B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 001

Reference:

Exhibit B-1-1, SPF Section 1.6, Page 18

Interrogatory:

With respect to Customer Satisfaction Research, Hydro One undertakes annual Large Transmission Customer survey. Large Transmission Customer survey are to measure the level of customer satisfaction, and to monitor Hydro One's performance in four dimensions of satisfaction among customers: Price, Customer Service, Product Quality/Reliability and Relationship. This research is conducted by independent expert customer research firms.

Please provide the Large Transmission Customer survey for the years 2017 to date.

Response:

The Large Transmission Customer Satisfaction Report of Findings for the years 2017 to 2020 are provided as Attachments 1-4.

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Customer Experience

Large TX Customer Satisfaction Report of Findings

November 28, 2017

Table of Contents

Technical Vocabulary Glossary

Throughout the survey, Northstar has presented data graphically, using arrows to represent statistical differences in data, and has crafted recommendations and key insights using technical research terminology. Below is a glossary of terminology and symbols used throughout the report.

- T2B / T4B – The top two box score (on a 5 point scale), or top four box score (on a 10 point scale) is compared throughout the report as a means of streamlining analysis.
- Arrows have been used to distinguish results which are statistically or directionally significant.
  -  Findings which are statistically higher or lower (calculated at a 90% confidence level) between years.
  -  Findings which are statistically higher or lower (calculated at an 80% confidence level) between years.
- Circles have been used to distinguish results which are statistically or directionally significant between customer groups.
  -  Findings which are statistically higher (calculated at a 90% confidence level) between customer groups.
  -  Findings which are statistically lower (calculated at a 80% confidence level) between customer groups.

Executive Summary

Survey Overview: Tx CSAT

- **Survey Objectives** – To measure key drivers of satisfaction among LTX customers and monitor Hydro One's performance in key service areas.
- **Survey Type** – Measures customers' opinion of the company as a whole (whether they have interacted with Hydro One recently or not). It seeks to uncover perceptions of how well the company is meeting customer expectations and delivering on critical success factors.
- **In-field Dates** – The 2017 Large TX research project was carried out by Northstar and our field partner – Decision Point Research. In 2017, only one wave was conducted for LTX, as opposed to two waves in previous years. Additionally, the survey was condensed this wave – only including questions 2, 10, 18, 19B, 24, 24B, 25, 26, 38 and 39. Field dates for the Large TX study changed in 2017. This wave included Hydro One sending the initial email invitation to all 183 Large TX customers on September 11, 2017. Telephone interviews started on September 18th. E-mail reminders were sent by Hydro One on September 28, with field closing on October 20.
- **Method of Communication** –All interviewing was conducted via telephone followed by computer-assisted telephone interviewing if customer prefers/is not reached.
- **Response Rate** – Of the 183 names provided, 3 had been disconnected / removed, resulting in a sample size of 180. 111 customers answered at least one foundational scorecard question, resulting in a survey response rate of 62% (vs. 64% in 2016).
- **Surveyed Segment** – the below table outlines the surveyed customer types & survey sample size. Please note that two non-responders were undefined in the sample.

