

Chapter 1

Ministry of Energy

Section 1.06

Independent Electricity System Operator— Market Oversight and Cybersecurity

Follow-Up on VFM Section 3.06, 2017 Annual Report

RECOMMENDATION STATUS OVERVIEW						
	# of Actions Recommended	Status of Actions Recommended				
		Fully Implemented	In the Process of Being Implemented	Little or No Progress	Will Not Be Implemented	No Longer Applicable
Recommendation 1	2		1	1		
Recommendation 2	1		1			
Recommendation 3	1		1			
Recommendation 4	1		1			
Recommendation 5	1	1				
Recommendation 6	1		1			
Recommendation 7	1		1			
Recommendation 8	3	2				1
Recommendation 9	2	2				
Recommendation 10	1		1			
Recommendation 11	1	1				
Recommendation 12	1	1				
Recommendation 13	1	1				
Recommendation 14	1	1				
Recommendation 15	1	1				
Recommendation 16	1	1				
Recommendation 17	2	1	1			
Recommendation 18	2					2
Total	24	12	8	1	0	3
%	100	50	33	4	0	13

Overall Conclusion

The Independent Electricity System Operator (IESO), the Ministry of Energy, and the Ontario Energy Board (OEB), as of August 31, 2019, have fully implemented 50% of actions we recommended in our *2017 Annual Report*. The Ministry, the IESO, and the OEB have made progress in implementing an additional 33% of the recommendations.

The IESO has fully implemented recommendations such as:

- providing 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;
- creating a senior-level position for cybersecurity and establishing a formal reporting process to both IESO executives and the IESO Board of Directors; and
- replacing the Oversight Division's computer system.

The IESO has made little progress on only one recommendation, which involves using its authority to amend a market rule immediately when recommendations are put forward by the OEB Panel.

The status of actions taken on each of our recommendations is described in this report.

Background

Ontario's electricity market determines the wholesale (market) price of electricity, which is one of the two components of the electricity charge on ratepayers' electricity bills. The other component is the "global adjustment," which in 2018 made up about 79% of the electricity charge (85% in 2016).

The Independent Electricity System Operator (IESO) administers the market, in which generators offer to supply electricity at prices to recover their

marginal costs for producing electricity, and large consumers and out-of-province electricity importers indicate how much electricity they are willing to consume and at what price.

Overseeing the market is a surveillance panel working for the Ontario Energy Board (OEB Panel), which monitors the market, and investigates and reports on ways that the market is vulnerable to being inappropriately manipulated by market participants because of weaknesses and flaws in its design. Also overseeing the market is a division of the IESO (IESO Oversight Division), which is responsible for monitoring, investigating and fining market participants that may be breaking market rules. The IESO is responsible for fixing weaknesses and flaws in market design; however, the Ontario Energy Board has the authority to revoke changes to the market rules and refer them back to the IESO for further consideration if the Ontario Energy Board considers that the changes are inconsistent with the purposes of the *Electricity Act, 1998*, or unjustly discriminate against or in favour of one or more market participants.

Among our findings:

- The OEB Panel had been effective in monitoring and reporting inappropriate market conduct, and recommending that the IESO fix problems with market design. However, the Ontario Energy Board itself could have done more to protect ratepayers' interests by requesting the IESO to further review and reconsider a market rule change to address the OEB Panel's repeated recommendations to fix certain weaknesses and flaws in the design of Ontario's electricity market.
- One program that the OEB Panel had recommended for years that the IESO scale back continued to pay gas generators an average of about \$30 million more per year than necessary. In addition, nine gas and coal generators claimed as much as \$260 million in ineligible costs under this program between 2006 and 2015. The IESO had recovered about two-thirds of this amount.

