

Summary Status Table in Response to the Report of the Auditor General of Ontario

*Chapter 3 2017 Annual Report of the Auditor General – IESO – Market Oversight and Cybersecurity
Ministry of Energy, IESO, OEB*

Auditor's Recommendation	Completed Undertaking	Outstanding Undertaking (including Timeline)
AG Recommendation #1 <i>To ensure that ratepayers' interests are protected and that recommendations made by the Ontario Energy Board Market Surveillance Panel to improve market rules are addressed, we recommend that the Independent Electricity System Operator (IESO):</i> <i>Implement the Ontario Energy Board Market Surveillance Panel's (OEB Panel) recommendations in an effective and timely way; and</i> <i>Where the OEB Panel submits a report to the Independent Electricity System Operator that contains recommendations relating to the misuse, abuse or possible abuse of market power, the IESO should use its authority to amend the market rule immediately and submit it to the Ontario Energy Board for its review.</i>	<u>2017 Annual Report – Response:</u> The IESO supports the OEB Panel's work and acknowledges the recommendation made by the Auditor General. The IESO carefully considers every OEB Panel recommendation and the OEB Panel's underpinning analysis, and responds to each recommendation outlining the actions it will take in a letter directed to the Chair and CEO of the Ontario Energy Board. The IESO has acted on a number of the recommendations made by the OEB Panel in the past and has made a number of market rule amendments as a result. The IESO will further continue to analyze and assess OEB Panel recommendations and consider possible amendments to market rules to address those recommendations, while also balancing the need to ensure the reliability of the electricity network, to consider the impact upon market design, including potential unintended adverse effects, and to assess the ability of the IESO and market participants to implement the change. Where the OEB Panel submits a report to the IESO that contains recommendations related to market power, the IESO will take the action required of it under the Electricity Act, 1998, including amending the market rules where so ordered by the Board. <u>Status Update:</u> The Independent Electricity System Operator (IESO) considers every OEB Panel recommendation and the Ontario Energy Board (OEB) Market Surveillance Panel's (MSP) underpinning analysis. The IESO has acted on a number of the recommendations made by the OEB's MSP in the past and has made a number of market rule amendments as a result.	The Independent Electricity System Operator (IESO) will continue to analyze and assess the Ontario Energy Board's (OEB) Market Surveillance Panel (MSP) recommendations and consider possible amendments to market rules to address those recommendations, while also balancing the need to ensure the reliability of the electricity network, to consider the impact upon market design, including potential unintended adverse effects, and to assess the ability of the IESO and market participants to implement the change.

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	When the OEB's MSP issues recommendations, usually through its semi-annual monitoring reports, the IESO assesses those recommendations, recognizing the need to ensure the reliability of the electricity network, to consider the impact upon market design, including potential unintended adverse effects, and to assess the ability of the IESO and market participants to implement the change. Should the OEB's MSP submit a report that contains recommendations related to market power, the IESO will take the action required of it under the Electricity Act, 1998, including amending the market rules where so ordered by the Board.	
AG Recommendation #2 <i>To ensure that ratepayers' interests are protected and that recommendations made by the Ontario Energy Board Market Surveillance Panel (OEB Panel) to improve market rules are addressed, we recommend that the Ontario Energy Board (OEB) use its legislative authority to revoke and refer a market rule amendment back to the Independent Electricity System Operator (IESO) for further consideration when the OEB's review determines that an amendment to the market rule is not in the best interest of ratepayers, having regard to</i>	<u>2017 Annual Report – Response:</u> The Ontario Energy Board (OEB) agrees with the importance that the Auditor General attaches to outcomes that are in the best interests of ratepayers. The OEB supports the recommendations of its OEB Panel, and will continue to use the tools at its disposal to signal that support while respecting its own mandate and processes and the authority and responsibilities of other agencies. Since 2011, the OEB has regularly corresponded with the IESO regarding the recommendations the OEB Panel makes in its reports. When the OEB renewed the IESO's licence in 2013, a new licence condition was included that requires the IESO to make annual filings to the OEB on the status of actions taken further to recommendations in OEB Panel reports, including the rationale for not taking action where a recommendation remains outstanding. The OEB will continue to work with the IESO to ensure that high-priority recommendations made by the OEB Panel are appropriately	As and when market rule amendments are made by the Independent Electricity System Operator (IESO) and filed with the Ontario Energy Board (OEB), the OEB will continue to exercise its existing authority in an independent manner and with due regard to the criteria for assessing market rule amendments as set out in the Electricity Act, 1998. Steps are being taken to further engage the IESO in respect of outstanding Market Surveillance Panel (MSP) recommendations on a timely basis. To the extent that the MSP questions the sufficiency or clarity of the IESO's response to an MSP recommendation, whether in correspondence with the OEB following release of an MSP report or in the IESO's annual filing, the MSP will follow up with the IESO rather than commenting on the response only in the next available semi-annual monitoring report as is currently the practice.

