quality control

efforts earlier in the project. Credit also goes to CGI, the software vendor, for producing the required corrective patches as they were identified.

While delaying the deployment in order to address critical issues is preferable to repeating the experience of the failed June 2020 OMS version 6.7 deployment, PSEG Long Island must not succumb to complacency about the risks of remaining on the unsupported OMS 5.5 version. This project must be addressed with urgency without sacrificing rigor and care. PSEG Long Island must also strengthen its project management and its technical design and planning efforts so that the OMS 6.7 deployment does not experience any further avoidable delays.

As performance testing and issue remediation efforts proceed on the OMS version 6.7 build, it is especially important that PSEG Long Island ensures that the test plans and scripts are comprehensive and well-designed, and that the schedule is maintained without impact to the quality of testing and other Quality Assurance/Quality Control measures. In addition to the application changes in this version and the deployment of new hardware platforms, PSEG Long Island has introduced several changes to the OMS and its interfaces as part of the post-Isaias remediation efforts. Failure to adequately account for the potential impacts of all changes in the test planning could lead to another botched upgrade and the associated risks of significant negative impacts on customers.

IV&V of the OMS Version 5.5 Performance Tests is in Progress

LIPA's Isaias Task Force continues to conduct IV&V of PSEG Long Island's May 2021 OMS version 5.5 Performance Tests. PSEG Long Island has submitted Test Execution Reports deeming the version 5.5 End-to-End Performance Test and the 24-Hour 90% Percent Customer Out OMS Test successful. While the results of the test are certainly positive and a welcome improvement over previous runs, the Task Force has identified some concerns, including:

- The End-to-End tests are not true end-to-end tests as the digital channels are not directly utilized. Instead, the output of the digital channels is simulated and fed directly into PSEG Long Island's systems instead of passing through the larger communications infrastructure. Additionally, they are missing the crucial element of unpredictability introduced by human actors interacting with the systems at scale.
- Concerns that the test design may not comprehensively cover the impact of implemented design changes; in particular, the Enterprise System Bus (ESB) filtering solution.
- The communications system was tested at midnight on a weekend instead of mid-week daytime peak hours.
- Differences between Test and Production environments not being sufficiently accounted for.

The Task Force is conducting additional reviews of the test design, test logs, and system configuration information. The IV&V effort was delayed significantly by PSEG Long Island's failures to provide requested documentation and information in a timely manner, and LIPA is now evaluating the optimal path to completion considering the current status of OMS 6.7 upgrade efforts. LIPA's current plan is to refocus its IV&V efforts to the soon-to-be-deployed OMS 6.7 version as that will become the production system.

Current Status: Business Continuity Plans

The 90-Day Report identified the lack of adequate BCPs as a significant management failure and recommended the development of comprehensive BCPs for all mission-critical systems and processes to enable graceful recovery from technology failures.

PSEG Long Island's initial responses to the recommendation were lacking. A major deficiency of the proposed contingency plan was that it focused on the last incidence of failure (OMS and telephony) and did not take a broader view of the potential failures of many other mission-critical systems. The organization and structural hierarchy of the plan was poorly framed, and LIPA provided specific recommendations to drive improvements.

PSEG Long Island has since made progress, though there is still work to be done. PSEG Long Island has submitted to LIPA a host of BCP "work-around" plans intended to document contingency procedures in case of failure of specific IT systems, as well as limited revisions in response to LIPA feedback. A second review cycle is currently in progress. A general shortcoming of the plans has been that they tend to take an overly siloed technology-based approach that addresses failures of specific individual applications, but do not sufficiently consider and address potential real-world failure scenarios that are likely to see a series of interlinked and possibly cascading system failures. For example, while considering the possibility of a potential failure of the ESB system (which actually failed during Isaias), the conclusion was that there is no technical workaround for ESB failures and the issue has to be addressed through BCPs from the "business side." Yet, no "business side" BCP has been produced to address an ESB system failure. LIPA has discussed these concerns with PSEG Long Island and it has been assured that PSEG Long Island's 2022 workplan will continue to refine the BCPs and undertake real-world exercises that validate the plans.

Figures 4, 5, and 6 summarize the status of each Isaias Task Force Recommendation, including those that are active, closed, and lack an approved PIP, respectively. Active recommendations that have been incorporated into the OSA 2022 Performance Metrics are listed in the tables for reference; but are not counted in statistics.

FIGURE 4:
Summary of Active Isaias Task Force Project Implementation Plans

#	Tier	Status	Recommendation	Status Summary	Start Date	Planned End Date	Projected End Date	Status/Schedule Change Since 2021Q3 Report
3.2.1.3	1	Delayed	The existing infrastructure for handling calls within the PSEG Long Island Call Center should be upgraded to a more recent version. PSEG LI should modernize its call center infrastructure to a technology that uses the newer "SIP Trunking" technology.	PSEG LI reports that the project has experienced delays due to increased environmental complexity over initial estimates as well as delays with resource allocations, with current cutover dates projected for the first quarter of 2022.	1/18/2021	7/9/2021	3/17/2022	Further schedule delays, with the projected end date now 3/17/2022 instead of the delayed projected end date of 11/30/2021 reported in September
3.2.2.3	1	NA (2022 OSA Metric)	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.	PSEG LI is projecting an end date of 12/31/2021 for the upgrade to OMS v 6.7.8, consistent with the Q4 2021 estimate reported in June. Regression testing is planned for September through early October.	12/3/2020	TBD per metric	TBD per metric	Incorporated into 2022 OSA Performance Metrics.
3.2.2.5	1	Delayed	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.	PSEG LI reports that components of DB monitoring have been ported to v6.7 (i.e. critical ORA errors), however there are some items (i.e. long-running queries) that are now completed in v5.5 but will require further development to port to v6.7. Infrastructure monitoring in Xymon and network monitoring in Solar Winds have been configured for v6.7.	11/23/2020	5/3/2021	1/31/2022	Further schedule delays, with the projected end date now 1/31/2022 instead of the projected end date of 11/10/2021 reported in September
3.2.2.7	1	Delayed	Automate monitoring of inbound outage reports to the OMS, to be able to detect and eliminate erroneous reports that may arrive from any source.	PSEGLI reports that the async solution to remedy repetitive customer calls was moved into OMS v5.5 Production on June 1, 2021. This solution works by filtering out calls which are part of a known outage, irrespective of digital channel. PSEG LI considers this PIP to be 80% complete, pending testing results once ported to OMS v6.7.	11/2/2020	5/3/2021	1/31/2022	Further schedule delays, with the projected end date now 1/31/2022 instead of the projected end date of 11/15/2021 reported in September

#	Tier	Status	Recommendation	Status Summary	Start Date	Planned End Date	Projected End Date	Status/Schedule Change Since 2021Q3 Report
3.2.2.8	1	Delayed	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.	PSEG LI is reporting that work is in progress for porting of the Splunk solution for OMS v 5.5 to v 6.7 after OMS production servers are available, with the v6.7 WebService log files currently being analyzed.	11/2/2020	5/3/2021	1/31/2022	Further schedule delays, with the projected end date now 1/31/2022 instead of the projected end date of 11/15/2021 reported in September
3.2.2.9	1	Delayed	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.	PSEG LI reports that all development and testing activities for this recommendation are complete and the solution was deployed to OMS v5.5 Production on 6/29/21. Testing against 6.7.8 is pending.	11/2/2020	5/11/2021	1/31/2022	Further schedule delay, with the projected end date now 1/31/2022 instead of the delayed projected end date of 9/30/2021 reported in September
3.2.4.3	1	Delayed	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.	PSEG LI has submitted deliverables for OMS V5.5. The project will be marked complete once OMS V6.7 testing is complete and resulting deliverables are submitted.		4/7/2021	9/17/2021	PSEG LI submitted deliverables for OMS V5.5, LIPA awaiting deployment of the solution in OMS V6.7 and submission of supporting artifacts,
3.2.4.4	3	No Status Reported	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.	This PIP was previously rejected, and a revised PIP has now been accepted. PSEG LI reports that work on the project is complete, and the project will be marked complete once all deliverables are submitted.	1/25/2021	3/24/2021	NA	PIP was accepted

#	Tier	Status	Recommendation	Status Summary	Start Date	Planned End Date	Projected End Date	Status/Schedule Change Since 2021Q3 Report
4.01	3	NA (2022 OSA Metric)	PSEG Long Island should develop and execute a comprehensive strategic technology plan for outage reporting and communications.	PSEG LI reports that they have deferred work on this recommendation.	1/4/2021	TBD per metric	TBD per metric	Incorporated into 2022 OSA Performance Metrics.
4.03	2	Delayed	For the long term, PSEG LI needs to strengthen its voice communications engineering and project management staff.	PSEG LI reports that the project start is delayed due to competing priorities that include the Contact Center Upgrade, SIP Migration as well as supporting priority efforts related to the OMS upgrade and Digital Channels deployment, and will be revised and confirmed by the end of 2021.	7/12/2021	9/3/2021	2/25/2022	Further schedule delay, with the projected end date now 2/25/2022 instead of the delayed projected end date of 12/30/2021 reported in September
4.04 & 4.05	2	Delayed	Explore integrating the high-volume voice communications design into a more powerful all-encompassing call center design. Develop a more scalable Inbound Contact Center.	PSEG LI reports that contracting negotiations are in progress with preferred vendor, previously determined as best able to meet requirements for the Contact Center, with conclusion of negotiations and award expected by December 2021. PSEG LI is currently reviewing approach and next steps for moving forward with implementation. Activities are expected to take approximately 1 year from start.	2/1/2021	4/1/2022	TBD	None, schedule to be revised after vendor engagement

#	Tier	Status	Recommendation	Status Summary	Start Date	Planned End Date	Projected End Date	Status/Schedule Change Since 2021Q3 Report
4.07	2	Delayed	Ensure that the Municipal Portal is more resilient and prepare a backup Mode of Operation in case of OMS failure.	Project is delayed due to additional security requirements. PSEG LI has defined a path forward to initially deploy a Kubra unencrypted solution with a temporary security waiver and subsequently meet the encryption requirement. PSEG LI reports that the file-based solution without encryption will be deployed in Q1 2022 in concert with the OMS upgrade, and the solution with encryption is estimated to be deployed in Q2 2022. Security waiver request documentation was approved by PSEG CISO on 10/12/2021.	8/31/2020	8/16/2021	5/31/2022	None
4.09	3	Delayed (Reported Closed, but pending deliverables)	Better prepare social media staff to handle barrage of posts using modern artificial intelligence tools.	PSEG LI reports the project as completed as of 10/05/2021. The project will be marked Closed (pending IV&V) once all deliverables and close-out artifacts have been submitted, one of which is still pending.	1/19/2021	6/25/2021	10/5/2021	Work reported completed as of 10/5/2021. Status change pending submission of close-out artifacts and deliverables.
4.13	1	NA (2022 OSA Metric)	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.	PSEG LI reports that OMS/CAD v6.7.8 performance testing is planned for December 2021 and January 2022.	1/7/2021	TBD per metric	TBD per metric	Incorporated into 2022 OSA Performance Metrics.
4.14	1	NA (2022 OSA Metric)	Accelerate the deployment of the mobile application for foreign crews and/or their crew guides ensuring that procedures are integrated into the ERP.	PSEG LI reports that initial work on the RPA POC (development, testing and solution demo) is complete, with PSEGLI leadership to review POC results and assess feasibility of moving forward with RPA solution	10/1/2020	TBD per metric	TBD per metric	Incorporated into 2022 OSA Performance Metrics.
4.15	3	NA (2022 OSA Metric)	Performance test OMS and “feeder” systems to establish peak capacity.	PSEG LI reports that the v 6.7 stress to failure test plan and strategy are to be developed. Per original implementation plan, test will be executed post Go-Live. No immediate future action is planned until performance test is completed on v 6.7.	1/13/2021	TBD per metric	TBD per metric	Incorporated into 2022 OSA Performance Metrics.