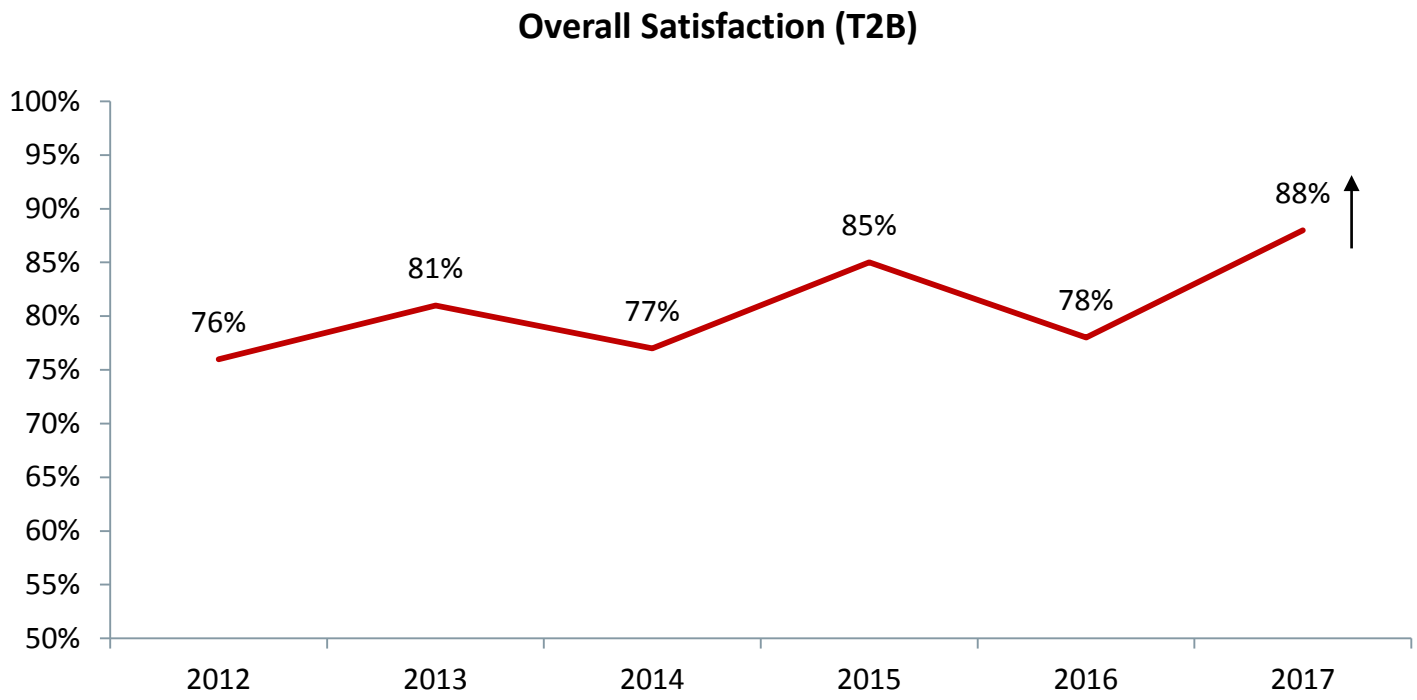
Segment Size	End Users	LDCs	Generators
Total Population Size*	59	66	58
Surveyed (N Value)	29	47	35

*Note: Total Population Size represent the total number of records provided in the sample.

Overall Satisfaction – Survey Results (All Tx)

The survey question reads:

"Overall, how satisfied are you with Hydro One? Would you say you are…?"