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<i>the fact that it does not address the Market Surveillance Panel's recommendations. The OEB should continue to revoke and refer such a market rule amendment back to the IESO until it is satisfied that the market rule amendment is in the best interest of ratepayers.</i>	addressed in a timely manner. <u>Status Update:</u> See Outstanding Undertakings for additional information	The OEB will undertake additional follow-up as appropriate in the event that substantial outstanding issues remain after the initial outreach by the MSP.
AG Recommendation #3 <i>To ensure that ratepayers' interests are protected and that recommendations made by the Ontario Energy Board Market Surveillance Panel (OEB Panel) to improve market rules are addressed, we recommend that the Ministry of Energy review the legislative power and authority of the Ontario Energy Board to conduct a review of a market rule on its own motion, and to consider expanding its authority under the Electricity Act, 1998, when misuse and abuse of a market rule is brought forward by the OEB Panel and is not effectively being addressed by the Independent Electricity System Operator (IESO).</i>	<u>2017 Annual Report – Response:</u> The Ministry of Energy supports the Ontario Energy Board (OEB) and the IESO in the important roles they play to ensure that Ontario's electricity market operates efficiently. The Ministry, in consultation with both the OEB and the IESO, will review the Electricity Act, 1998, regarding the market rule approval process. The Ministry will also review the authority of the OEB. <u>Status Update:</u> See Outstanding Undertakings for additional information	The Ministry of Energy is committed to strong electricity market oversight in Ontario and is working closely with the Independent Electricity System Operator (IESO) and the Ontario Energy Board (OEB) in reviewing the appropriate role and legislative authority of the OEB with regards to the review and amendment of market rules. This review is expected to be completed this year.

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AG Recommendation #4 <i>To ensure the transparency of government decisions, we recommend that the Ministry of Energy review the impact of the Industrial Conservation Initiative on low-energy consuming ratepayers and publicly report this information.</i>	<u>2017 Annual Report – Response:</u> The Ministry continues to monitor the impact of the Industrial Conservation Initiative (ICI) on the electricity system in reducing peak demand and the impact on all classes of electricity consumers. The recovery mechanism under ICI maintains the relationship between a consumer's electricity costs and their contribution to provincial peak demand. Lowered peak demand reduces the need for supply resources and ultimately the projection for electricity system cost. The Independent Electricity System Operator (IESO) estimates that ICI reduced peak demand by about 1,300 megawatts in 2016. ICI supports a fair cost allocation framework where consumers who are contributing the least to peak demand pay a smaller portion of these related long-run costs. It is also worth noting that the IESO publishes on its website the allocation of global- adjustment costs each month, as well as the consumption for each class of consumer. The Ministry would also like to clarify that the benefit for residential and small-business consumers will not be influenced by ICI expansion. The Ontario Fair Hydro Plan reduced electricity bills for residential consumers by an average of 25% and will hold any increases to the rate of inflation for four years. <u>Status Update:</u> See Outstanding Undertakings for additional information	The Industrial Conservation Initiative (ICI) program has been successful at reducing peak electricity demand, which benefits the system by reducing the need for peaking generation. This puts downward pressure on electricity system costs as we move forward, helping to ensure a more cost-effective system for all ratepayers. The Ministry of Energy continues to monitor and report on the impact of the ICI program on the electricity system, including reductions in peak demand and impacts on all classes of electricity consumers. The results of the ICI program can be seen in monthly Independent Electricity System Operator (IESO) reports and the quarterly Ontario Energy Report.