#	Tier	Status	Recommendation	Status Summary	Start Date	Planned End Date	Projected End Date	Status/Schedule Change Since 2021Q3 Report
4.17	1	Delayed (Reported On Schedule, but Delayed per PSEG LI dates)	Re-architect the inter-system message queuing applications for greater dynamic stability under highly demanding workloads.	PSEG LI reports that the Async Queue solution deployed to v 5.5 production on 6/1/21 has completed post-release testing and is stable, with open deliverables and artifacts to be submitted to LIPA by 12/17/21. PSEG LI states that the queue will be tested functionally and under load in OMS v6.7.8.	11/13/2020	7/9/2021	12/17/2021	Further schedule delays, with the projected end date now 12/17/2021 instead of the delayed projected end date of 10/18/2021 reported in September
4.19	1	Delayed	As part of storm preparation ensure that all application errors and debug conditions have been cleared and the system is operating normally.	PSEG LI reports the project as completed, with the pre-storm checklist in use for OMS v 5.5, and the close-out artifacts submitted 9/17/2021. However, no artifacts have been submitted for OMS 6.7, and PSEG PSEG LI notes that they are in the process of configuring/testing the re-platformed 6.7. The project will be marked Closed once the artifacts and deliverables for OMS 6.7 are submitted.	1/7/2021	5/3/2021	8/3/2021	Work reported completed, status change pending submission of close-out artifacts
5.02 & 5.03	3	Delayed	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.	PSEG LI reported the project completed as of 12/01/2021. The project will be marked Closed (pending IV&V) once all close-out artifacts and deliverables have been submitted via designated channels.	4/1/2021	6/30/2021	12/1/2021	Work reported completed as of 12/1/2021. Status change pending submission of close-out artifacts and deliverables.

#	Tier	Status	Recommendation	Status Summary	Start Date	Planned End Date	Projected End Date	Status/Schedule Change Since 2021Q3 Report
5.04	3	Delayed	Create BCPs for all mission critical systems and processes.	No status reported in December. PSEG LI reported on 10/7/2021 that 32 Repair and Recovery Plans and the Repair and Recovery Exception Plan were complete and that 4 plans would be completed in October; and that Revision 2 workarounds have been completed.	2/26/2021	7/30/2021	unknown (reported as 6/25/21)	Further schedule delay, with the project not completed by the delayed projected end date of 9/30/2021 reported in September
5.07	1	Delayed	Expand the Emergency Assistance Agreement with National Grid to include Generation employees.	No status report submitted in December. PSEG LI reported in October that National Grid updated PSEG via phonecall on 9/30/21 regarding the response to the National Grid Agreement proposal that a written response could be expected within 1-2 weeks.	12/31/2020	2/15/2021	Unknown (reported as 10/29/2021)	Further delay; projected end date unknown
5.08	3	No Status Reported	Institute a program to train National Grid Gas and Generation resources to support damage assessment and materials handling work during major storms.	No status reports have been submitted. This PIP was previously rejected, and a revised PIP has now been accepted.	Unknown	4/2/2021	NA	PIP was accepted
5.10 & 5.4.6	3	No Status Reported	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).	No status reports have been submitted. This PIP was previously rejected, and a revised PIP has now been accepted.	Unknown	TBD	NA	PIP was accepted

#	Tier	Status	Recommendation	Status Summary	Start Date	Planned End Date	Projected End Date	Status/Schedule Change Since 2021Q3 Report
5.13 5.4.3 5.4.4	3	Delayed	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.	No status reported in December. PSEG LI reported in November that regarding the use of National Grid for additional Storm Services, a decision by National Grid had not been made as of 11/5/21, and that the last correspondence with National Grid was on 10/26/21 requesting an update. Regarding utilization of local electricians, work is in progress.	unknown	8/1/2021	1/28/2022	Further delayed
5.17	2	Delayed	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.	PSEG LI reports that a summary of the outcome of the 20/21 Annual Recertification process was provided to LIPA. The overall response rate achieved for the 2020-2021 LSE recertification process was 57.3%, and as of 11/1/2021 there are 4,601 LSE's. Evaluation of the 20/21 Annual Recertification process was in progress as of 11/16/2021.	12/11/2020	10/31/2021	10/31/2021	Status changed from On Schedule to Delayed, pending final close-out artifacts and deliverables

#	Tier	Status	Recommendation	Status Summary	Start Date	Planned End Date	Projected End Date	Status/Schedule Change Since 2021Q23 Report
5.4.1 & 5.4.5	3	NA (2022 OSA Metric)	<p>Selective undergrounding of main or branch lines in areas with difficult access.</p> <p>Revisions to the current vegetation management program to shorten the 4-year cycle across the system or in selected areas with denser vegetation.</p> <p>This overall comprehensive project aims to address and improve the resiliency of the Long Island and Rockaways electrical infrastructure. This project will cover three main areas:</p> <p>1) Transmission and Substations / Load Pockets - equipment and transmission system / load pocket reinforcements</p> <p>2) Overhead circuits - Mainline and Branch line hardening, equipment upgrades (i.e., operationalize LT5H devices), and vegetation management practices updates</p> <p>3) Selective Undergrounding</p>	Evaluation of the PIP was previously postponed pending further storm hardening evaluation. A revised PIP was accepted by the Board at the September meeting.	3/29/2021	12/31/2025	NA	Incorporated into 2022 OSA Performance Metrics.

FIGURE 5:
Summary of Closed/Completed Isaias Task Force Project Implementation Plans

#	Tier	Status	Recommendation	Status Comments	Start Date	Planned End Date	Projected End Date	Close-Out Artifact Submission Date	Changes This Reporting Period
3.2.1.2	1	Closed	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.	Closed 2021Q3	11/17/2020	12/22/2020	8/13/2021	8/20/2021	None
3.2.1.5	1	Closed	PSEG LI should develop appropriate capacity monitoring and management processes to support evidence-based demand forecasting and capacity planning.	Closed 2021Q3	12/4/2020	NA (no approved PIP)	8/13/2021	8/20/2021	None
3.2.1.6	1	Closed	PSEG LI should review the service operation process between PSEG LI and Verizon to understand how the major issues as identified are handled.	Closed 2021Q3	9/10/2020	1/19/2021	8/6/2021	8/20/2021	None
3.2.3.1	1	Closed	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.	Closed 2021Q3	12/1/2020	3/22/2021	9/17/2021	9/17/2021	None
3.2.4.1	3	Closed	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.	Closed 2021Q3	1/11/2021	9/2/2021	9/17/2021	9/17/2021	None

#	Tier	Status	Recommendation	Status Comments	Start Date	Planned End Date	Projected End Date	Close-Out Artifact Submission Date	Changes This Reporting Period
3.2.5.3	2	Closed	PSEG LI 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.	Closed 2021Q3	unknown	3/31/2021	3/31/2021	8/20/2021	None
4.08	2	Closed	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.	Closed 2021Q3	1/4/2021	12/31/2021	7/20/2021	8/20/2021	None
4.16		Closed	Install standby hardware resources for use during peak demand.	Closed 2021Q3	NA (no approved PIP)	NA (no approved PIP)	8/20/2021	8/20/2021	None
5.01	3	Closed	Improve Emergency Planning governance so that utility-wide Emergency Training is under a single Emergency Planning Team and not dispersed among various departments.	PSEG LI previously reported the project completed as of 6/28/2021; however, deliverables and close-out artifacts were outstanding. The deliverables and close-out artifacts were submitted on 10/25/21 and accepted for IV&V.	2/19/2021	4/12/2021	6/28/2021	10/25/2021	Close-out artifacts submitted. Status changed from Delayed to Closed (pending IV&V).

#	Tier	Status	Recommendation	Status Comments	Start Date	Planned End Date	Projected End Date	Close-Out Artifact Submission Date	Changes This Reporting Period
5.06	3	Closed	The Task Force found the general structure of PSEG Long Island's ICS is consistent with the National Incident Management System (NIMS), however, failures of technology were exacerbated by lack of visibility and some adjustments to the ICS may have mitigated the situation. The goal of this plan is to improve visibility within ICS to issues relating to mission critical technology, such that these issues can be more effectively managed during an incident.	PSEG LI previously reported the project completed as of 6/30/21, with the completion of ICS/Mission Critical System Plan training; however, deliverables and close-out artifacts were outstanding. The deliverables and close-out artifacts were submitted on 10/25/21 and accepted for IV&V.	3/1/2021	4/1/2021	6/30/2021	10/25/2021	Close-out artifacts submitted. Status changed from No Status Reported to Closed (pending IV&V).
5.09	3	Closed	Work with off-island sustaining tree contractors to develop consistent work practices, especially for removal of trees from energized lines.	PSEG LI reports that the work was completed on 4/30/21. The deliverables and close-out artifacts were submitted on 10/25/21 and accepted for IV&V.	3/1/2021	5/1/2021	4/30/2021	10/25/2021	Close-out artifacts submitted. Status changed from No Status Reported to Closed (pending IV&V).
5.11	1	Closed	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.	PSEG LI reports that the work was completed on 5/14/21. The deliverables and close-out artifacts were submitted on 10/25/21 and accepted for IV&V.	1/19/2021	5/15/2021	5/14/2021	10/25/2021	Close-out artifacts submitted. Status changed from No Status Reported to Closed (pending IV&V).

#	Tier	Status	Recommendation	Status Comments	Start Date	Planned End Date	Projected End Date	Close-Out Artifact Submission Date	Changes This Reporting Period
5.12	3	Closed	Improve training for RDAs including on BCPs. Prepare to implement RCA, when advantageous.	PSEG LI reports that the project was completed as of 6/30/21. Deliverables and close-out artifacts were submitted on 10/25/21 and accepted for IV&V.	1/20/2021	5/1/2021	6/30/2021	10/25/2021	Close-out artifacts submitted. Status changed from Delayed to Closed (pending IV&V).
5.14	3	Closed	Develop a backup plan for tiered restoration in large-scale events. Train and exercise for tiered restoration operations.	PSEG LI reports that the work was completed as of 6/16/2021; however, deliverables and close-out artifacts were outstanding. The deliverables and close-out artifacts were submitted on 10/25/21 and accepted for IV&V.	unknown	3/5/2021	6/16/2021	10/25/2021	Close-out artifacts submitted. Status changed from No Status Reported to Closed (pending IV&V).
5.15	1	Closed	Create an ETR Manager position with staff to monitor OMS systems and ETR quality. The ETR Manager should report to the planning chief within the ICS.	Closed 2021Q3	12/21/2020	2/22/2021	-	-	None
5.16	2	Closed	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 (the AMI portion of this recommendation has been addressed in Project Plan 5.4.2)	PSEG LI reports that the work was completed as of 3/01/2021; however, deliverables and close-out artifacts were outstanding. The deliverables and close-out artifacts were submitted on 10/25/21 and accepted for IV&V.	unknown	3/1/2021	3/1/2021	10/25/2021	Close-out artifacts submitted. Status changed from No Status Reported to Closed (pending IV&V).

#	Tier	Status	Recommendation	Status Comments	Start Date	Planned End Date	Projected End Date	Close-Out Artifact Submission Date	Changes This Reporting Period
5.4.2a	1	Closed	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. (Recommendation was split into 5.4.2a AMI Deployment and 5.4.2b AMI Integration and Operation with OMS.	The target for 5.4.2a to complete 95% of meter deployment by September 2021 was completed and verified by LIPA, but no PSR was submitted. PIP 5.4.2a is now considered closed.	1/4/2021	8/30/2021			Status changed to Closed (pending IV&V).
7.01	1	Closed	Appoint a dedicated “turnaround” CIO at PSEG Long Island.	Closed 2021Q3		03/31/2021	5/3/2021	8/20/2021	None
7.05	3	Closed	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 consider termination the contract.	The recommendation is addressed by the proposed Second Amended and Restated Operations Services Agreement (OSA) and will be Completed on OSA approval.	-	12/15/2021	-	NA	Status changed from Deferred to Closed (pending OSA approval)
7.07	3	Closed	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.	The recommendation is addressed by the proposed Second Amended and Restated Operations Services Agreement (OSA) and will be Completed on OSA approval.	-	12/15/2021	-	NA	Status changed from Deferred to Closed (pending OSA approval)

FIGURE 6:
Isaias Task Force Recommendations Without Approved Project Implementation Plans

#	Tier	Recommendation
3.2.1.1	1	PSEG Long Island should complete implementing the planned telecommunication design changes and conduct additional capacity testing as soon as possible.
3.2.2.4 2022 OSA Metric	1	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.
4.10	3	Implement a solution that allows the OMS to decouple customer reporting from field management activities.
4.12 ¹¹	1	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.
4.18 2022 OSA Metric	1	Monitor application performance and error logs of all mission critical application systems, such as OMS, CAD, SCADA, ESB, etc.
5.05	1	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.
5.4.2b & 4.21 2022 OSA Metric	1	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. Complete the integration of the MDMS and OMS to report the meters' power restoration events. (Recommendation was split into 5.4.2a AMI Deployment and 5.4.2b AMI Integration and Operation with OMS. PIP for 5.4.2b is pending resubmission.)
6.01	1	PSEG should review the Isaias Task Force's 90-day Report and issue a CATRR (Causal Analysis Team Review Report) that 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.
7.02 ¹²	2	Appoint a dedicated CISO at PSEG Long Island.
7.03a	3	Centralize Long Island IT under one enterprise PSEG Long IT organization.
7.03b 2022 OSA Metric	3	Separate LIPA IT systems from those in New Jersey.
7.04	3	Initiate programs to develop stronger project management capability in PSEG Long Island's IT practice areas.
7.06 ¹³	3	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.