- There was little representation of ratepayers' interests on the working group that was helping to determine the future design of the electricity market through the IESO's Market Renewal Initiative. Some members of this group had been, or were being, investigated for benefitting financially from existing market design problems.
- According to the OEB Panel and our own review, the process at the IESO to change market rules was influenced by gas generators and others that had a direct and substantial financial interest in the current market design.
- Three investigations by the IESO's oversight division between 2015 and 2017 uncovered significant problems resulting in over \$30 million in fines and settlement recoveries, yet this division had limited resources and lacked explicitly legislated investigative powers to do more and timelier work.
- The government had several times broadened industry participation in the Industrial Conservation Initiative (ICI), a program that allows industrial ratepayers to reduce their electricity charges by shifting their global-adjustment costs to residential and small-business ratepayers. The OEB Panel reported that the ICI's impact in its first 10 months (it was launched in January 2011) was a reduction in the global-adjustment charges of about 65 large industrial ratepayers of about \$245 million, which was added to the electricity bills of residential and small-business ratepayers. Since the initial launch, the ICI was further expanded three times (in July 2015, January 2017 and July 2017), shifting an even more significant amount of the global-adjustment charge from large industrial ratepayers to residential and small-business ratepayers. Before the initiative launched in January 2011, all ratepayers were paying about 7 cents per kilowatt hour (cents/kWh). After six-and-a-half years (as

of June 2017), residential and small-business payers were paying 12 cents/kWh and large industrial ratepayers were paying 6 cents/kWh for the commodity cost of electricity.

We also audited how well the IESO protected its critical IT assets and infrastructure, and found the IESO's cybersecurity system complied with power grid reliability standards. However, the IESO could be better equipped to defend itself from an advanced cyberattack should one occur.

We made 18 recommendations, consisting of 24 action items, to address our audit findings.

Status of Actions Taken on Recommendations

We conducted assurance work between February 5, 2019 and August 31, 2019. We obtained written representation from the Ministry of Energy, the Independent Electricity System Operator, and the Ontario Energy Board that effective September 27, 2019, they had provided us with a complete update of the status of the recommendations we made in the original audit two years ago.

The IESO and Ontario Energy Board Could Have Done More to Support the OEB Panel's Recommendations

Recommendation 1

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 Independent Electricity System Operator (IESO):

- *implement the OEB Panel's recommendations in an effective and timely way; and*

- where the OEB Panel submits a report to the IESO 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.

Status: In the process of being implemented by March 2023.

Details

In our 2017 audit, we found that the IESO had not always taken all the steps it could to meaningfully implement the OEB Panel's numerous recommendations for the Standby Cost Recovery and the Lost Profit Recovery programs. For example, in 2010, 2011, 2014, 2015 and 2016, the OEB Panel questioned if the Standby Cost Recovery Program needed to be retained, recommending that the program be reviewed, reassessed, justified and scaled back. This program paid gas generators about \$60 million per year to cover some of the costs incurred while on standby to produce electricity. If the IESO eliminated the reimbursement of certain operating and maintenance costs, the OEB Panel estimated the cost of the program would be reduced by approximately \$30 million annually. Also, in almost all of its 28 reports, released between 2002 and 2017, the OEB Panel expressed concerns about, or recommended changes to the Lost Profit Recovery Program. According to the OEB Panel, weaknesses in this program had allowed market participants to offer or bid prices into the market, not based on actual costs or electricity supply needs, but for the sole purpose of getting payments from the program. The program had paid market participants about \$110 million per year, on average.

In our follow-up, we found that since we issued our report in December 2017, the OEB Panel had made four recommendations to the IESO on the Lost Profit Recovery Program in two of its electricity market monitoring reports released on March 22, 2018 and April 29, 2019. The IESO had responded to the OEB with steps that it planned

to take in response to three out of the four recommendations and the timelines for completion of those steps. At the time of our follow-up, the IESO was in the process of implementing the three recommendations.

The fourth recommendation, which the IESO does not intend to implement, relates to how payments from the Lost Profit Recovery Program are calculated. The IESO expressed concern that this recommendation could result in a reduction in the effectiveness of this program and could also raise ratepayer costs. The IESO plans to address this recommendation through the Market Renewal Program, scheduled for implementation by March 2023.

- where the OEB Panel submits a report to the IESO 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.

Status: Little or no progress.

Details

During our follow-up, we found that the IESO had not received a recommendation from the OEB Panel that specifically identified the misuse, abuse, or possible abuse of market power since the issuance of our report in December 2017. As a result, the IESO had not yet used its authority to amend a market rule immediately and submit it to the Ontario Energy Board for its review.

Recommendation 2

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 the fact that it does not address the OEB 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.