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AG Recommendation #5 <i>To protect ratepayers' interests and to improve the transparency of the decisions of the Independent Electricity System Operator (IESO), we recommend that the IESO provide a detailed analysis to the Ontario Energy Board Market Surveillance Panel (OEB Panel) to support its assertion that the Standby Cost Recovery Program is necessary to ensure a reliable supply of electricity for Ontarians.</i>	<u>2017 Annual Report – Response:</u> In 2018, the IESO will present to the OEB Panel a detailed analysis supporting the rationale for its previous assertions to the OEB Panel that a real-time generator commitment mechanism (currently the Real-Time Generator Cost Guarantee Program, referred to in this report as the Standby Cost Recovery Program) is necessary to allow the IESO to comply with North American power system reliability standards and ensure a reliable supply of electricity for Ontarians. <u>Status Update:</u> The Independent Electricity System Operator (IESO) is scheduled to meet with the Ontario Energy Board's Market Surveillance Place (MSP) on April 5, 2018 to present a detailed analysis supporting the rationale for maintaining a real-time generator commitment mechanism.	The Independent Electricity System Operator (IESO) is making fundamental changes to the electricity market, through the Market Renewal Program, that will include replacing the current real-time generator commitment mechanisms with a more efficient and transparent form of unit commitment. Until fundamental changes can be made, the current program is necessary to maintain the reliability of our electricity system and comply with mandatory continent-wide power system reliability standards.
AG Recommendation #6 <i>To ensure that ratepayers are not charged for unnecessary costs, we recommend that, if the Independent Electricity System Operator does not cancel the Standby Cost Recovery Program, it fully implement the Ontario Energy Board Market Surveillance Panel's (OEB Panel) recommendations</i>	<u>2017 Annual Report – Response:</u> The IESO acknowledges the recommendation made by the Auditor General and notes that the total costs of the Real-Time Generator Cost Guarantee Program (referred to in this report as the Standby Cost Recovery Program) have fallen from \$61 million in 2014 to \$23 million in 2016. In light of OEB Panel recommendations, the IESO implemented a new cost recovery framework for this Program on August 1, 2017. Under this new framework, the values for 14 of 15 eligible costs are now set and approved in advance of participating in the Program for each program participant. This change introduced transparency and removed the potential for overpayments and the	The Independent Electricity System Operator (IESO) is making fundamental changes to the electricity market, through the Market Renewal Program, that will include replacing the current real-time generator commitment mechanisms with a more efficient and transparent form of unit commitment.

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<i>and not reimburse generators for operating and maintenance costs under the Program.</i>	need for after-the-fact audits for these components. One cost component is still subject to audit, as it cannot be pre-approved, but this cost component was not identified as an issue in the Standby Cost Recovery Program audits. The IESO acknowledges issues with the current Standby Cost Recovery Program in our responses to previous OEB Panel reports and has committed to replace it. The IESO has initiated a \$200-million comprehensive program to fundamentally overhaul Ontario's electricity market. Market Renewal is estimated to result in up to \$5.2 billion in savings, the majority of which is estimated to be realized by ratepayers (see "The Future of Ontario's Electricity Market, A Benefits Case Assessment of the Market Renewal Project," http://www.ieso.ca/-/media/files/ieso/document-library/engage/me/benefits-case-assessment-market-renewal-project-clean-20170420.pdf?la=en and http://www.ieso.ca/sector-participants). The Enhanced Real-Time Unit Commitment initiative of Market Renewal will replace the current Standby Cost Recovery Program with a transparent and competitive mechanism that will ensure reliability through a more efficient commitment of resources near real time. <u>Status Update:</u> In light of Ontario Energy Board's Market Surveillance Panel (MSP) recommendations, the Independent Electricity System Operator (IESO) implemented a new cost recovery framework for this Program on August 1, 2017. Under this framework, eligible costs are set and approved in advance of participating in the Program for each program participant. Program costs have fallen from \$61 million in 2014 to \$22	