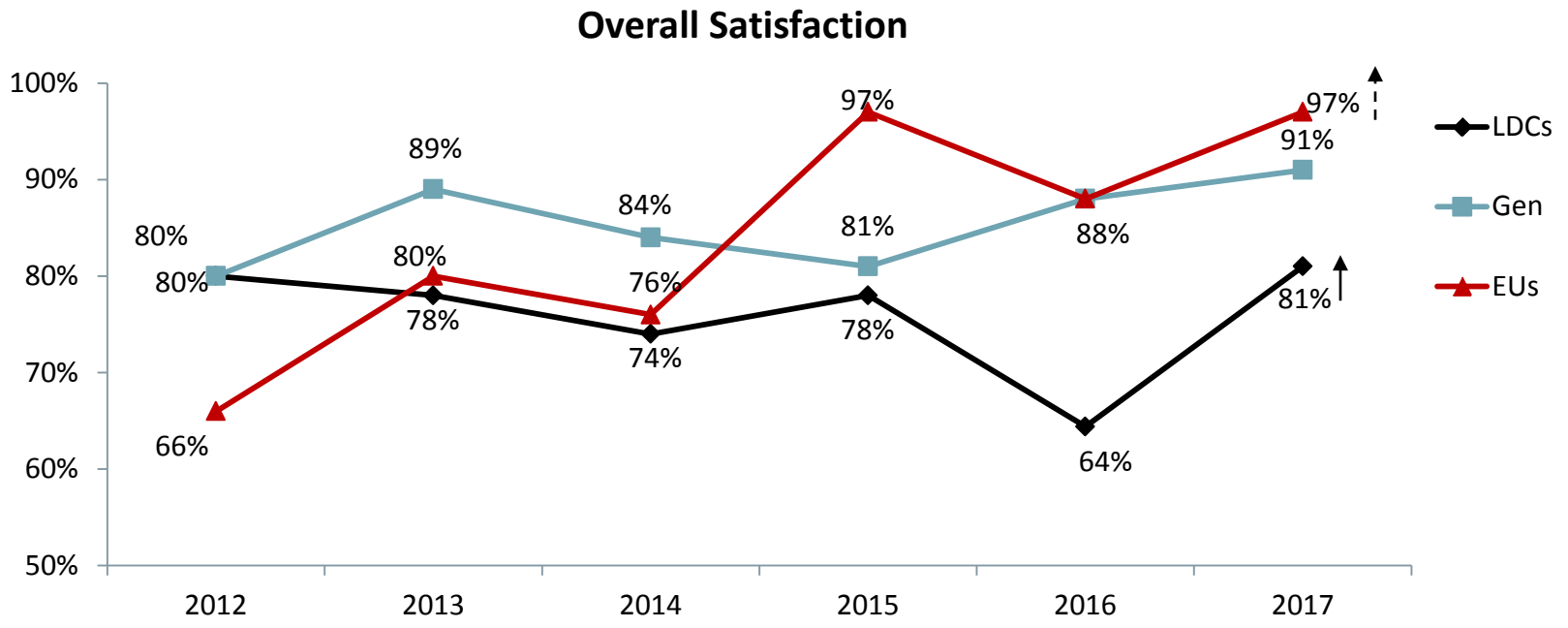
Key Insights

- *Overall satisfaction with Hydro One has increased 10 points over the previous year, with levels at the highest since tracking began in 2012.*

Overall Satisfaction – Survey Results (By Segment)

The survey question reads:

"Overall, how satisfied are you with Hydro One? Would you say you are…?"



Key Insights

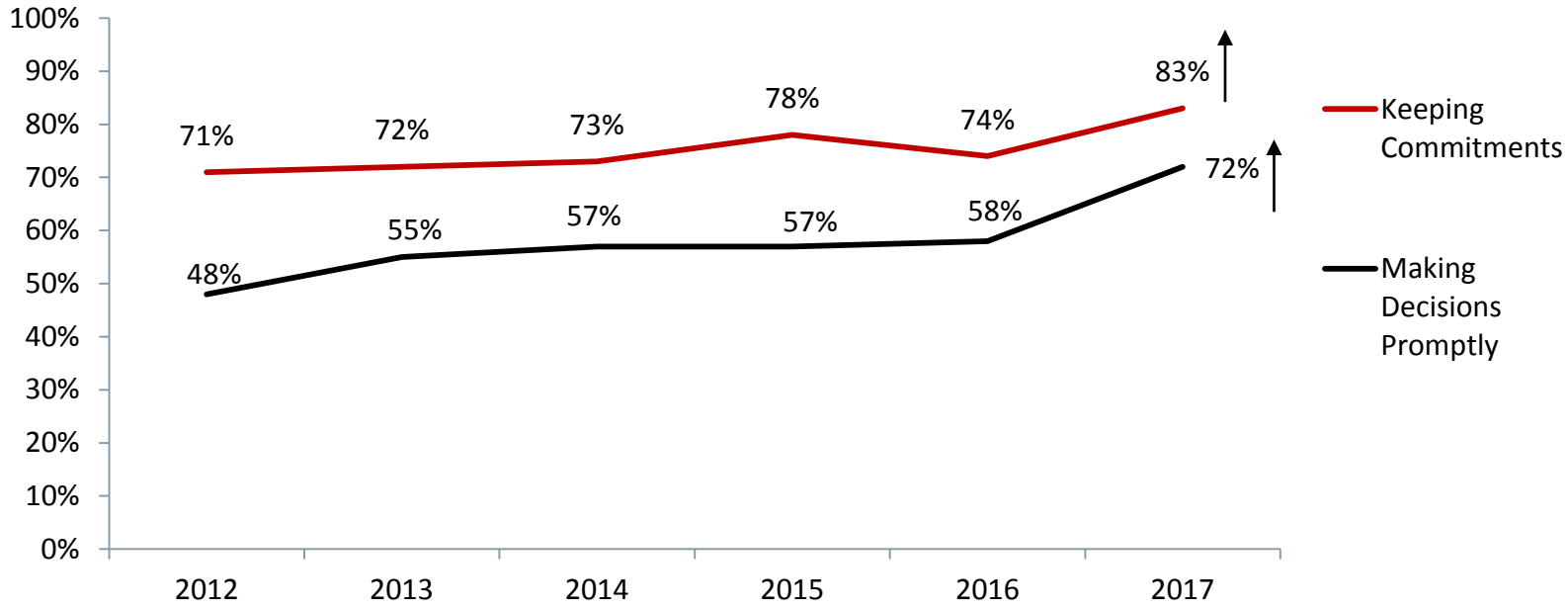
- *The increase in overall satisfaction score can be largely attributed to LDC customers, who show a significant (+17, 81%) increase in satisfaction, reversing the 14 point decline in satisfaction in 2016.*
- *End User customers show a directional increase of 9 points.*
- *Satisfaction for all three customer groups is at its highest since tracking started.*

Scorecard Metrics – Survey Results (All Tx)

The survey questions read:

"How would you rate Hydro One on the following specific attributes… Keeping Commitments and Making Decisions Promptly?"