¹¹ PIP submitted and under review

¹² PIP submitted and under review

¹³ PIP submitted and under review

SECTION 2

STATUS OF MANAGEMENT RECOMMENDATIONS

The LIPA Board has adopted 83 recommendations to address known management deficiencies in 13 PSEG Long Island operational areas beyond the scope covered by the Isaias Task Force reports, as shown in Figure 7. Many of these deficiencies are longstanding and have been raised with PSEG Long Island management previously both by LIPA and in Department of Public Service Management and Operations Audits.

FIGURE 7:
LIPA Board Management Recommendations

Enterprise Risk Management	Operating Budget	Real Estate	Inventory Management	Collections Management	Asset Management	Affiliate Services	Strategic Planning	IT System Modernization	Capital Budget	Work Management	Small Generator Interconnection	Data and Information Access	Geographic Information System
8	3	5	23	3	7	7	3	2	3	8	7	1	1

These 83 recommendations have resulted in 68 PIPs to address the operational findings. Figure 8 summarizes the status of the Board's review of these PIPs.

FIGURE 8:
Status of Project Implementation Plans for LIPA Board Management Recommendations
(As of December 2021)

Findings	Adopted	Total #	Complete & Under Review	In Progress	In 2022 Metrics	Plans Due
Risk Management	12/16/20	8	7	1	-	-
Operating Budget	12/16/20	3	2	1	1	-
Real Estate Management	1/27/21	5	1	3	-	-
Inventory Management	2/24/21	23	16	2	-	5
Collections Management	2/24/21	2	1	1	3	-
Asset Management	3/29/21	3	-	-	1	2
Affiliate Services	3/29/21	3	-	2	-	-
Strategic Planning	4/28/21	1	-	-	1	1
IT System Modernization	4/28/21	2	-	-	-	2
Capital Budget	5/19/21	1	-	1	5	-
Work Management	5/23/21	8	-	-	4	8
Small Generator Interconnection	8/11/21	7	-	-	1	7
Data and Information	8/11/21	1	-	-	1	1
Geographic Information System	10/29/21	1	-	-	-	1
Total		68	27	11	17	27

- **11 PSEG Long Island PIPs have been accepted** by the LIPA Board and are in various stages of execution:
- **3 PSEG Long Island accepted PIPs** have now been incorporated into OSA 2022 Performance Metrics and are in various execution stages.
- **27 PIPs have yet to be submitted.** 14 of these PIPs have now been incorporated into the OSA 2022 Performance Metrics and are not yet due..
- **27 recommendations are complete** and pending LIPA review.

Each of the recommendations is summarized in the discussion below. Many of the PIPs are still in the early stages of execution. We discuss progress in implementing the PIPs only in those where that applies.

Risk Management

Since 2015, LIPA and PSEG Long Island have worked collaboratively to develop and implement an effective Enterprise Risk Management (ERM) Program to identify, assess, and manage the most significant risks to LIPA and its customers.

In 2019 and 2020, LIPA saw a notable decline in the level of transparency and collaboration from the management of PSEG Long Island in the ERM Program and inaccurate ratings by PSEG Long Island of certain key risks (i.e., the OMS and other key IT risks). The development, implementation, and monitoring of mitigation strategies and actions was also less than satisfactory. To address these issues, LIPA Staff proposed the following eight recommendations to improve the ERM Program, which were adopted by the LIPA Board in December 2020.

#	Reported Status	Recommendation	Status Summary	Planned End Date
ERM-1	Closed	Include LIPA subject matter experts (SMEs) and ERM team members in all risk discussions	PIP approved 1/27/2021. IT sessions were significantly delayed, review held 7/14/21.	5/30/2021
ERM-2	Closed	Designate management-level owners for each risk mitigation strategy and related management action plan	PIP approved 1/27/2021. All risks have designated mitigation owners. Last review held 7/14 with IT.	6/01/2021
ERM-3	Closed	Establish a joint Microsoft SharePoint Extranet site so that risk information, including risk assessment, deep dive analysis, mitigation strategies, current status of implementation plans, and annual reports can be accessed in real-time by LIPA SMEs	PIP approved 1/27/2021. Complete.	12/02/2020

ERM-4	Closed	Produce an annual ERM report, providing a complete aggregation of all risks, effectiveness of mitigation actions for high-priority risks, areas of weakness/need improvement, and general observations, by June 1 of each year	PIP approved 2/24/2021. Risk report was due June 1, provided June 25 and presented to LIPA senior management on July 19 after significant revision.	6/30/2021
ERM-5	Closed	Perform a deep dive analysis on high-priority risks including what mitigation actions have been implemented, those underway, planned, and areas of deficiency	PIP approved 2/24/2021. Risk reviews were completed in December 2021.	7/30/2021
ERM-6	On Schedule	Develop a risk correlation matrix to better understand end-to-end impacts and the risks that are interrelated (especially for major storms) to better inform needed mitigation strategies	PIP approved 1/27/2021. LIPA ERM Team developed framework and completed proof of concept; PSEG LI to utilize framework on an agreed upon risk prior to PIP being closed.	6/30/2022
ERM-7	Closed	Provide risk training to all SMEs participating in the annual risk assessment process so that the expectations and value of the process are better understood by the participants	PIP approved 1/27/2021. Training materials have been reviewed and approved by LIPA ERM and two trainings were held in December.	12/31/2021
ERM-8	Closed	Develop a process so that if a high-risk event or condition is identified by LIPA, PSEG Long Island, or PSEG personnel (i.e., when OMS was failing days before the storm) such event or condition (i) immediately triggers a risk review by the LIPA and PSEG Long Island ERM teams, and (ii) is elevated to both LIPA and PSEG Long Island management.	PIP approved 2/24/2021. Process developed to escalate, perform review, and elevate the discussion to LIPA and PSEG Long Island Management. Concept presented and approved in 3/24 Risk Management Committee, Corporate Communication disseminated 5/06 to all PSEG LI employees on importance; 5/12 VP received information for discussion with managers and supervisors and will be ongoing discussion point for RMC meetings. Ongoing monitoring of this recommendation is required to ensure the concept is adopted throughout the organization.	4/30/2021

Over the past twelve months, PSEG Long Island has made considerable progress in addressing many of the deficiencies identified in the eight ERM recommendations. Specifically, the PSEG Long Island ERM team has completed 7 of the 8 ERM Recommendations and the remaining one, related to development and utilization of a risk correlation matrix, is on schedule. As a result of ERM-1 and ERM-2, there has been an improvement in the level of detail provided in the risk discussions and increased accountability by PSEG Long Island SMEs in managing their risks.

Related to ERM-2, PSEG Long Island has designated management-level owners for each risk mitigation action and developed a dashboard for Tier 1 and 2 risks that have mitigation actions underway to provide a status of the progress. LIPA will continue to work with PSEG Long Island to identify the appropriate level of detail for risks and to improve the tracking of the effectiveness of mitigation actions.

With the completion of ERM-3 access to real time information and the quality of information reported there has been progress, however, quality control remains an issue and LIPA ERM has requested PSEG Long Island review the quality of the content with a closer eye to ensure information is concise and accurate.

For ERM-4, PSEG Long Island ERM presented the annual report to LIPA senior management on July 19, 2021. The annual report and presentation were delayed to address substantive concerns that LIPA expressed regarding the level of information provided in draft reports. The final product contained useful information and elicited meaningful discussion on the most significant risks identified by PSEG Long Island. LIPA and PSEG Long Island have negotiated a 2022 Performance Metric that will require additional improvements to the annual report, including a discussion of key insights for year over year changes and the description and tracking of mitigation activities. Additionally, over the 2021 risk assessment cycle, PSEG Long Island ERM did not follow the timeline developed or the process for risk profile reviews agreed upon in December 2020 before the assessment cycle began. This lack of adherence to the process was discussed multiple times and improvement has been seen related to better planning for the 2022 risk assessment cycle, including proactively planning the facilitated working sessions and sending communications out well in advance to inform those involved of the expectations related to the process.

Both LIPA and PSEG Long Island share the goal of developing and piloting a risk correlation framework (ERM-6) to identify end-to-end risk impacts to better inform mitigation strategies. LIPA ERM developed the risk correlation framework and presented a proof of concept in late July that was well-received. The next step will involve PSEG Long Island ERM identifying a risk and utilizing the same process to highlight risk interdependencies, associated mitigation actions, and identified improvements for a Tier 1 or 2 risk, which will occur in the first half of 2022.

PSEG Long Island ERM included high-level risk training information in the 2021 risk assessment working sessions but no formalized training materials or sessions were developed or presented (ERM-7). PSEG Long Island has since developed a preliminary training deck and held two formal training sessions in December 2021 prior to the commencement of the 2022 risk assessment cycle.

For ERM-8, the risk escalation process has been developed and was distributed to all PSEG Long Island employees in May. Additional information was provided to PSEG Long Island Vice Presidents to communicate with managers and supervisors to increase awareness on the importance of escalating identified issues. LIPA ERM recognizes it will take time to adopt the process across the organization and the effectiveness will be evaluated on an ongoing basis.

Overall, PSEG Long Island ERM has made significant improvements to the program since the Board approved the eight recommendations in December 2020. However, there is still additional effort required to improve the program, and LIPA ERM will remain diligent in identifying and overseeing the activities that will ensure the program is in alignment with industry best-practices.

Operating Budgets

The Board adopted recommendations to improve the Operating Budget Process on December 16, 2020 to ensure that comprehensive information is available to both LIPA and PSEG Long Island in a timely manner to support decision-making. This requires increased transparency, accountability, and documentation. Further, improvements are necessary to align budget planning with the development and review of operational work plans.

LIPA requested that PSEG Long Island develop PIPs for OBD-2 and 3. LIPA staff developed the PIP for OBD-1. PSEG Long Island submitted the two PIP proposals in January 2021, and LIPA submitted the proposals to the Board at the February 2021 meeting. The three PIPs were approved by the Board on February 24, 2021.

#	Reported Status	Recommendation	Status Summary	Planned End Date
OBD-1	On Schedule	LIPA will initiate the development of a new budget system to provide for improved documentation, centralized budget calculations, data analytics and forecasting capabilities, and budget control.	PIP approved 2/24/2021 for implementation of Enterprise Planning and Budgeting System to enable transparent and comprehensive budget planning, development, and management for LIPA and PSEG Long Island. This project is led by the LIPA team. The current phase of the project is on track, including: <ul style="list-style-type: none"> • Acquisition and Project Management Services • Development of Business Requirements and Traceability Matrix (RTM). • Market research on Technology Solutions. • Completing Fit-Gap Analysis • Acquisition of Technology Platform and implementation services. 	Phase 0 – 2022 Q3 Phase 1 – 2023 Q3 Phase 2 – 2024 Q2
OBD-2	Closed	PSEG Long Island will develop Budget Briefing Books as part of the budget development process. The Budget Briefing Books will document and explain work plans and the proposed resource allocation at department levels.	PIP approved 2/24/2021. Budget briefing books for 2022 Budget were provided timely by July 31, 2021.	July 2021
OBD-3	Closed	LIPA is requiring PSEG Long Island to provide explanations on the reallocation of funds within the Operations & Maintenance Budget.	PIP approved 2/24/2021. Reallocation forms have been provided for activities whereby projected year-end variances are expected to be in excess of the agreed upon threshold in the PIP.	April 2021

To meet the requirements of OBD-2, PSEG Long Island developed Budget Briefing Books to support selected 2021 department budgets in detail, focusing on one department in each PSEG Long Island Vice President area. This effort was expanded to all departments for the 2022 Budget development process. Budget Briefing Books for the 2022 budget were provided to LIPA as required by July 31, 2021. Overall, the Budget Briefing Books provided an improved level of transparency and detail; however, further improvements are necessary in documenting, in particular, new resource requests and aligning operational work plans and budgets.