Status: In the process of being implemented upon completion of the Ministry of Energy, Northern Development and Mines' stakeholder consultation.

Details

In our 2017 audit, we found that the Ontario Energy Board had never revoked a market rule change approved by the IESO Board, despite the fact that the OEB Panel had made a number of recommendations in its reports highlighting the misuse and abuse of market rules.

In our follow-up, we found that since we issued our report in December 2017, the IESO had filed 15 market rule amendments with the OEB under *Section 33 of the Electricity Act, 1998 (Act)*.

The OEB did not revoke any of these rule amendments and refer them back to the IESO for further consideration. The OEB told us that it exercises its mandate within the parameters set out in the Act, and that it would use its legislative authority to revoke a market rule amendment and refer it back to the IESO if it finds that the amendment is inconsistent with the purposes of the Act, or unjustly discriminates against, or in favour of a market participant or class of market participants. In our follow-up, we found that the Ministry was assessing the current electricity market oversight structure, including the role and powers of the OEB under the Act.

On May 9, 2019, legislative amendments to the *Ontario Energy Board Act, 1998* were passed as part of the *Fixing the Hydro Mess Act, 2019*. These amendments enable reform of the OEB's governance structure, and seek to promote stronger governance and accountability. As of August 31, 2019, the Ministry was developing options for OEB reform for the government's consideration. This included examining the role and authority of the

OEB in the market rule amendment process. The Ministry has indicated it will be in a position to provide more information with respect to the timing once the results of ongoing stakeholder consultations are available.

Recommendation 3

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) in a timely manner.

Status: In the process of being implemented upon completion of stakeholder consultation.

Details

We found in our 2017 audit that the Ontario Energy Board could not order the IESO to make specific changes to market rules, even if the OEB Panel brought forward evidence of misuse and abuse of a market rule. Under the *Electricity Act, 1998*, the IESO must give the Ontario Energy Board an assessment of the impact on ratepayers for any approved changes to market rules before the IESO implements them. The Ontario Energy Board has the authority to revoke changes to market rules and send them back to the IESO for further consideration. The IESO is not required to make changes or re-approve market rules revoked by the Ontario Energy Board.

In our follow-up, we found that the Ministry's review of the OEB's legislative authority was ongoing in consultation with both the OEB and the IESO. The Ministry planned to continue assessing the current market oversight structure, including the role and powers of the OEB under the *Electricity Act, 1998*.

On May 9, 2019, legislative amendments to the *Ontario Energy Board Act, 1998* were passed as part of the *Fixing the Hydro Mess Act, 2019*. The amendments enable reform of the OEB's governance structure, and seek to promote stronger governance and accountability. At the time of our follow-up, the Ministry was developing options for OEB reform for the government's consideration. This included examining the role and authority of the OEB in the market rule amendment process. The Ministry was unable to tell us when it expected to complete this work, as that was dependent on the results of ongoing stakeholder consultation.

Government Not Transparent about the Effect of Expanding the Industrial Conservation Initiative

Recommendation 4

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.

Status: In the process of being implemented upon completion of stakeholder consultation.

Details

We found in our 2017 audit that more global adjustment charges had been shifted to residential and small-business ratepayers as a result of the Industrial Conservation Initiative. In 2011, shortly after the program was launched, the OEB Panel reported that electricity prices continued to decrease for eligible industrial ratepayers while over the same time period, electricity prices for residential and small-business ratepayers almost doubled. In 2017, the government significantly lowered the eligibility threshold for the Initiative as part of the Fair Hydro Plan. This resulted in many more industrial and business ratepayers becoming eligible to participate in the program.

In our follow-up, we found that the Ministry had announced an industrial electricity pricing

consultation in its 2018 Fall Economic Statement. As part of this consultation, the Ministry would be assessing the Industrial Conservation Initiative and its impacts on low-consuming ratepayers, and would consider alternate rate structures. On April 1, 2019, the Ministry launched the consultation, and stakeholders had until June 14, 2019 to submit their written input online. The Ministry completed its consultation in the summer 2019, and has begun to develop policy options. The results would inform the future of the program. The Ministry advised us that the timing of any public report was not yet known, as it would depend on the scope of stakeholder comments submitted through the consultation, and the results of ongoing analysis of industrial electricity pricing policy.