Keeping Commitments & Making Decisions Promptly (T4B)



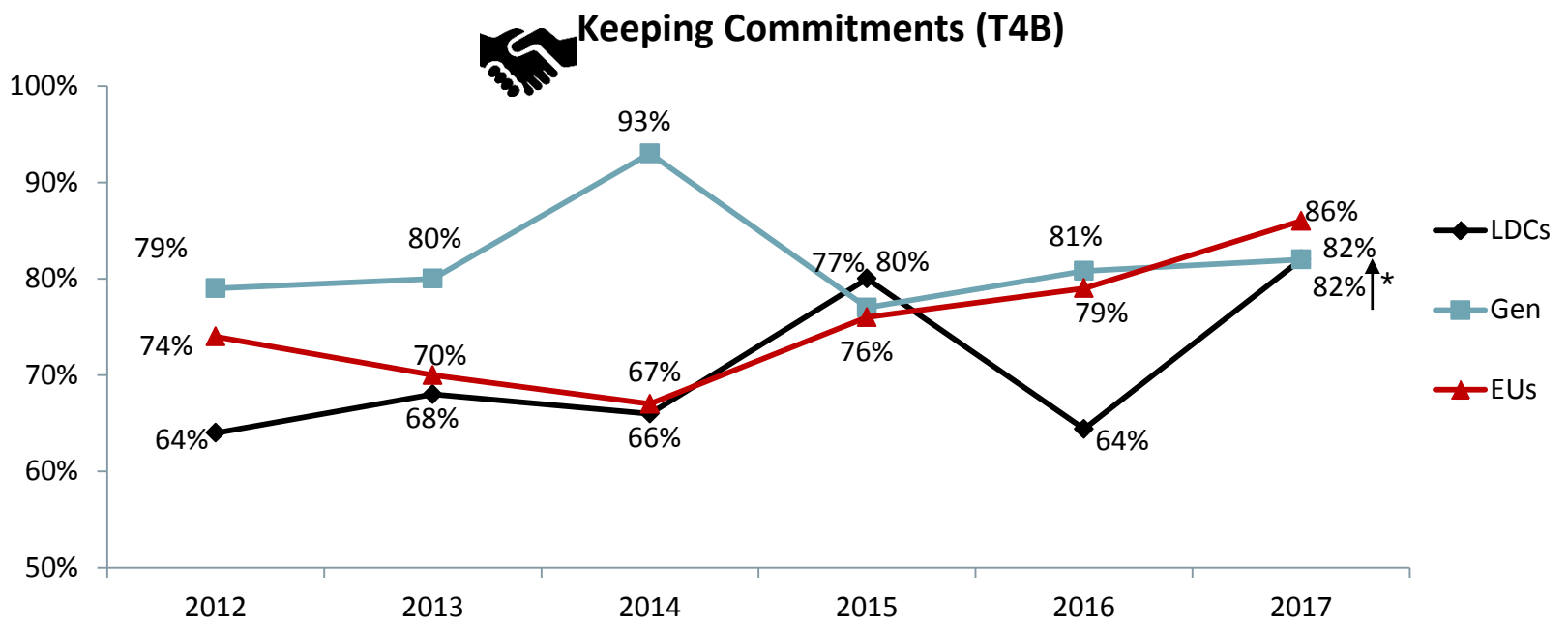
Key Insights

- *Hydro One's performance on both these foundational attributes is now at its highest since tracking began.*
- *Hydro One's ability to make decisions promptly shows a significant 14 point increase over the last year, and its ability to keep commitments shows a significant 9 point increase over the same period.*

Keeping Commitments – Survey Results (By Segment)

The survey question reads:

"How would you rate Hydro One on the following specific attributes… Keeping Commitments?"