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	million in 2017.	
AG Recommendation #7 <i>To ensure that ratepayers are not charged for unnecessary costs associated with the Lost Profit Recovery Program, we recommend that the Independent Electricity System Operator (IESO) implement the recommendations of the Ontario Energy Board Market Surveillance Panel (OEB Panel) regarding this Program.</i>	<u>2017 Annual Report – Response:</u> The IESO acknowledges the recommendation made by the Auditor General and carefully considers every OEB Panel recommendation and the OEB Panel's underpinning analysis, and responds to each recommendation outlining the actions it will take in a letter directed to the Chair and CEO of the OEB. The IESO has acted on a number of the recommendations made by the OEB Panel related to Congestion Management Settlement Credits (referred to in this report as the Lost Profit Recovery Program) and has implemented more than a dozen market rule amendments regarding the Program. In light of the recommendations made by the OEB Panel over the years, the IESO will continue to consider the OEB Panel recommendations when assessing amendments to market rules while also balancing the need to ensure the reliability of the electricity network, to consider the impact upon market design including potential unintended adverse effects and to assess the ability of the IESO and market participants to implement the change. The IESO has initiated a \$200-million comprehensive program to fundamentally overhaul Ontario's electricity market. Market Renewal is estimated to result in up to \$5.2 billion in savings, the majority of which is estimated to be realized by ratepayers (see "The Future of Ontario's Electricity Market, A Benefits Case Assessment of the Market Renewal Project," http://www.ieso.ca/-/media/files/ieso/document-library/engage/me/benefits-case-assessment-market-renewal-project-clean-20170420.pdf?la=en and http://www.ieso.ca/sector-participants). The Single Schedule Market	The Independent Electricity System Operator (IESO) has introduced fundamental changes through the Market Renewal Program that would eliminate the need for CMSC through the Single Schedule Market (SSM). The IESO has initiated a \$200 million comprehensive program to fundamentally overhaul Ontario's electricity market. Market Renewal is estimated to result in up to \$5.2 billion in savings, the majority of which is estimated to be realized by ratepayers (see "The Future of Ontario's Electricity Market, A Benefits Case Assessment of the Market Renewal Project," http://www.ieso.ca/-/media/files/ieso/document-library/engage/me/benefitscase-assessment-market-renewal-projectclean-20170420.pdf?la=en and http://www.ieso.ca/sector-participants). The Single Schedule Market (SSM) initiative of Market Renewal will eliminate the Lost Profit Recovery Program.

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	(SSM) initiative of Market Renewal will eliminate the Lost Profit Recovery Program. <u>Status Update:</u> The Independent Electricity System Operator (IESO) has acted on a number of the recommendations made by the Ontario Energy Board's Market Surveillance Panel (MSP) related to Congestion Management Settlement Credits (referred to in this report as the Lost Profit Recovery Program) and has implemented more than a dozen market rule amendments regarding the Program. A December 2016 MSP report noted: "many of the most problematic issues associated with the CMSC regime have been brought to an end – in large measure as a result of the Panel having identified these situations, and the IESO having acted to eliminate them."	
AG Recommendation #8 <i>To ensure that the Market Renewal Initiative (Initiative) considers and protects all ratepayers' interests, we recommend that the Independent Electricity System Operator (IESO):</i> <i>immediately prohibit representatives from companies that have been found by the Ontario Energy Board Market Surveillance Panel or the IESO</i>	<u>2017 Annual Report – Response:</u> The IESO acknowledges the recommendations of the Auditor General and will continue to evaluate the membership of the working groups used for Market Renewal. The IESO will also continue to ensure that its stakeholder engagement processes, including Market Renewal, seek representation from low-volume consumers where appropriate. The IESO's stakeholder engagement processes seek the input from a wide representation of participants—generators, traders, consumers, stakeholders, First Nations and Metis Peoples, communities, and the general public—and are guided by seven engagement principles that were put in place in November 2015 (see http://www.ieso.ca/sector-participants/engagement-initiatives/overview/engagement-	The Independent Electricity System Operator (IESO) will complete a general review of its engagement strategy. The IESO expects to communicate and implement updates to its engagement strategy by Q3 2018. The engagement strategy will continue to be aligned with the IESO engagement principles and ensure wide representation from our market participants, sector stakeholders and other stakeholders such as low volume consumers.

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<i>Oversight Division to have misused IESO programs from participating in the Initiative working group;</i> <i>establish a minimum number of working group members representing low-power consumers and ensure that those positions are always filled; and</i> <i>publicly report in clear language how the results of the Initiative will be in the best interests of all ratepayers.</i>	principles). One of the principles, which applies to Market Renewal, seeks to ensure adequate representation in each engagement of the public or those that have a tendency to remain silent or reluctant to engage. Where practical, a variety of engagement methods will be offered to provide flexibility to participate. The IESO is also required by statute (the Electricity Act, 1998, S.O. 1998, c. 15, Sched. A, s. 188) to have a Stakeholder Advisory Committee that provides appointed stakeholder representatives with the opportunity to present advice and recommendations on key initiatives like Market Renewal directly to the IESO's independent Board of Directors and Leadership Team. Members include low-volume consumers (see http://www.ieso.ca/-/media/files/ieso/document-library/sac/sac_tor.pdf). <u>Status Update:</u> In December 2017, a member representing low volume consumers was added to the Market Renewal Working Group (MRWG). The Independent Electricity System Operator (IESO) will continue to ensure that its stakeholder engagement processes, including Market Renewal, seeks broad, all-inclusive representation.	
AG Recommendation #9	<u>2017 Annual Report – Response:</u>	The Market Assessment and Compliance Division (MACD) will complete a risk and resourcing assessment in the first