With respect to OBD-3, PSEG Long Island developed a Reallocation Explanation template. The first reallocation explanation was due in April 2021. Two reallocation template forms have been provided to LIPA to date. The PIP reflected phasing in the threshold for reporting a reallocation over a three-year period to provide PSEG Long Island with additional time to refine internal budget processes and practices:

- Effective 2021 – Actual spending and/or forecasted year-end results that causes a year-end aggregate variance to budget at the Vice President level of the lesser of \$5.0 million or 5 percent of the annual budget
- Effective 2022 – Actual spending and/or forecasted year-end results that causes a year-end aggregate variance to budget at the Director level of 10 percent of the annual budget and greater than \$500k
- Effective 2023 – Actual spending and/or forecasted year-end results that causes a year-end aggregate variance to budget at the Director level of 5 percent of the annual budget and greater than \$500k

Real Estate Management

PSEG Long Island is responsible for real estate management, easements, leases and agreements, pole attachments, joint use agreements, and telecommunications for the provision of electric service.

Beginning in mid-2019, LIPA, PSEG Long Island, and National Grid discussed the potential reconfiguration of certain properties and facilities that were part of the 1998 merger, when LIPA acquired the Long Island Lighting Company as a wholly-owned subsidiary of the Authority. Both PSEG Long Island and National Grid also expressed interest in separating certain operational facilities. Finally, as a parallel effort, PSEG Long Island has been looking for a location for a new Primary Transmission Control Center (PTCC). All these workstreams are necessary efforts for LIPA's ongoing operations.

These efforts stalled at different stages due to challenges at arriving at concrete valuations for properties that LIPA co-occupies, the piecemeal approach utilized by PSEG Long Island to plan for consolidation of these properties, and lost bids for some properties considered for the PTCC.

These efforts required greater focus and a more organized management approach, including timelines and deliverables, to address LIPA's ongoing concerns in a comprehensive and timely manner, including a comprehensive evaluation of LIPA's real estate needs prior to a year-end 2021 early termination right on certain leased facilities. Specifically, this effort requires a comprehensive look at the facilities currently owned and leased by LIPA and the space needs of the employee population at these locations, especially in a post-COVID work environment.

To address these concerns, on January 27, 2021, the Board adopted the below five recommendations. The Board requested that PSEG Long Island prepare PIPs for these recommendations no later than February 8, 2021. On February 24, 2021, the Board rejected the first iteration of these PIPs and directed PSEG Long Island to revise them consistent with LIPA Staff comments. Based upon LIPA Staff comments, PSEG Long Island resubmitted the PIPs for the Board's consideration at the May 2021 meeting. Progress on implementing these PIPs is described in the table.

This effort is critical to ensuring an accurate and comprehensive understanding of LIPA's real property and facility assets and will ensure that LIPA and PSEG Long Island are focusing their efforts on the long-term viability of the LIPA real estate portfolio in a manner that is best suited for the workforce and provides the highest value to our customers. Given that these PIPs relate to long term strategy planning for LIPA's real estate portfolio, LIPA continues to take an active oversight role, and is part of the discussions with PSEG Long Island consultants in progressing these PIPs toward completion.

#	Reported Status	Recommendation	Status Summary	Planned End Date
RE-01 (10.04)	On Schedule	Develop a long-term strategy for LIPA's real estate and facility assets, including a post-COVID-19 space needs analysis	PIP approved May 19, 2021. PSEG Long Island's project consultant, Colliers Portfolio Strategy Consulting ("Colliers"), presented the final deliverable to LIPA and PSEG Long Island Executive Management on November 15. Follow up discussions are planned in December to finalize the long-term strategy in advance of potential year-end lease termination options.	Q4 2021
RE-02 (10.01)	Delayed	Develop a comprehensive and formal strategy for the development of a new PTCC and Alternate Control Center	PIP approved May 19, 2021. The PTCC project is dependent upon finding a suitable property on Long Island. Realtors continue to search for suitable properties to meet PTCC operational requirements. LIPA T&D Oversight and LIPA Legal suggested to PSEG Long Island that the search criteria and operational requirements be expanded to include other potential properties. PSEG Long Island has expanded that scope, but the milestone in selecting a property by year end remains at risk.	Q1 2028
RE-03 (10.02)	NA (2022 OSA Metric)	Develop a joint strategy with National Grid for separation of existing operations centers, including, among others, those located at Hicksville, Riverhead, Roslyn, and Hewlett	PIP approved May 19, 2021. As discussed above under RE-01, Colliers presented the final deliverable to LIPA and PSEG Long Island Executive Management on November 15, 2021. This overall strategy takes into account the entirety of the LIPA real estate portfolio, including the operations centers shared with National Grid. T&D Metric-33 for 2022 requires PSEG Long Island to develop an additional PIP to implement the final recommendations in the Collier's report. Such PIP will, in part, take into consideration the recommendations relating to the operations centers. As such, the status of this recommendation and related PIP is being deferred pending the completion of T&D Metric-33 in 2022.	Q4 2021
RE-04 (10.03)	On Schedule	Hire an outside consultant to perform a comprehensive review of the existing real property records to confirm accuracy, identify gaps, and make recommendations or process improvements	PIP approved May 19, 2021. The Records Management vendor is in process of scanning and reviewing the real relevant estate records. Phase 1 completion is delayed from December 2021 to February 2022, but overall project remains on schedule.	Q2 2022
RE-05 (10.05)	Completed	Develop a succession plan for current long-serving PSEG Long Island real estate professionals to ensure knowledge capture and transfer	PIP approved May 19, 2021. The respective departments completed training documentation of the positions and met with respective Directors and Vice Presidents. LIPA and PSEG Long Island reviewed and discussed final deliverables. LIPA to follow up on bi-weekly status calls, as needed.	7/31/2021

Inventory Management

PSEG Long Island is responsible for “Inventory Control,” including (a) maintaining an inventory of equipment, spare parts, materials, and supplies and maintaining and documenting an inventory control program; (b) complying with the inventory policy provided in the Operations Manual; (c) purchasing, maintaining, and storing inventory in a manner consistent with the System Policies and Procedures; and (d) completing, on an agreed-upon cycle count basis, a physical inventory of the equipment, spare parts, materials and supplies, and reconciling the same with the inventory assets carried on the balance sheet and providing the information to LIPA.

In December 2017, LIPA engaged an outside consultant to perform a review of inventory controls during storm events. The review included:

- Evaluation of existing policies, procedures, and guidelines in place for the request and issuance of materials/equipment from storerooms under conditions of high activity (i.e., storms);
- Understanding the systems or tools utilized in the process including tracking, approving and/or reporting mechanisms used for materials/equipment distribution; and
- Assessing the return of materials/equipment to storerooms after the storm event including, but not limited to monitoring processes over the expected return of materials and Key Performance Indicators in place, effectiveness of policies and procedures, and cost recording/record-keeping implications if unused materials/equipment are not returned, but then used in a non-storm event.

The consultant for the December 2017 review presented 11 findings with 14 recommendations.

In 2020, LIPA engaged another consultant to confirm that the 2017 recommendations had been implemented and to conduct a broader assessment of PSEG Long Island’s inventory management practices. The 2020 consultant’s assessment included a review of the efficiency and effectiveness of warehouse and inventory management practices, how the practices benchmark against industry standards, and where there are opportunities to improve performance. The assessment was conducted from November 2020 through January 2021 and included evaluating current inventory operations and processes, identifying current state gaps, assessing the readiness of storm response, and developing recommendations.

The 2020 consultant confirmed that the 2017 recommendations had all been implemented but reported 25 additional findings (collectively, the Inventory Management Recommendations) among the areas of general management, information technology, warehouse management, inventory management, and procurement practices. The findings and remediations are summarized as follows:

- PSEG Long Island struggles with maintaining inventory turn targets and thereby has inflated the working capital required to run the business. PSEG Long Island does not have inventory turn targets aligned with industry practice and that consider the related financial and storm fulfillment considerations.
- PSEG Long Island cannot generate written / system generated, repeatable reports with fundamental supply chain information in a formalized cadence.
- PSEG Long Island currently has a roadmap in “stage 0” to improve IT systems. However, foundational capabilities, such as bar-coding, do not function and managerial reporting capability is marginal and not supportive of transparent communication.
- PSEG Long Island does not utilize common algorithms to set min/max cycle stocking targets. From conversations, min/max stocking targets rarely, if ever, change during the year, though no information is

available to quantitatively verify this statement. A formalized consolidated demand forecast is not available.

- There is a storm safety stock concept limited to ~150 of 7,000 part numbers, and PSEG Long Island has been unable to communicate to LIPA the methodology for calculating these stocking levels. Based on the review, it does not appear that inventory levels increase during storm season and decline during the non-storm season. Further, PSEG Long Island has only one vendor with a storm supply clause. PSEG Long Island has not utilized “storm supply” clauses to bring in materials from a supplier.
- PSEG Long Island struggles with demand aggregation from engineering, contractors, and field crews. This, in turn, causes inflated inventory levels to account for demand variability as well as increased manual efforts by supply planners to verify demand prior to the creation and release of Purchase Orders.
- PSEG Long Island has made strides in improving warehouse execution, specifically in the Hicksville location. However, there remain several smaller opportunities for improvement related to signage, location management, and process management.

On February 24, 2021, the Board adopted 25 recommendations to address the findings related to inventory management. On April 9, 2021, PSEG Long Island submitted 23 PIPs for LIPA review. The Board adopted 15 of the PIPs, as identified in the table below, and asked for eight PIPs to be resubmitted in advance of the Board’s May meeting with LIPA’s concerns addressed.

On May 6, 2021, PSEG Long Island submitted three additional PIPs. PSEG Long Island also indicated that they would not resubmit any PIPs related to SAP but rather would continue to meet with LIPA to discuss these recommendations in the context of the Board’s recommendation to replace the current SAP Enterprise Resource Planning System. LIPA staff expressed their reservations to this approach as nearly all recommendations can be accommodated using simpler reporting and analysis tools or third-party applications plugged into existing systems rather than waiting for a multi-year plan to replace the SAP system. LIPA continues to urge PSEG Long Island to revise its technical approach and resubmit these PIPs to realize the benefits of the Board’s recommendations for customers in a timely manner.

On May 19, 2021, the Board adopted two additional PIPs, as indicated in the table below.

PSEG Long Island has addressed 20 of the 25 recommendations to date. The remaining 5 recommendation will be included in future system replacements or upgrades. LIPA’s plan is to roll up the “reporting” recommendations to the Data Access scope and the system improvement recommendations into the Enterprise Asset Management System (EAMS) scope.