The IESO Continues to Administer the Standby Cost Recovery Program Despite Reasons Not To

Recommendation 5

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.

Status: Fully implemented.

Details

We found in our 2017 audit that the IESO was continuing to use the Standby Cost Recovery Program to reimburse gas and coal generators with their fuel costs and operating and maintenance costs, despite a number of concerns raised by the OEB Panel. The program pays generators for costs to start and run their equipment while on standby to supply electricity. The panel reported that the electricity supplied by gas generators under the program in 2014 cost \$61 million for generating less than 1% of the hours of electricity needed to meet Ontario's

demand. The panel was also concerned that the program was being overused at a time when Ontario regularly had surplus power, and was a net exporter of electricity. The IESO had yet to provide any detailed analysis to the panel to justify the need for the program.

In our follow-up, we found that the IESO provided a rationale to the panel on April 5, 2018 to support the assertion that the Standby Cost Recovery Program was necessary to ensure a reliable supply of electricity for Ontarians. The IESO explained that having generators readily available ensured electricity demand was met without reducing electricity grid reliability. If they could not recover their costs, generators would not have any incentive to be available. As a result, the IESO might have to purchase electricity on emergency basis at a much higher cost. However, the IESO did acknowledge that generally, it agreed with most of the underlying issues raised in the panel's reports. The IESO intended to replace the Standby Cost Recovery Program with a new more cost-effective program by March 2023, three-and-a-half years from now.

Recommendation 6

To ensure that ratepayers are not charged for unnecessary costs, we recommend that, if the Independent Electricity System Operator (IESO) does not cancel the Standby Cost Recovery Program, it fully implement the Ontario Energy Board Market Surveillance Panel's (OEB Panel) recommendations and not reimburse generators for operating and maintenance costs under the Program.

Status: In the process of being implemented by March 2023.

Details

We found in our 2017 audit that the maintenance and operating costs reimbursed to gas and coal generators through the Standby Cost Recovery Program was reducing the incentive for these generators to operate more efficiently by managing costs. Costs associated with the program are directly passed on to ratepayers. In 2015, the OEB

Panel reported that ratepayers would save about \$30 million annually if the program stopped reimbursing gas generators for certain maintenance and operating costs. The IESO Oversight Division also identified that almost \$260 million in potentially ineligible claims for costs out of about \$600 million total were paid out to gas and coal generators under the program. The IESO did not implement the panel's recommendations and as a result, the program continued to reimburse gas generators for their maintenance and operating costs.

In our follow-up, we found that the IESO continued to use the Standby Cost Recovery Program. It reported that the program was necessary to maintain a reliable power system, and to ensure compliance with North American Electric Reliability Corporation standards. Cancelling the program would result in more frequent instances where the IESO could be required to purchase electricity on emergency basis at a much higher cost. The IESO plans to eliminate the Standby Cost Recovery Program through the Market Renewal Program by March 2023.

The IESO Continues to Pay Market Participants under the Lost Profit Recovery Program without Addressing the Program's Flaws and Weaknesses

Recommendation 7

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.

Status: In the process of being implemented by March 2023.

Details

We found in our 2017 audit that the OEB Panel had made recommendations in almost all of its 28

reports for the IESO to fix the rules flaws that allow market participants to claim artificial losses under the Lost Profit Recovery Program. The OEB Panel reported that as of the end of 2015, about \$500 million of the \$1.5 billion program total was paid to market participants in northwestern Ontario. The generators in this region represent less than 5% of Ontario's generation capacity, and electricity demand for the region has fallen. The concern was that the market participants involved may be submitting market bids and offers to create the conditions under which they could claim lost profits that they may not have incurred.

In our follow-up, we found that the IESO would be making changes through the Market Renewal Program that included eliminating the need to make payments under the Lost Profit Recovery Program. The Market Renewal Program would introduce a single-schedule market where market prices will reflect the true costs of producing and consuming electricity at a given place and time. This would eliminate the need to reimburse generators for lost profits. The IESO expects to implement these changes by March 2023.