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<i>To ensure that the Independent Electricity System Operator (IESO) Market Assessment and Compliance Division can conduct proper oversight of the market, we recommend that the IESO:</i> <i>• assess the resources needed to eliminate its investigation backlog and conduct the large-scale investigations that have proven effective in recovering funds and identifying and sanctioning significant rule violations; and</i> <i>• attract and retain staff with experience in market rules and expertise in investigation.</i>	The IESO agrees with the Auditor General's recommendation, as it is consistent with recent increases in staff at the Oversight Division and the process of ongoing review of priorities. As part of the IESO Business Planning process for 2018, the IESO is evaluating the risk profile of a variety of its priorities, including the enforcement of market rules. As part of this exercise, consideration is being undertaken to both increase the total level of resources made available for enforcement, as well as the conversion of some current resources to full-time and non-temporary staff. In doing so, attracting staff with expertise in market rules and investigations will be a priority. <u>Status Update:</u> See Outstanding Undertakings for additional information	quarter of 2018 to identify opportunities to convert contracted staff to regular (i.e., full-time and non-temporary) status and increase the total level of resources to the enforcement and oversight functions.
AG Recommendation #10 <i>To enable the Independent Electricity System Operator Market Assessment and Compliance Division (Oversight Division) to conduct thorough and effective investigations, we recommend that the Ministry of Energy give the Oversight Division explicit legislative</i>	<u>2017 Annual Report – Response:</u> The Ministry supports the vital roles that the Oversight Division plays in investigating potential infractions in Ontario's electricity system. To ensure that the Oversight Division can effectively conduct its investigations, the Ministry will consult with Independent Electricity System Operator regarding the potential need for additional legislative authority to assist the Oversight Division in performing its mandated duties.	The Ministry of Energy is committed to strong electricity market oversight in Ontario, and is working closely with the Independent Electricity System Operator (IESO) in reviewing the appropriate role and legislative authority of Market Assessment and Compliance Division (MACD) regarding oversight of Ontario's electricity market, in order to ensure effective and efficient investigations into instances of potential abuse of the market rules.

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<i>authority under the Electricity Act to compel information and evidence in the course of its investigations.</i>	<u>Status Update:</u> See Outstanding Undertakings for additional information	
AG Recommendation #11 <i>To ensure that the Independent Electricity System Operator (IESO) Market Assessment and Compliance Division (Oversight Division) can conduct proper oversight of the market, we recommend that the IESO replace the Oversight Division's computer system as soon as possible.</i>	<u>2017 Annual Report – Response:</u> As part of the IESO Business Planning process for 2018, the IESO is evaluating the risk profile of a variety of its priorities, including the sufficiency of resources directed towards the Oversight Division's IT support and replacement of the computer system. <u>Status Update:</u> Substantial technical support has been provided to the Market Assessment and Oversight Division (MACD) to enable the development of technical business requirements geared towards an enforcement support tool. The MACD is now using a proposed tool on a pilot basis for case management and using industry-standard litigation and evidence management tools to support its current cases.	Market Assessment and Compliance Division (MACD) expects to complete its internal assessment, including user acceptance testing and full implementation of the proposed enforcement support tool by Q2 2018.
AG Recommendation #12 <i>To strengthen the independence of the Independent Electricity System Operator (IESO) Market Assessment and Compliance Division (Oversight Division), we recommend that the IESO change the Oversight Division's</i>	<u>2017 Annual Report – Response:</u> The IESO agrees with the Auditor General's recommendation. The IESO's independent Board of Directors approved in October 2017 a new reporting structure whereby the Director of the Oversight Division will report directly to the IESO Board of Directors and report only administratively to the IESO CEO. <u>Status Update:</u>	The Independent Electricity System Operator (IESO) has completed all actions to address the recommendation.