#	Reported Status	Recommendation	Status Summary	Planned End Date
IMR-01 (GMIT1)	PIP Not Accepted/ Submitted	SAP System is Not Innovating with the Business. Barcoding Technology is not available in current systems.	No approved PIP.	-
IMR-02 (GMIT2)	On-going	Lack of Visibility & Formalized Communication	PIP accepted 4/28/2021. Reports shared and reviewed at t bi-monthly PSEGLI/LIPA inventory management meetings. 2022 meeting calendar has been set.	
IMR-03 (GMIT3)	PIP Not Accepted/ Submitted	Lack of Standard Reporting Functionality	No approved PIP.	-
IMR-04 (GMIT4)	Complete	Opportunities to Improve and Formalize Training	PIP accepted 4/28/2021. PSEG Long Island indicates an internally developed employee refresher training program has been assigned to all employees for completion by the end of September 2021. LIPA verified that this training is now complete.	
IMR-05 (GMIT5)	PIP Not Accepted/ Submitted	Perform performance testing to validate the ability of the SAP system to support the high volume transactions during storms.	No Approved PIP.	-
IMR-06 (GMIT6)	PIP Not Accepted/ Submitted	Confirm detailed Business Continuity Plan and Fail-Over Preparations	No approved PIP.	-
IMR-07 (WM1)	Combined	Barcoding technology is not utilized in material handling	Combined with IMR-01 (GMIT1)	-
IMR-08 (WM2)	Complete	Exception Reporting	No approved PIP. PSEGLI has been able to demonstrate the ability to produce exception reports using the existing system. These reports were reviewed with LIPA during the November meeting.	-
IMR-09 (WM3)	Complete	Lack of Formal Location Signage at Service Centers	PIP accepted 4/28/2021. New signage, labeling machines and labels have been purchased. Internal labor has been actively labeling all inside and outside bin locations. All signage has been installed.	
IMR-10 (WM4)	Closed	Formalize Quality Hold and Returns Locations are Present	PIP accepted 4/28/2021. A disciplined supplier returns and quality hold process with clearly defined physical and SAP Bin locations is complete. Four SAP Bins have been created. Physical space within the Hicksville warehouse receiving area has been allocated and delineated with yellow floor striping. 4 milestones have been completed and were verified at the bi-monthly meeting held 9/1/21.	

IMR-11 (WM5)	Complete	Create Bin location in SAP is not restricted	PIP accepted 4/28/2021. PSEG Long Island reports complete. LIPA verified completion at 6/30/21 bi-monthly meeting.	
IMR-12 (WM6)	Complete	Risk of crew-based pilferage, misuse, mispicked inventory in a self-serve environment	PIP accepted 4/28/2021. Deliverables were reviewed with PSEG Long Island at the 6/30/21 status meeting. LIPA verified all 4 milestones were complete.	6/30/2021
IMR-13 (IM1)	Complete	Formalize and Communicate Storm Inventory Strategy	PIP accepted 4/28/2021. PSEG Long Island departments have collaborated to develop recommended storm inventory levels. The recommended levels were shared and discussed with LIPA and verified complete at the 9/1/21 bi-monthly meeting.	
IMR-14 (IM2)	Complete	Accountable Parties at an Executive Level do not Meet in a Formal and Routine Manner	PIP accepted 4/28/2021. Quarterly D&OP inventory forecast meetings scheduled for 6/30/2021. A draft N+2 to 12 month forecast tool has been developed and is being vetted internally. Verified complete at the 9/1/21 bi-monthly meeting.	
IMR-15 (IM3)	PIP Not Accepted/ Submitted	Some portion of fundamental inventory metrics to control the business are not available	No approved PIP.	-
IMR-16 (IM4)	Delayed	Workorder Demand, Requisitions and Maintenance BOMs for Material Order is Considered to be Inaccurate	PIP accepted 4/28/2021. In April, critical vacancies in the M&L organization (Mgr.- M&L and Analyst positions) put additional demands on the management team resulting in certain tasks not being completed on time. Both vacant positions are actively being filled. However, new hires were not in place as of the 9/1/21 bi-monthly meeting.	6/30/2021
IMR-17 (IM5)	Completed	Demand Forecast is not Consolidated and Reviewable in a Drill Down Manner	PIP accepted 4/28/2021. Creating a historical forecast spreadsheet with 3 years data and project plan input method. Incorporated accuracy measurement analytics and 2020 actual project data in the spreadsheet. This will be reviewed at the October 2021 bi-monthly meeting.	
IMR-18 (IM6)	Completed	Inventory Policies, do not Formally Incorporate the Concept of Safety Stock	PIP accepted 4/28/2021. Determined the Safety Stock calculation scope and methodology and included same in Inventory Reorder and Stocking Strategy Policy MM-001, dated 4-6-2021. Adding the plan to the inventory control reorder desk guide LI-DG-REORDER was completed and shared at the 9/1/21 bi-monthly meeting.	

IMR-19 (IM7)	Complete	Minimum/ Maximum Stocking Levels are Formulated based on Experiential Knowledge	PIP accepted 4/28/2021. Developed methodology for Min/Max creation and validation process. Adding the methodology to desk guide LI-DG-REORDER and capturing the components of min/max changes.	
IMR-20 (IM8)	Combined with SP1 (IMR-24)	Inventory Policies do not Incorporate “Storm” Clauses (which guarantee supply during critical periods) within Supplier Contracts	PIP approved 5/19/2021.	6/30/2022
IMR-21 (IM9)	Complete	Inventory Policies are Reviewed and Potentially Changed 1 x Per Year	PIP accepted 4/28/2021. Inventory Reorder and Stocking Strategy Policy MM-001 was completed 4/6/2021. Outstanding milestones reviewed and accepted by LIPA at 9/1/21 bi-monthly meeting.	
IMR-22 (IM10)	Complete	Limited Stock Rotation Regimen	PIP accepted 4/28/2021. Implemented a FIFO (First In First Out) inventory rotation process where applicable. Revised warehouse mapping and configuration to accommodate inventory rotation. Internal picking orders are directed to the oldest material first. Materials with multiple bin locations are set up with three or more bins. Bins are configured as primary, secondary, and overflow. Picks are directed to primary, when the primary is depleted the material from the secondary is rotated to the primary bin. When the secondary bin is depleted, material is rotated from the overflow bin to the secondary. Newly received material is placed in the overflow bin. Material with one bin location, picking is done from the front and newer material is placed to the rear of the shelf. Larger material is handled the same way within the yard compounds. LIPA has not verified completion.	
IMR-23 (IM11)	Complete	Limited ability to Track PPE, Consumables, and Tools Spend	PIP accepted 4/28/2021. A monthly PPE, consumables and tool issuance report has been created and is reviewed by Materials & Logistics management. LIPA has not verified completion.	
IMR-24 (SP1)	Complete	Nearly no usage of “storm” clauses in vendor contracts	PIP approved 5/19/2021. A preliminary report of critical inventory requirements based on historical storm activity and engineering considerations has been developed under the IM1 PIP and is pending approval. Preliminary discussions have been held with vendors to determine costs and ability to store storm inventory. A cost-benefit analysis has begun including a series of internal reviews of onsite non-labor carrying costs. LIPA has not verified completion of plan milestones.	

IMR-25 (SP2)	Complete	No EDI / VMI	PIP approved 5/19/2021. A memo summarizing the potential use of PSEG's EDI transactions for PSEG Long Island was submitted on 06/01/2021 to LIPA. This memo addressed LIPA's request following submission of the SP2 plan.	10/31/2022
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Collections Management

In 2017 and 2018, LIPA expressed its concerns to PSEG Long Island's collections department related to issues surrounding non-product billings and miscellaneous receivables. LIPA asked for efforts to address the increasing receivable balances related to billings for damage done to LIPA's system, which is managed by PSEG Long Island through its Damage Tracking System (DTS). At the time, PSEG Long Island accounting recorded a 33 percent reserve for accounting purposes as the collection of these receivables was uncertain. The low realization rate represents a burden on LIPA's customers. Furthermore, reports provided monthly on miscellaneous receivables should be more detailed and streamlined.

On February 24, 2021, the LIPA Board adopted three recommendations related to DTS charges and other non-product billings. DTS-1 and DTS-3 were consolidated into a single PIP, which was approved at the May 19, 2021 meeting. The status of each recommendation is summarized in the table below.

#	Reported Status	Recommendation	Status Summary	Planned End Date
DTS-1	Delayed	Materially improve the DTS billing and collections process, including through a review and analysis of the current end-to-end process.	PIP approved on May 19, 2021. Process review & benchmarking completed. Collection & reporting enhancements completed. Initial reporting requirements provided but need to be enhanced. Billing process improvements require results demonstration to close. Need billing backlog cleanup approach to determine if billing changes are adequate.	9/30/2021
DTS-2	Closed	Provide access to the DebtNext platform to one LIPA user, who should be able to view transactions and run all reports.	LIPA personnel have access to PSEG Long Island DebtNext platform.	-
DTS-3	Combined w DTS-1	Improve the billing and collections process for miscellaneous non-utility billings, including delivering improved reports to LIPA.	Combined with DTS-1.	-

LIPA and PSEG Long Island meet monthly to review progress and provide information as scheduled in the PIP. PSEG Long Island and LIPA have agreed on key performance metrics and improved reporting for collections. PSEG Long Island has implemented several collection process improvements, including enhanced reporting and onboarding a second outside counsel with 30-day collection reporting. Billing key performance metrics, reporting include: % of accounts billed within x days (report in 30-day increments), average cycle days, # of accounts open but unbilled claims and # closed claims. Billing metrics and reporting need further refinement. Process improvements to reduce billing cycle time were developed, such as automating the process to accelerate missing data identification, piloting accident flagging in Eastern Suffolk in October (pending outcome analysis) and automatic creation of orders, which will be implemented in the future.

Asset Management

PSEG Long Island operates and maintains approximately 15,000 miles of transmission and distribution (T&D) assets owned by LIPA. A well-functioning asset management program reduces cost to customers and increases reliability by guiding investment and maintenance decisions. Modern asset management systems are integrated with work management practices and are a core utility function.

In 2020, LIPA hired the Woodhouse Partnership (TPWL), a firm with international expertise in asset management across many sectors, including the utility sector, to evaluate PSEG Long Island's asset management programs and policies. This review followed findings of significant weaknesses in National Grid's and PSEG Long Island's management, respectively, of LIPA's assets in 2013 and 2018 by the New York State Department of Public Service (DPS) in Management and Operations Audits, which PSEG Long Island was responsible for remedying. TPWL evaluated PSEG Long Island's asset management practices and processes relative to International Standards Organization (ISO) 55001 requirements. On a scale of zero (innocent) to four (beyond ISO), with three being "competent," TPWL rated PSEG Long Island's Asset Management program between zero (innocent) and two (developing) on each of the 27 program components prescribed by ISO.

The systems currently supporting PSEG Long Island's management and maintenance functions are fragmented and siloed and do not lend themselves to a comprehensive enterprise-wide understanding of system assets. Asset data is spread out between various departmental data systems with limited data quality assurance. These fragmented systems impede the effective implementation of data-driven asset management programs. The Computerized Maintenance Management System (CMMS) upgrade that PSEG Long Island is planning to implement is only a partial step and a modern, integrated Enterprise Asset Management System (EAMS) is needed to fully realize the potential benefits of modern asset management techniques.

Additionally, over the past several years, PSEG Long Island has implemented policies and procedures to strengthen Property, Plant and Equipment (PP&E) records, beginning with a project to improve record-keeping related to sub-station assets and a separate project for "outside plant" (i.e., the poles, wires and associated equipment). While PSEG Long Island has made improvements, a recent physical survey of select circuits including over 5,000 poles across the service territory indicates that additional work remains. For example, the selected survey found a discrepancy of 35 percent between records and the physical inventory of Third-Party Attachments. With regards to Asset Collection (i.e., capacitors, protective devices, fuses, riser switches, and transformers), the physical inventory in one town found 24 more transformers than the 27 shown in the mapping system. Additionally, with regards to the identification of double wood poles, the physical inventory identified 170 locations while the statewide notification system (i.e., National Joint Utilities Notification System) had 73. These discrepancies indicated the need for a comprehensive inventory of PP&E records.

On February 24, 2021, the Board adopted five recommendations to address the findings related to PSEG Long Island's asset management program (AM-1 through AM-5). On March 29, 2021, the Board adopted two additional

recommendations (AM-6 and AM-7). On May 19, 2021, the Board adopted a consolidated PIP from PSEG Long Island to address AM-1 through AM-5.

LIPA recently received PSEG Long Island's proposed Implementation Plans for developing an Asset Management program complying with the ISO-55000 framework. The proposed implementation plan entails significant investment commitments from LIPA. It is also evident that there is a disconnect between the business-side of the asset management team and the technology staff that would be responsible for the EAMS. LIPA staff and consultants are currently reviewing these plans to align the plans more closely to LIPA's objectives.