Market Participants Benefiting from Market Flaws Are Involved in Changing Market Rules and Market Design

Recommendation 8

To ensure that the Market Renewal Initiative (Initiative) considers and protects all ratepayers' interests, we recommend that the Independent Electricity System Operator (IESO):

- *immediately prohibit representatives from companies that have been found by the Ontario Energy Board Market Surveillance Panel or the IESO Oversight Division to have misused IESO programs from participating in the Initiative working group;*

Status: Fully implemented.

Details

We found in our 2017 audit that the working group leading the Market Renewal Initiative, formed to address known issues with the current market design, were representing companies found by the OEB Panel and/or the IESO Oversight Division to have misused market rules. Specifically, the OEB Panel found that Goreway Power Station had claimed ineligible or fabricated costs under the Standby Cost Recovery Program totalling \$89 million. Goreway also took advantage of the Lost Profit Recovery Program. A substantial portion of the \$11 million in total that Goreway received through the program were for lost profits that had not been incurred. We also noted that the representation of consumers in the working group was weighted in favour of high-volume electricity consumers, as opposed to medium- and low-volume electricity consumers.

In our follow-up, we found that in December 2017, a member representing low-volume consumers was added to the Market Renewal Working Group. In addition, Goreway, then co-chairing the Working Group, was removed from the Initiative altogether. The Working Group's work was completed in February 2019, and it was officially disbanded when the focus of the Market Renewal Program moved on to a detailed design phase.

- *establish a minimum number of working group members representing low-power consumers and ensure that those positions are always filled;*

Status: No longer applicable.

Details

At the time the Market Renewal Working Group was disbanded in February 2019, eight of the 21 members were consumer representatives.

- *publicly report in clear language how the results of the Initiative will be in the best interests of all ratepayers.*

Status: Fully implemented.

Details

In our follow-up, we found that the IESO had hosted education and awareness sessions in fall 2018 to broaden the awareness and understanding of the Market Renewal Program with low-volume consumers. The sessions were intended to introduce the core concepts and impact of the program and provide a practical understanding for this audience. The IESO's Stakeholder Advisory Committee, which included consumer representatives, was also provided with frequent updates on the program. In April 2019, the IESO launched a new website allowing the public to access all Market Renewal Program information. Language used on the website was less technical and clearly described how the Market Renewal Program would benefit Ontarians.

The IESO Oversight Division's Ability to Uncover Significant Rule Violations Is Limited

Recommendation 9

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:

- *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;*

Status: Fully implemented.

Details

We found in our 2017 audit that that the IESO Oversight Division had five potential major rule violations out of a total of 78 that required large-scale investigations. However, only one investigation was underway. Four others were suspended because of a lack of resources. The IESO Oversight Division receives information from the IESO about suspicious or unusual market activity that could signal rule

violations. The division also conducts investigations, and if there is a violation, warns or fines the guilty party. From 2015 to 2017, the division uncovered repeated non-compliance that resulted in total fines or settlements exceeding \$30 million. As of June 2017, the division also had a backlog of 43 investigations for minor breaches of market rules. We also found that only 60% of staff positions in the division were filled, and the average staff turnover had been almost 30% per year since 2012.

In our follow-up, we found that since our audit, the division had filled 19 positions and converted six contract staff into regular full-time staff. As of August 31, 2019, the division had 43 full-time staff, compared to 24 full-time staff at the time of our 2017 audit. The investigation phase of the suspected major rule violations we found during our audit were either fully resolved or in the adjudication, penalty or dispute stage. While the backlog of suspected violations could not fully been eliminated because potential market rule breaches arise continuously, the division was monitoring for these compliance issues daily, and was using risk-based analysis to determine earlier whether a matter should advance to the investigation phase.

- *attract and retain staff with experience in market rules and expertise in investigation.*

Status: Fully implemented.

Details

In our follow-up, we found that since the time of our audit, the IESO Oversight Division had been able to attract and retain 19 new staff with experience in market rules and investigations. All new staff had various levels of expertise, with knowledge of market rules, experience with investigations, or both. The division was able to attract three new senior staff with significant experience.

Recommendation 10

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 authority under the *Electricity Act* to compel information and evidence in the course of its investigations.

Status: In the process of being implemented.