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<i>reporting structure.</i>	Prior to the release of the Auditor's report, the Independent Electricity System Operator (IESO) completed implementing a new reporting structure whereby the Director of the Oversight Division reports directly to the IESO Board of Directors and reports only administratively to the IESO CEO.	
AG Recommendation #13 <i>To strengthen its cybersecurity governance, we recommend that the Independent Electricity System Operator (IESO) create a senior-level position for cybersecurity and establish a formal reporting process to both IESO executives and the IESO Board of Directors.</i>	<u>2017 Annual Report – Response:</u> The IESO agrees with the Auditor General's recommendation. The IESO is already in the process of recruiting a new Chief Information Officer (CIO) with an increased focus on cybersecurity, and will consider creating a senior-level position for cybersecurity with formal reporting to both IESO executives and the IESO independent Board of Directors. <u>Status Update:</u> Prior to the release of the Auditor's report, the Independent Electricity System Operator (IESO) had initiated a recruitment process for a Chief Information Officer (CIO), with an increased focus on cybersecurity. Based on the senior-level nature of the role, the successful candidate in the CIO position will be an experienced senior technology executive, who has a deep understanding of Critical Infrastructure Protection environments, like the IESO, and demonstrated experience in overseeing enterprise-wide cybersecurity management programs. The CIO will have cross-organizational influence to ensure that cybersecurity risk management is being addressed and integrated across all business units of the organization.	Target date for appointment of Chief Information Officer (CIO) is by end of Q1 2018. The Independent Electricity System Operator (IESO) is also looking to establish a senior-level position for cybersecurity, reporting to the CIO, who will be responsible for the delivery and operations of the IESO's cybersecurity program. The timing of the senior-level cybersecurity role is targeting Q1 2018.

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	The CIO will report to the IESO's Chief Executive Officer. This was an internal governance decision, made by the IESO's executive in collaboration with the board.	
AG Recommendation #14 <i>To ensure there are sufficient cybersecurity resources in place to respond to cyberattacks, we recommend that the Independent Electricity System Operator (IESO) increase the number of cybersecurity staff to the recommended level of seven and/or engage an external IT cybersecurity vendor to be on standby.</i>	<u>2017 Annual Report – Response:</u> The IESO complies with all applicable North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection standards, which include standards for cybersecurity. The IESO is in the process of implementing an independent consultant's recommendation to increase the number of current cybersecurity staff in a manner consistent with the Auditor General's recommendation. The IESO has also retained the services of a cybersecurity vendor to augment the existing staff in the event of a cybersecurity event. The IESO is also an active member of the North American Cybersecurity Mutual Assistance Program (CMA), which provides access to cybersecurity specialists from over 150 North American utilities in the event of a cyberincident. <u>Status Update:</u> Prior to the release of the Auditor's report, the Independent Electricity System Operator (IESO) had started implementing an independent consultant's recommendation to increase the number of current cybersecurity staff, which is consistent with the Auditor General's recommendation. The IESO has retained the services of a cybersecurity vendor to augment the existing staff in the event of a major cybersecurity event.	The Independent Electricity System Operator (IESO) has also launched a competitive process to retain a cybersecurity third-party vendor that will, in conjunction with IESO staff, provide a robust security operations center (SOC) enabling 24/7/365 real-time cybersecurity monitoring.

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AG Recommendation #15 <i>To reduce cybersecurity risk and to prevent potential costly IT project redesigns, we recommend that the IT department of the Independent Electricity System Operator (IESO) involve its cybersecurity staff in the early stages of all IT projects that could pose cybersecurity risks.</i>	<u>2017 Annual Report – Response:</u> The IESO complies with all applicable North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection standards, which include standards for cybersecurity. It is the IESO's current practice that security risk assessments are incorporated in the IT project management practices. Having said that, the IESO will continue to enhance its approach to ensure "cybersecurity by design" in all of its IT-related projects. That means ensuring that the cybersecurity requirements are being considered early in the process of any new IT program design and that sufficient cybersecurity staff are allocated at this important part of any project. This will be further facilitated by the formation of the IESO's new Program Management Office, which will ensure an enterprise-holistic view on all IESO projects. <u>Status Update:</u> The Independent Electricity System Operator's (IESO) new Project Management Office was formed in Q4 2017.	The incoming Chief Information Officer (CIO) and senior-level cybersecurity resource (as referenced in the Independent Electricity System Operator (IESO) responses to recommendation #13) will establish effective governance ensuring that security practices are being built-in to the IESO's project management program and individual IT project lifecycles. The IESO will also be developing a best practice guide for the sector on cybersecurity risks in the supply chain. This would be applicable to the vendor supply chain that delivers industrial control system hardware, software, and computing and networking services associated with not only the bulk system operations, but traditional enterprise environments. The best practice guide is expected to be in place by the end of 2018.
AG Recommendation #16 <i>To reduce the cybersecurity risk of the Independent Electricity System Operator (IESO), we recommend that the IESO procure technology that prevents and identifies breaches of confidential information and monitors</i>	<u>2017 Annual Report – Response:</u> The IESO agrees with the Auditor General's recommendation. The IESO complies with all applicable North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection standards, which include standards for cybersecurity. The IESO has procured technology that prevents and identifies breaches of confidential information and monitors staff access to confidential information in real time through the Advanced Malware project, and is	The Independent Electricity System Operator (IESO) is currently making minor refinements to the Advanced Malware system, and project closure is planned for the end of Q1 2018.