#	Reported Status	Recommendation	Status Summary	Planned End Date
AM-01	NA (2022 OSA Metric)	Adopt the ISO Asset Management Framework – adopt the principles and standards prescribed by ISO 55000 and 55001 as an asset management framework and develop a three-year roadmap with milestones and steps toward a maturity goal of three by the end of 2023.	PIP approved 5/19/2021. PSEGLI has developed an Asset Management Framework Implementation Plan / Roadmap and draft Asset Management Policies. These and other deliverables are being reviewed by LIPA.	12/31/2023
AM-02	Combined with AM-01	Annual Reliability Assessment of Plant Asset Performance – within 90 days of each year-end, PSEG Long Island should perform and report results of an annual reliability assessment of plant asset performance. The report must include a plan and timeline to address identified deficiencies.	PIP consolidated with AM-01.	-
AM-03	Combined with AM-01	Develop Asset Management Plans – complete the development of asset management plans for transmission, distribution, and substation infrastructure (preventative maintenance, upgrade/replacement of transformer, breaker, switchgear, poles, underground cable, switches (ASU), capacitor, etc.) with annual reviews and three-year comprehensive updates.	PIP consolidated with AM-01.	-
AM-04	Combined with AM-01	Capture Additional Data into the Computerized Maintenance Management System – Complete the development of the CMMS in accordance with the 2013 and 2018 Management and Operations Audit Recommendations and then expand data capture to include all T&D assets.	PIP consolidated with AM-01.	-
AM-05	Combined with AM-01	Strategic Asset Management Plan (SAMP) – Develop a SAMP that binds the work activities, investment commitments, and decision making through an overarching framework that would be explained and communicated throughout the organization.	PIP consolidated with AM-01.	-

AM-06	NA (2022 OSA Metric)	Implement an Enterprise Asset Management System. Expand the scope and objectives of the planned CMMS upgrade to include a full-fledged EAMS with capabilities in maintenance management, a full-featured asset database that can accommodate all utility operational assets, comprehensive asset health monitoring, and predictive maintenance capabilities. This system should be the system of record for maintaining all operational asset data, including data for all plant assets and all field/network assets. This integrated enterprise system should provide the baseline for improving our capabilities in a data-driven, risk-based program for asset management decisions and move the utility towards a preventive and predictive approach for managing assets. The system development plan should align with PSEG Long Island's SAMP. The new system should replace the limited, home-grown, custom CMMS and integrate asset life-cycle management, predictive maintenance, asset risk analysis, and other key asset management functions. Phase 1 of this system to go-live no later than December 30, 2022.	PSEG Long Island has not submitted a PIP for this recommendation.	-
AM-07	NA (2022 OSA Metric)	Conduct a System-Wide Physical Inventory of Outside Plant Assets. PSEG Long Island should engage an outside firm to perform a system-wide physical inventory of outside plant assets for completion within three years. The physical inventory should collect detailed data on all significant physical assets belonging to the network, including poles, pole attachments, transformers, switches, line characteristics, and line-attached devices. The data developed in this physical assessment should align with asset data models in the Enterprise Asset Management System (see Recommendation No. 6). PSEG Long Island should also consider collecting relevant condition data during the physical inspection to the extent feasible.	PSEG Long Island has submitted a draft PIP for this recommendation. LIPA is working with PSEG-LI to align this draft PIP more closely to LIPA objectives and expects to present this PIP for Board Adoption at its October meeting.	-

Affiliate Services

The use of PSEG subsidiaries as “affiliates” to perform services for PSEG Long Island is permitted under the terms of the Amended and Restated Operations Services Agreement. Affiliate costs are charged to PSEG Long Island and therefore paid by LIPA. The services that PSEG Long Island typically uses affiliates to perform include IT system support, IT project support, Human Resources, Procurement, Treasury, and Legal Services.

The current procedures relating to the use of affiliates do not provide LIPA with sufficient detail to determine whether the use of such affiliates is the most economic approach and in the best interest of LIPA's customers.

LIPA reimbursed PSEG Long Island a total of \$23 million for affiliate-related services in 2020. Furthermore, \$17 million, or 75 percent of the total affiliate costs, were allocated based on a formula that assigns Long Island a percentage of PSEG's aggregated “pooled” costs across its operating companies. As a result, LIPA has minimal detail on affiliate costs and the actual services provided to support LIPA operations.

Lastly, affiliate costs typically come with a premium due to facility, support, and administrative overhead costs being added to direct labor costs. A “fully-loaded” affiliate cost is typically higher than the cost of PSEG Long Island in-house personnel.

To improve oversight of PSEG Services Corporation affiliate charges and services funded by LIPA, and gain a

better understanding of transactional charges, the Board adopted the below three recommendations on March 29, 2021.

On April 16, 2021, PSEG Long Island submitted to LIPA Staff three proposed PIPs to address the recommendations. PSEG Long Island agreed with the premise of the LIPA recommendations, however, proposed a PIP that delayed providing LIPA much of the requested information until 2022. While LIPA could accept a phased-in plan for AS-01, the PIP related to cost substantiation should start immediately with the key cost areas addressed in the early stages of the plan.

Leading up to the May Board meeting, PSEG Long Island submitted draft PIPs for the three affiliate cost recommendations. However, LIPA Staff was not able to accept the plans for AS-01 and AS-02 and required PSEG Long Island to modify the plans, especially in terms of schedule and clarity. At the May 19, 2021 Board meeting, the Board adopted the PIP for AS-03.

On June 15, 2021, PSEG Long Island provided LIPA with updated PIPs for AS-01 and AS-02. The updated plans addressed LIPA's concerns. As such, the Board adopted these PIPs at its June 23, 2021 meeting.

#	Reported Status	Recommendation	Status Summary	Planned End Date
AS-01	NA 2022 OSA Metric	Enhanced Affiliate Budget Transparency. PSEG Long Island should prepare cost and benefit justifications for affiliate use as part of the annual budget development process in 2022. PSEG should minimize the use of transactional cost allocations and review the basis of allocating a percentage of its costs to Long Island customers to ensure that LIPA is not subsidizing New Jersey services. PSEG should document the specific IT projects affiliates perform. PSEG's budget submission should provide supporting documentation reflecting the calculation of activity/billing hourly rates.	Board adopted PIP at the June 23, 2021, meeting. LIPA and PSEG have been holding regular meetings to discuss information available to meet this requirement.	9/30/2023
AS-02	On Schedule	Enhanced Affiliate Actual Cost Transparency. PSEG must provide LIPA with a quarterly affiliate report detailing actual use of affiliates as compared to budget, including variance explanations. PSEG should provide detailed support for affiliate positions billed at a level equivalent to one full-time position.	Board adopted PIP at June 23, 2021 meeting. LIPA and PSEG have been meeting regularly to discuss format and additional data to meet this PIP. First quarterly report is due to LIPA for the 9/30/2021 quarter.	3/1/2023
AS-03	Delayed	LIPA requires PSEG Long Island immediately request approval for hiring ServCo employees, pursuant to its contractual obligations.	Board adopted PIP at May 19, 2021. LIPA and PSEG Long Island need to implement a "contract administration manual" to formalize the approval process.	5/15/2021

Strategic Planning

Long-term strategic planning is an essential element of utility governance and management. Strategic planning provides for proper setting of objectives, prioritization of projects, alignment among stakeholders, and accountability for promised results. Good strategic planning requires long-range plans for each key area of the

business and a process for coordinating long-range plans with shorter-term work plans and associated budgets.

LIPA has tried in the past, most recently in the summer of 2019, to collaborate with PSEG Long Island on strategic planning initiatives, but those efforts were largely unsuccessful. Although PSEG Long Island leaders participated in several meetings with LIPA to discuss strategic planning issues, those meetings were ultimately not productive because of a lack of support by PSEG Long Island leadership.

On April 29, 2021, the LIPA Board adopted a recommendation to develop five-year roadmaps as a tool to improve PSEG Long Island's strategic planning processes, encourage more long-term thinking about the management of LIPA's assets, and align PSEG Long Island's budget submissions with long-range plans and short-term work plans. This process will result in greater alignment of management and budgets with the LIPA Board's objectives, better value to LIPA's customers, and accountability of PSEG Long Island management for promised results.

PSEG Long Island submitted a PIP to address the Board's recommendation to LIPA staff on June 3, 2021. In July, LIPA suggested significant revisions to meet the intent of the Board and clarify timelines and deliverables. PSEG Long Island has not yet provided a revised draft that substantively addresses LIPA's revisions or the Board's recommendations.

However, in the course of contract negotiations, LIPA and PSEG Long Island agreed to develop five-year strategic roadmaps in each of the five scope functions of the amended contract that will evaluate the current state of the function, articulate an end state vision, and identify specific projects to close the gap, in accordance with LIPA and the LIPA Board's vision and strategic directions. The requirements outlined in the amended contract are substantially similar to the requirements LIPA had requested in its revised PIP and address the substance of the Board's recommendations. The LIPA Board has begun reviewing LIPA's strategic direction and LIPA management has begun the planning process to compile LIPA's views of the strategic priorities and projects that should be included in the roadmaps.

#	Reported Status	Recommendation	Status Summary	Planned End Date
SP-1	PIP Not Accepted	<p>Initiate development of five-year roadmaps for the transmission and distribution (T&D), information technology (IT), and customer service functions, in a format mutually agreed to by LIPA and PSEG Long Island, to be completed by March 31, 2022, and used as guidance for the 2023 Budget. The five-year roadmaps should evaluate the current state, which includes consideration of their top enterprise operations risks, and articulates an end state vision, and identify the projects necessary to close the gap. The end state vision for the functions should take into account industry trends and customer needs and should align with the strategic direction articulated in the policies adopted for the utility by the LIPA Board.</p> <p>The roadmap should also include (i) a cost-benefit analysis for each project; (ii) identify the schedule for and sequencing of projects; (iii) dependency on or interaction with projects initiated by other departments; and (iv) budget requirements for project implementation and operations. The roadmap should include Project Implementation Plans (PIPs) with greater detail for each of the projects.</p> <p>Beginning in April 2022, commence development of five-year roadmaps for PSEG Long Island's remaining seven key functions (i.e. power supply, clean energy programs, business services, human resources, procurement, external affairs, communications, and legal) to be completed by March 31, 2023. Thereafter, the five-year departmental roadmaps should be updated on a biennial cycle.</p> <p>Roadmaps will be reviewed with, and approved by, the Board as guidance documents for future budget requests. Projects identified on the roadmaps with budgetary implications will be included in the Budget Plan for each year.</p>	PSEG Long Island submitted a draft PIP in June 2021. LIPA provided significant revisions in July 2021. PSEG Long Island has yet to provide a substantively revised draft.	3/31/2023

Information Technology System Modernization

Modern IT systems are crucial to improving operational efficiency, reliability, and customer satisfaction to support the Board's vision of a clean, lean, and customer-first utility. IT is the soft infrastructure in utilities, providing the connectivity and harnessing data-derived intelligence to benefit customers.

IT investments should be approached in a similar manner as investments in physical infrastructure. The Board's Strategic Planning recommendations address the importance and need for long-term IT plans, which will identify opportunities for technology investments to support strategic objectives. LIPA has additionally identified two critical IT system priorities where planning should begin prior to the completion of the medium-term Strategic Planning process: the Enterprise Resource Planning (ERP) system and the Customer Accounting System (CAS).

ERP refers to a type of software that organizations use to manage day-to-day business activities such as accounting, reporting, human resources, procurement, and other operational functions. SAP is the integrated business software PSEG Long Island uses to coordinate these various aspects of LIPA's business. In 2014, PSEG expanded its existing SAP system to include PSEG Long Island rather than building a stand-alone ERP system for LIPA's operations. This action was taken for purported savings to LIPA's customers (limited or no savings was likely realized). The legacy PSEG ERP implementation is at the end of its lifecycle and is due for an upgrade.

Additionally, LIPA's business model was designed to change service providers without significant business interruption. PSEG Long Island's SAP implementation is intricately intertwined with its setup for other PSEG business units. Consequently, using the PSEG corporate ERP raises the complexity, cost, and time required to change service providers, if necessary, and reduces the ability of LIPA to exercise its oversight rights, as PSEG Long Island limits LIPA's oversight of its corporate systems.