Details

We found in our 2017 audit that the IESO Oversight Division had no explicit legislative authority to compel the subjects of its investigations to provide information. This meant that there was no way of ensuring that its investigations uncovered complete information about rule violations committed by market participants that could result in more appropriate penalties for those violations. In contrast, the *Electricity Act, 1998* empowered the OEB Panel to compel the subjects of its investigations to provide information. This meant that the panel could obtain complete evidence to determine the full extent of market participants' behaviour. However, the panel was not empowered to sanction or fine the market participants its investigations. It could refer matters to the IESO Oversight Division.

In our follow-up, we found that the Ministry's work to assess the allocation of roles, responsibilities and powers within Ontario's market oversight structure was ongoing as part of the Ministry's plan to reform the OEB's structure, discussed in **Recommendation 3**. As the OEB Panel and the IESO Oversight Division both played a role in investigations into market participant behaviour, the Ministry was developing options for an effective allocation of investigatory powers. These options would take into account the upcoming structural changes underway to reform the OEB's governance structure in amendments made to the *Ontario Energy Board Act, 1998*. The Ministry was working with the IESO to identify any required improvements to the oversight structure, including the potential need for additional authority for the IESO Oversight Division, and would continue to develop options for consideration. The Ministry was not able to tell us when it expected to complete this work.

Recommendation 11

To ensure that the Independent Electricity System Operator Market Assessment and Compliance Division (Oversight Division) can conduct proper oversight of the market, we recommend that the Independent Electricity System Operator replace the Oversight Division's computer system as soon as possible.

Status: Fully implemented.

Details

We found in our 2017 audit that the IESO Oversight Division used a computer system developed in 2003 that no longer supported their oversight activities. The system lacked the basic functions needed to analyze trends in the information it contained, was prone to freezing, and staff were unable to enter fines issued to generators if the fine amounts were more than five digits. In the absence of a sufficiently functional computer system, division staff manually tracked and analyzed some market activity information in spreadsheets. But due to lack of resources, these spreadsheets were not always updated and the updates, entered manually, were prone to errors.

In our follow-up, we found that the Oversight Division had procured a new computer system to support its enforcement work. The new system was installed in December 2017, and had been used since then to support all market enforcement investigations.

Oversight Division Not Independent of the IESO

Recommendation 12

To strengthen independence of the Independent Electricity System Operator Market Assessment and Compliance Division (Oversight Division), we recommend that the Independent Electricity System Operator change the Oversight Division's reporting structure.

Status: Fully implemented.

Details

We found in our 2017 audit that the IESO Oversight Division was not fully independent from the IESO, because the IESO's senior management was involved in the division's activities and operations. For example, we found that senior management was involved in negotiating a settlement with a generator to recover ineligible overpayments found in audits of the Standby Cost Recovery Program. The IESO's CEO was responsible for approving the division's budgets and approving any budget increases. The division was empowered to investigate not only market participants for rule violations, but also the IESO itself. This made it critical for the division to operate independently of the IESO.

In our follow-up, we found that on December 6, 2017, the IESO Board of Directors passed a resolution that changed the IESO Oversight Division's reporting structure. The division now reports directly to the Human Resources and Governance Committee of the IESO Board. This committee is now also responsible for the Oversight Division Director's performance evaluation.

The IESO Lacks Dedicated Cybersecurity Resources

Recommendation 13

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.

Status: Fully implemented.

Details

We found in our 2017 audit that the IESO did not have a designated senior executive responsible for cybersecurity. Comparable organizations that follow best practices such as Hydro One, and grid operators in New York, New England, and California, had a dedicated senior executive solely responsible for reporting cybersecurity matters to senior executives and the Board of Directors.

In our follow-up, we found that the IESO had created and filled a Chief Information Officer (CIO) role in March 2018. The CIO reports directly to the IESO CEO and provides a strategic cybersecurity update to the IESO Board of Directors twice a year.

Recommendation 14

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.

Status: Fully implemented.

Details

We found in our 2017 audit that the IESO had four cybersecurity staff, and that this complement had not increased in the past decade. However, over this same period, IESO staff had almost doubled in number, and cyberattacks had become more sophisticated and frequent. Two external consultants, who conducted reviews of the IESO's IT environment in 2015 and 2016, both recommended that the IESO should have at least seven dedicated cybersecurity staff.