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<i>staff access to confidential information in real time.</i>	implementing that technology now, with a target completion date of the end of the fourth quarter of the 2017 fiscal year. <u>Status Update:</u> The Independent Electricity System Operator (IESO) has procured robust detection technology that has the ability to not only identify unusual activity that could lead to breaches of confidential information, but also malicious activity that could compromise the integrity of the IESO IT environments. Through the delivery of the Advanced Malware project, the detection technology is now in place, and in addition, all objectives identified in the business case for the project were met in 2017.	
AG Recommendation #17 <i>To reduce the cybersecurity risk of the Independent Electricity System Operator (IESO), we recommend that:</i> • <i>the IESO establish an external vendor cybersecurity policy; and</i> • <i>the cybersecurity team conduct a regular assessment of the security risk that external vendors pose to the IESO.</i>	<u>2017 Annual Report – Response:</u> The IESO complies with all applicable North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection standards, which include standards for cybersecurity. The cybersecurity team works directly with the procurement and legal processes to ensure security requirements are met. The IESO was an active participant in the development of the NERC Supply Chain risk standards, and is in the process of developing and implementing supply chain risk management measures to comply with these standards, which will also include processes that are responsive to the recommendation. <u>Status Update:</u> On an ongoing basis, the Independent Electricity System Operator's	The Independent Electricity System Operator (IESO) is in the process of developing and implementing supply chain risk management measures that comply with North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection Supply Chain risk standards, which will also include processes that are responsive to the recommendation. The IESO is expanding its cybersecurity governance framework over the next two to three years to meet the National Institute of Standards and Technology (NIST) Cybersecurity framework that will help assess and mitigate vendor risks to the supply chain. This framework will establish effective security governance around external vendors. The plan associated with this will be developed by the end of 2018.

**Summary Status Table in Response to the
Report of the Auditor General of Ontario**

*Chapter 3 2017 Annual Report of the Auditor General – IESO – Market Oversight and Cybersecurity
Ministry of Energy, IESO, OEB*

Auditor's Recommendation	Completed Undertaking	Outstanding Undertaking (including Timeline)
	(IESO) cybersecurity team works directly with the procurement and legal processes to ensure security requirements are met.	As identified, the IESO will also be developing a best practice guide for the sector on cybersecurity risks in the supply chain; the guide is expected to be in place by the end of 2018.
AG Recommendation #18 <i>To ensure that backup tapes are adequately protected and available when needed, we recommend that the Independent Electricity System Operator (IESO):</i> <i>properly encrypt all backup tapes; and</i> <i>store them in a secure off-site location.</i>	<u>2017 Annual Report – Response:</u> The IESO complies with all applicable North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection standards, which include standards for cybersecurity. Access to backup tapes is tightly controlled both in on-site and off-site storage. The IESO will investigate the feasibility of storing all backup tapes off-site and of further protecting backup tapes with encryption. The IESO does not rely on backup tapes as a primary recovery mechanism as all of our critical systems are high availability and site redundant through our Backup Data Centre. <u>Status Update:</u> The Independent Electricity System Operator (IESO) has eliminated the use of tape-based backups in favour of system and data redundancy across two highly available and redundant data centers.	The Independent Electricity System Operator (IESO) will continue investigating the feasibility of storing all legacy backup tapes off-site and to further protection of legacy backup tapes with encryption.