LIPA's CAS, which manages customer billing and other related customer information, was implemented in 1975 when the Long Island Lighting Company, as an investor-owned utility, operated the electric transmission and distribution system. Over the years, the system has become more complex and intractable, requiring workarounds to meet changing bill formats, urgent customer needs, and regulatory requirements. The utility industry has already moved away from outdated Cobalt-based systems due to the shortage of programming expertise in this antiquated language and the lack of flexibility and agility to respond to customers' ever-changing needs. Because the current system is unable to retain key data attributes and program functions required to meet customer needs, PSEG Long Island is forced to add new interfaces or manual workarounds that increase complexity and put system stability at risk.

In 2013, PSEG Long Island concurred that the CAS replacement was in LIPA customers' best interest and recommended this initiative to LIPA as part of the transition from National Grid. This recommendation was based on a lack of agility of the existing CAS, cost, and the shrinking availability of skills to maintain the legacy system. Their evaluation report concluded that "PSEG Long Island will be able to greatly reduce ongoing operating costs and achieve very rapid paybacks even while factoring in substantial investments of time and expense in the migration process." In 2016, PSEG Long Island declined to proceed with the CAS replacement without offering a detailed analysis. LIPA believes that further delays in CAS replacement will result in higher costs, system errors, slower delivery, and lower functionality, as articulated in PSEG Long Island's 2013 analysis.

Both the ERP and CAS systems need upgrades to modern versions that provide all the functions needed to best serve LIPA's customers and avoid the inherent risks of running antiquated IT systems. Replacement of such critical systems comes with significant costs and operational risks. Therefore, it requires thorough planning and testing to ensure a successful implementation and minimize disruptions to utility operations and service to customers.

This effort is critical to ensure that LIPA's customer information and financial systems are robust and reliable, effectively and efficiently respond to changes in customer needs and the regulatory environment, and provide the greatest value for money to Long Island electric customers.

These systems do not operate in a vacuum, and replacement is a multi-year project. The planning process needs to identify all related systems impacted by the replacements, the proper sequencing of activities, required resources, potential roadblocks, and other operational considerations, including financial impacts, cost-control measures, and enterprise risk management.

On April 28, 2021, the Board adopted a recommendation asking for PIPs for the replacement of the ERP and CAS. PSEG Long Island should immediately initiate planning to modernize the existing ERP and CAS systems with a clear delivery timeline. Any replacement effort should recognize that LIPA's business model is designed to change service providers without significant business interruption and ensure that new systems are separate and independently operable from PSEG's enterprise systems.

PSEG Long Island was asked to present PIPs for the Board's consideration at its June 2021 meeting. PSEG Long Island has not yet submitted PIPs for either system. ITSM-02 has now been incorporated as a 2022 OSA Performance Metric.

#	Reported Status	Recommendation	Status Summary	Planned End Date
ITSM-01	PIP Not Submitted	Plan for Replacement of Enterprise Resource Planning System	PSEG Long Island has not submitted a PIP for this recommendation.	-
ITSM-02	NA 2022 OSA Metric	Plan for the Replacement of the Customer Information System	PSEG Long Island has not submitted a PIP for this recommendation. The recommendation has now been incorporated as a 2022 metric.	-

Capital Budgets

LIPA and PSEG Long Island have made progress on improving the Operating Budget development and oversight process in accordance with the recommendations adopted by the Board on December 16, 2020. However, the Operating Budget only captures half the financial picture. In 2021, PSEG Long Island is budgeted to spend \$727 million on capital projects. This spending targets critical investments in system reliability, technology, infrastructure upgrades, and load growth requirements. The existing Capital Budget development and project oversight process shares many of the same weaknesses as the Operating Budget process.

The main result of these weaknesses is that PSEG Long Island's requests for Capital Budgets are routinely more than the funds expended. In addition, there is a high level of variance between the funds requested for the year by project and category as compared to those expended, with the result of large shifts between projects and categories of spending from those planned and approved by the Board. This leads to a loss of accountability for project delivery and controls, as well as can result in higher borrowing costs for customers. As an example, the table below shows the original Board-approved Capital Budget for each year since 2014 as compared to the funds spent.

Year	Budget (\$M)	Actual (\$M)	Variance (\$M)
2015	\$577	\$375	\$202
2016	\$644	\$524	\$120
2017	\$670	\$658	\$12
2018	\$695	\$591	\$104
2019	\$815	\$690	\$125
2020	\$785	\$753	\$32

Note: Does not reflect Capital Budget amendments, which are principally to roll over unspent funds.

Prior Department of Public Service Management and Operations Audits have pointed to needed reforms in capital project optimization, capital project estimating, risk and contingency management, project management performance reporting, the definition and quantification of work standards, and other areas that contribute to the development and management of capital projects and the Capital Budget. PSEG Long Island has implemented improvements in many of these areas, while some still require greater effort. An improved process governing capital project and Capital Budget review and approval, including managing changes during the year, will enhance transparency and accountability of customer funds and ensure adequate information flow to LIPA to conduct oversight on behalf of our customers.

On May 19, 2021, LIPA's Board adopted a resolution approving three recommendations developed by LIPA to improve the Capital Budget development and monitoring process. PSEG Long Island is to implement the Capital Project and Budget Development and Monitoring Process Improvement Recommendations effective with the 2022 Budget.

The recommendations are intended to increase the transparency and oversight of the Capital Budget and capital projects by requiring PSEG Long Island to submit to LIPA a complete Project Justification Description form outlining the project scope, schedule, cost information, and benefits. Further, the recommendations would establish a process for addressing projects that were in a preliminary stage of development as well as providing for updates to LIPA on project and Capital Budget changes.

The LIPA Board adopted a PIP at its August 11, 2021 meeting to address the recommendations. LIPA and PSEG Long Island continue to hold joint meetings to begin the work required on deliverables for the Capital Budgeting PIP, including reviewing working examples to ensure all scenarios are captured for LIPA analysis and review.

#	Reported Status	Recommendation	Status Summary	Planned End Date
CB-01	On Schedule	<p>Capital Project and Budget Review and Approval Process</p> <p>Complete Project Justification Descriptions: For a project to be considered by the Board for inclusion in the LIPA Board-Adopted Consolidated Budget, which includes the PSEG Long Island Capital Budget as well as the balance of the 8-Year Capital Plan, LIPA's Chief Executive Officer or their designee ("CEO"), must first have reviewed and approved a Project Justification Description ("PJD") containing the project level information detailed in Section 4.13 (A) of the OSA.</p> <p>Preliminary Project Justification Descriptions: If PSEG Long Island is unable to provide a full and complete PJD prior to consideration of the PSEG Long Island Capital Budget by the LIPA Board, PSEG Long Island may submit a preliminary PJD as part of its Capital Budget request. Based on its sole judgment regarding the completeness of the PJD, LIPA's CEO may recommend to the Board that the project be included in the LIPA Consolidated Capital Budget on a contingent basis, therefore outside of the PSEG Long Island Capital Budget.</p> <p>New Projects or Changes in Project Scopes Between Capital Budgets: In the event PSEG Long Island proposes to add a new project to the PSEG Long Island Capital Budget portion of the Board-approved LIPA Consolidated Budget, or in the event of a material change in project scope from that was previously reviewed and approved, PSEG Long Island will need to submit a new PJD to LIPA's CEO for review in accordance with the process outlined above regarding the consideration of a project for inclusion in the current year LIPA approved Consolidated Budget and 8-year Plan.</p>	Board adopted PIP at August 11, 2021 meeting. PSEG Long Island has substantially provided PJDs for the 2022 Budget cycle.	4/1/2022

CB-02	Combined with CB-01	<p>Capital Budget Changes and Reallocations</p> <p>Annual Project Justification Description Updates: PSEG Long Island should provide LIPA with annual updates to PJDs highlighting changes from the prior PJD and reflecting the current cost estimates, including R&C, schedule, and scope details as part of the annual budget process. For multi-year projects that have progressed through more advanced project design stages since the prior budget (e.g. order of magnitude, conceptual estimate, design estimate, definitive estimate), the PJD and budget request should reflect an updated R&C estimate.</p> <p>Capital Budget Reallocation Explanations: To fulfill PSEG Long Island's obligation to consult with LIPA prior to reallocating budgeted funds, PSEG Long Island must submit to LIPA's CEO a Capital Budget Reallocation Explanation form, in a format requested by LIPA, when proposing to reallocate funds within the adopted Capital Budget when projected year-end spending at the project level is forecasted to result in a variance to the Annual Budget for that project equal to or greater than 10% and \$0.5 million.</p>	PIP combined with CB-01	-
CB-03	Combined with CB-01	<p>Carryover Projects: If a Capital Project funded within the Adopted LIPA Consolidated Capital Budget is delayed into the subsequent year's Capital Budget, PSEG Long Island must identify the change in the project schedule and propose to carryover the approved Capital Budget funds from the current adopted Capital Budget to the proposed Capital Budget as part of the next year's Capital Budget adoption process. LIPA CEO shall not recommend to the Board the re-funding of a project scope that was re-scheduled from a prior budget year if the funding was not carried over from the prior year.</p>	PIP combined with CB-01	-

Work Management

The Department of Public Service and its consultant, NorthStar Consulting Group (NorthStar), submitted Management and Operations audits of LIPA and its service providers in 2013 and 2018 that included recommendations to improve work management.

In 2020, PSEG Long Island engaged a third-party consultant to assess PSEG Long Island's work management operations and progress toward addressing the findings in the NorthStar reports. Upon extensive review, the third-party consultant recommended ten initiatives to strengthen business capabilities and address the NorthStar recommendations. The ten initiatives were intended to benefit LIPA customers by progressing in seven key outcome areas:

- Productivity improvement in work execution
- More efficient deployment of capital
- Reduced compliance backlog
- Improved safety
- Higher customer satisfaction
- Improved stakeholder management/relations
- Execution of higher priority work

Certain of the third-party consultant recommendations complement recommendations already adopted by LIPA's Board, such as those related to Asset Management.

At the Board's June 23, 2021 meeting, LIPA staff recommended that the Board adopt the below additional Work Management Recommendations based on the third-party consultant findings and LIPA Staff observations and request PIPs from PSEG Long Island management to address these findings by the Board's October 2021 meeting.

After the Board's adoption of the Work Management recommendations, LIPA's Internal Audit department completed a work management audit with additional material findings in this area. These additional findings will be reflected in the PIP brought to the LIPA Board for approval.

#	Reported Status	Recommendation	Status Summary	Planned End Date
WM-01	PIP Not Accepted	Develop best practice-based work management processes – On March 29, 2021, the LIPA Board passed a resolution directing PSEG Long Island to develop an integrated enterprise asset management system ("EAMS"), the first phase of which would go-live no later than December 30, 2022. Concurrent with this implementation, PSEG Long Island should focus on improving business processes and work practices so that all asset-related work is orchestrated, managed, executed, and controlled using the EAMS system. These improved business processes and management controls should be developed such that they can become integrated with and available for use during the first phase of the EAMS deployment no later than December 30, 2022.	LIPA staff currently reviewing	-

WM-02	NA 2022 OSA Metric	Develop processes and systems to improve planning and tracking of work – Improve the management and organization of project Work Breakdown Structures (WBS) to the appropriate granularity and ensure that labor and other resources are tracked to the WBS elements for both operating and capital projects. To be completed by June 30, 2022.	LIPA staff currently reviewing	-
WM-03	NA 2022 OSA Metric	Improve and standardize estimating, Compatible Unit Estimates (CUE), and task list management – Improve the accuracy of estimating via a consistent process and use of reusable planning artifacts with standard times (i.e. CUEs and task lists) for all work types. To be completed by June 30, 2022.	LIPA staff currently reviewing	-
WM-04	NA 2022 OSA Metric	Implement Aligned Annual Work Plan and Short-Term Scheduling/Dispatch – Implement annual project/work planning-scheduling and short-term scheduling aligned with the organization's EAMS solution. Centralize high-level scheduling and yard-level short-term work-week scheduling and dispatch with multi-week scheduling and visibility. To be completed by June 30, 2022.	LIPA staff currently reviewing	-
WM-05	PIP Not Accepted	Enable Mobile and Field Management – Improve the use of mobile devices and ergonomic transaction design to enhance field management of work and data collection and integrate the same into the new EAMS. To be completed by December 30, 2022.		-
WM-06	NA 2022 OSA Metric	Improve Work Management Metrics – Improve Key Performance Indicator/metric definition and dashboards/reporting for work management visibility and performance improvement. To be completed by January 31, 2022.	LIPA staff currently reviewing	-
WM-07	NA 2022 OSA Metric	Clarify and Rationalize Work Management Roles – Map future state of work management processes to standardize PSEG Long Island work management roles/positions (e.g. planner, scheduler, work coordinator, router) and implement across yards. To be completed by June 30, 2022.	LIPA staff currently reviewing	-
WM-08	PIP Not Accepted	Implement Work Prioritization Principles – Develop key principles for work prioritization and scheduling/rescheduling. Clarify process and decision rights for developing an annual schedule and adjusting the schedule. To be completed by December 31, 2021.	LIPA staff currently reviewing	-

Small Generator Interconnection Procedures

In April 2021, LIPA engaged a third-party consultant to assess PSEG Long Island's Smart Grid Small Generator Interconnection Procedure (SGIP) management practices, benchmark those practices against industry standards and identify opportunities to improve performance. The SGIP affects interconnection requests of up to 10 megawatts (i.e. primarily solar). The assessment examined the strengths and weaknesses of the interconnection process and how easy it is to do business with PSEG Long Island.