In our follow-up, we found that the IESO had increased the total number of staff allocated to the cybersecurity team to eight in 2018, and had plans to add an additional three positions in late 2019, for a total of 11. In June 2018, the IESO also retained the services of an external cybersecurity service provider for 24/7 operational cybersecurity support.

Recommendation 15

To reduce cybersecurity risk and to prevent potential costly IT project redesigns, we recommend that the IT department of the Independent Electricity Sector Operator (IESO) involve its cybersecurity staff in the early stages of all IT projects that could pose cybersecurity risks.

Status: Fully implemented.

Details

We found in our 2017 audit that the IESO did not have an independent cybersecurity department with clearly defined roles and responsibilities. This would ensure that security is at the forefront of all IT project planning, reducing cybersecurity risks. IT project managers are responsible for deciding whether and when to involve cybersecurity staff in IT planning. We found that in a number of instances, project managers involved cybersecurity staff only in the later stages of a project. This increased the risk that the IESO could be more vulnerable to an attack if something was missed, or that costly redesigns would be necessary when cybersecurity staff identified an issue at a late stage of a project.

In our follow-up, we found that the IESO had involved its cybersecurity staff in 25 IT security projects since we issued our report. At the beginning of a project, the project manager uses a checklist to plan for appropriate cybersecurity actions. The checklist involves completing a cybersecurity risk assessment including an initial vulnerability scan to be performed on new hardware, software, and cloud services, for example. From the list of 25 projects, we selected and reviewed documentation for three projects and found that IT security staff were engaged to ensure that the new IT systems or solutions deployed met information security standards.

No Centralized Control and Monitoring of User Access

Recommendation 16

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 staff access to confidential information in real time.

Status: Fully implemented.

Details

We found in our 2017 audit that the IESO's cybersecurity staff did not monitor the real-time activities

of privileged IT users that would allow them to trigger alerts for unusual behaviour. About 14% of IESO employees had privileged-user access, meaning that they had almost unrestricted freedom to access any part of the computer system or network. Privileged users could abuse their authority and hack a system, or a hacker could try to steal the privileged user's log-in credentials and use them to launch a cyberattack.

In our follow-up, we found that in January 2018, the IESO upgraded its cybersecurity systems. The IESO is now able to monitor the activities of privileged users in real time for any unusual behaviour, which would trigger an alert.

No Cybersecurity Policy for External Vendors

Recommendation 17

To reduce the cybersecurity risk of the Independent Electricity System Operator (IESO), we recommend that:

- *the IESO establish an external vendor cybersecurity policy;*

Status: Fully implemented.

Details

We found in our 2017 audit that the IESO did not have a strong, uniform policy that required external vendors providing specialized IT services to maintain high security standards with IESO log-in credentials. This increased the risk of log-in credentials being stolen and used by hackers to attempt a cyberattack. Also, the cybersecurity staff did not review contracts or assess the security risk of external vendors on an ongoing basis.

In our follow-up, we found that in August 2019, the IESO has established a new external vendor cybersecurity policy and began conducting formal security risk evaluations, which includes review of log-in credentials.

- *the cybersecurity team conduct a regular assessment of the security risk that external vendors pose to the IESO.*

Status: In the process of being implemented by December 2021.

Details

In our follow-up, we found that the IESO began conducting a regular assessment of the security risk that external vendors pose to it. In February 2019, the IESO started a security assessment of its cloud vendors and told us that it plans to conduct a security risk assessment of all other types of external vendors by December 2021.

Backup Tapes Not Adequately Protected

Recommendation 18

To ensure that backup tapes are adequately protected and available when needed, we recommend that the Independent Electricity System Operator (IESO):

- *properly encrypt all backup tapes; and*
- *store them in a secure off-site location.*

Status: No longer applicable.

Details

We found in our 2017 audit that the IESO's storage policies for its system backup information could be improved. The backup tapes the IESO used to store system backup information were not encrypted. This meant that anyone accessing the tapes could access the information. Also, some backup tapes were stored onsite. If the IESO's location were to sustain physical damage, the tapes could be damaged. As a result, it would take the IESO longer to recover from a potential attack or natural disaster.

In our follow-up, we found that the IESO no longer used tapes to back up its data. Instead, the IESO transmitted all system backup information through a dedicated secured connection to an off-site secured storage.