In August 2021, the Board adopted seven recommendations to strengthen the SGIP business practices and benefit LIPA customers based on the findings of the assessment. The Board requested PIPs from PSEG Long Island for each recommendation for the Board's consideration. The PIP submission combined all seven recommendations into one plan and was largely incorporated into 2022 Performance Metrics.

#	Reported Status	Recommendation	Status Summary	Planned End Date
SG-01	NA 2022 OSA Metric	Independent Review of Escalated Cases: Currently the PSEG Long Island Interconnection Ombudsperson is the Manager of the interconnection department. PSEG Long Island should ensure an independent review of escalated interconnection cases by changing the organizational placement of the Interconnection Ombudsperson.	The PIP submitted September 17, 2021 was rejected October 4, 2021 and is being revised.	-
SG-02	NA 2022 OSA Metric	Improve Customer Experience: PSEG Long Island's SGIP portal currently provides status updates as projects move through the different phases of the SGIP. PSEG Long Island should leverage the portal to provide proactive emails and updates on upcoming activities that require coordination between PSEG Long Island and the customer such as meter installation.	The PIP submitted September 17, 2021 was rejected October 4, 2021 and is being revised.	-
SG-03	NA 2022 OSA Metric	Provide new channels for online payment options: PSEG Long Island should allow customers to provide payment quicker and eliminate delays associated with mailing a check or checks expiring before they can be cashed.	The PIP submitted September 17, 2021 was rejected October 4, 2021 and is being revised.	-
SG-04	NA 2022 OSA Metric	Evaluate interconnection project cost sharing options: PSEG Long Island should develop a method to equitably share costs for network upgrades to replace the current process for charging the customer that pushes the capacity over the limit for a circuit. PSEG Long Island should determine a method that is consistent with other New York utilities.	The PIP submitted September 17, 2021 was rejected October 4, 2021 and is being revised.	-

SG-05	PIP Rejected	Integrate the Interconnection Online Portal: PSEG Long Island should advance the integration of the interconnection portal with its enterprise systems to improve the system implementation and build an analytics platform to automate the technical screening process.	The PIP submitted September 17, 2021 was rejected October 4, 2021 and is being revised.	-
SG-06	PIP Rejected	Leverage AMI technology to monitor system performance: PSEG Long Island should leverage AMI technology to monitor actual DER production and alert customers if their systems are not performing as expected.	The PIP submitted September 17, 2021 was rejected October 4, 2021 and is being revised.	-
SG-07	PIP Rejected	Leverage the PSEG Long Island Interconnection Working Group: PSEG Long Island should prioritize upgrades or modifications to the SGIP with the developers who are participants of the Interconnection Working Group. The IWG meeting is a collaborative effort bringing the Utility and Developer professionals together to identify technical and procedural improvements to the interconnection process. Many developers work with different utilities across North America and are a channel to identify improvement opportunities that have been successful elsewhere.	The PIP submitted September 17, 2021 was rejected October 4, 2021 and is being revised.	-

Data and Information Access

During the past several years, LIPA has had the ability to access PSEG Long Island systems on an as-requested basis. However, the usefulness of such access provisions has been limited by the complexity of the access procedures, availability of user training, and organization of system data.

The existing agreement between LIPA and PSEG Long Island stipulates that “Service Provider shall establish and maintain an information system to record, provide and, to the extent practicable, provide real time retrieval for LIPA’s review and copying of T&D System operating and financial data, including all information necessary to verify calculations made pursuant to this Agreement. Such information shall include information about the T&D System (including information in physical formats such as diagrams, flow charts, and schematics related to the T&D System), reports (and all supporting data) regarding the performance of the T&D System, and information regarding management (including planning, design, engineering, operation, maintenance, and customer contact) of the T&D System (collectively, ‘System Information’)”.

Furthermore, the Second Amended and Restated OSA with PSEG Long Island provides, among other things, that: “Prior to the separation of the IT systems, the Service Provider will provide LIPA and its representatives and consultants with the same access, including the same real-time access, where applicable, as the Service Provider and its Affiliates have to all information technology systems and processes that are utilized in whole or in part to serve LIPA, as well as to all of the financial-, customer-, and T&D system-related data, information and reports residing therein and accessible there through.”

Modern data warehouse systems serving enterprise data are characterized by an enterprise-wide data dictionary, a central repository of enterprise data, and meaningful organization of enterprise data suitable for decision-making and performance monitoring. Additionally, data lakes facilitate access to semi-structured and

unstructured data as well as raw data from structured databases for in-depth analysis.

A standardized Data Access Platform consisting of a data warehouse and a data lake would provide effective centralized access to organization-wide data that would facilitate PSEG Long Island's management decision-making capability as well as LIPA and Department of Public Service oversight.

In August 2022, the Board directed PSEG Long Island to develop a PIP with the objective of deploying a Standardized Data Access Platform consisting of an enterprise-wide data warehouse, a broader data lake, and provisioning and development of tools to support reporting and analytics. The Standardized Data Access Platform will provide PSEG Long Island management, LIPA, and the DPS seamless and effective access to PSEG Long Island financial, operational, and performance data. This data repository will contain structured data from PSEG Long Island's financial and operational systems and will be equipped with suitable tools to facilitate query, reporting, and analyses of data from the entire spectrum of data sources without the users needing to manage connections to different source systems.

PSEG Long Island was directed to deliver the PIP no later than September 10, 2021 with the objective of a production Phase I system to be delivered no later than December 31, 2022. LIPA reviewed the PIP submitted by PSEG Long Island and recommended deferring consideration of the project plan so that it could be improved to better meet the objectives of the Board's recommendations.

The recommendation has now been incorporated into the 2022 Performance Metrics; with the requirement to develop, by March 31, 2022, a plan and long-term roadmap which addresses the Board's Data Access recommendation and includes:

- Conduct Data Assessment (LIPA Internal, DPS and PSEG LI) per the Board Recommendation
- Develop high-level requirements and Use Cases addressing the Board Recommendation
- Develop and submit Master Data Analytics Project Plan by March 31 that includes a Phase 1 deployment by the end of 2022 per the Board recommendation.

#	Reported Status	Recommendation	Status Summary	Planned End Date
DIA-01	NA 2022 OSA Metric	<p>Develop a Standardized Data Access Platform consisting of an enterprise-wide data warehouse, a broader data lake, and provisioning and development of tools to support reporting and analytics.</p> <p>Phase I of the implementation should, at a minimum, incorporate data from the following source systems: SAP, Outage Management System/Pragma CAD (OMS/pCAD), Advanced Metering Infrastructure (AMI) and Customer Information and Billing System (CAS). Phase II should, as a minimum, include data from Asset Management, Energy Management System (EMS), Advanced Distribution Management System (ADMS) and Supervisory Control and Data Acquisition (SCADA).</p>	PIP was previously deferred to October meeting to better align with LIPA's objectives. The recommendation has now been incorporated as a 2022 Performance Metric, with the requirement to develop a plan and long-term roadmap by March 31, 2022.	-

Geographic Information System

The Geographic Information System (GIS) is a foundational platform for every utility, leveraging geographic and geo-referenced data to manage and optimize the use of spatial information. As spatial data collection and analytics technologies become increasingly sophisticated, utility IT and operational technology (“OT”) systems have evolved to leverage these capabilities, with GIS becoming an integral component of modern utility line-of-business processes and systems, including SCADA, Enterprise Asset Management, Advanced Distribution Management Systems, Distributed Energy Resource Management Systems, and Customer Information Systems.

Long-term planning is essential for leveraging the potential of GIS to optimize utility operations and drive improved decision-making via geospatial-data-derived insights. A comprehensive long-term GIS plan will assess the business objectives, opportunities, and priorities; the technology platform and marketplace; and the data, resource and process requirements; and provide a clear roadmap for delivering business applications across the enterprise cohesively and efficiently.

PSEG Long Island’s current GIS plan consists of a GIS Roadmap and Product Lifecycle chart that identifies broad timelines for upgrades/enhancements of current components and applications over the next 10 years; a rudimentary level of planning that falls far short of a comprehensive long-term plan. In the absence of a long-term plan, PSEG Long Island’s GIS project development has too often been conducted in an ad-hoc, localized manner, without adequate enterprise-level prioritization against business goals or evaluation of the IT marketplace.

Development of a comprehensive GIS Long-Term Plan would improve PSEG Long Island’s ability to leverage GIS as a platform for application development across the enterprise in a manner that optimizes business value. In October 2021, the Board directed PSEG Long Island to develop a PIP with the objective of developing a comprehensive GIS Long-Term Plan that provides a clear roadmap for leveraging GIS across the enterprise in a manner that optimizes business value, and that, at a minimum:

- Assesses and identifies the business objectives, opportunities, and priorities across the enterprise lines-of-business processes and systems, including SCADA, Enterprise Asset Management, Advanced Distribution Management Systems, Distributed Energy Resource Management Systems, and the Customer Information Systems.
- Evaluates the technology marketplace and develops a comprehensive ecosystem plan that considers the core platform and associated infrastructure; system resiliency; business application development toolsets and approaches; and third-party integration products and services.
- Identifies new opportunities to establish GIS-based services, applications, and capabilities to enhance utility business performance and customer experience.
- Identifies available or potential data sets and any associated data management or integration issues.
- Addresses process and resource requirements

PSEG Long Island was directed to deliver the PIP no later than January 5, 2022 with the objective of the comprehensive GIS Long-Term Plan to be delivered for LIPA approval no later than July 1, 2022, and modernization/upgrade of the GIS technology stack and go-live, in line with the approved plan, no later than November 30, 2022.

The recommendation has now been incorporated into the 2022 Performance Metrics as part of the GIS – Long Term Plan, Architecture and Technology Stack Upgrade Project, with the requirement to deliver the PIP no later than January 5, 2022; deliver the GIS Long-Term Plan/Roadmap no later than July 1, 2022; and deploy the modernized/upgraded GIS technology stack no later than December 31, 2022.

#	Reported Status	Recommendation	Status Summary	Planned End Date
GIS-01	NA 2022 OSA Metric	<p>Develop a comprehensive GIS Long-Term Plan that provides a clear roadmap for leveraging GIS across the enterprise in a manner that optimizes business value, and that, at a minimum:</p> <ul style="list-style-type: none"> • Assesses and identifies the business objectives, opportunities, and priorities across the enterprise lines-of-business processes and systems, including SCADA, Enterprise Asset Management, Advanced Distribution Management Systems, Distributed Energy Resource Management Systems, and the Customer Information Systems. • Evaluates the technology marketplace and develops a comprehensive ecosystem plan that considers the core platform and associated infrastructure; system resiliency; business application development toolsets and approaches; and third-party integration products and services. • Identifies new opportunities to establish GIS-based services, applications, and capabilities to enhance utility business performance and customer experience. • Identifies available or potential data sets and any associated data management or integration issues. • Addresses process and resource requirements <p>Modernize/upgrade of the GIS technology stack.</p>	<p>The recommendation has now been incorporated into the 2022 metrics, with the requirement to deliver the PIP no later than January 5, 2022; deliver the GIS Long-Term Plan/ Roadmap no later than July 1, 2022; and deploy the modernized/ upgraded GIS technology stack no later than December 31, 2022.</p>	-



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