Key Insights

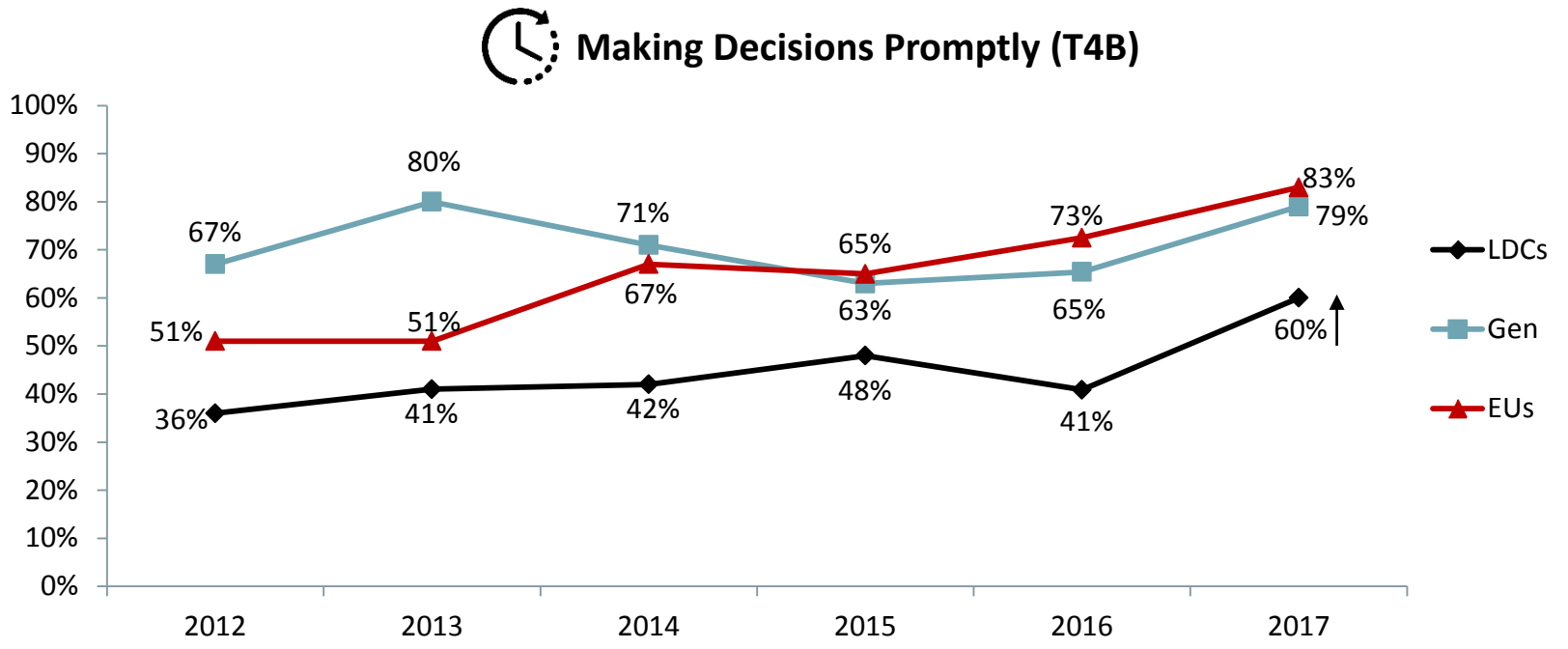
- *Generator customers have historically shown the highest level of satisfaction regarding Hydro One's focus on keeping commitments.*
- *LDCs show a significant 18 point increase in satisfaction regarding Hydro One's focus on keeping commitments, reaching the highest point seen since tracking began.*
- *End Users continue their upward movement, with satisfaction at its highest since tracking began.*

***Note:** the arrow in the graph only refers to a significant increase in Keeping Commitments for LDCs.*

Making Decisions Promptly – Survey Results (By Segment)

The survey question reads:

"How would you rate Hydro One on the following specific attributes… Making Decisions Promptly?"



Key Insights

- *LDC customers provided significantly higher ratings for Hydro One's ability to make decisions promptly.*
- *Both End Users and Generators show an increase in satisfaction with Hydro One's ability to make decisions promptly over the last year.*

Survey Findings

Key Findings	Impacted Segment

- **The overall Large TX customer score is 86%, with overall satisfaction at 88%. Both these are at their highest since tracking began, underscoring Hydro One's initiative to improve relations with all three subgroups.**

  The increase in overall satisfaction can be largely attributed to LDCs (+17, 81%) and End User customers (+9, 97%). Both show a reversal of the previous year's negative shift, with satisfaction ratings climbing back to their highest points since tracking began.

  Generator customers continue to show consistent satisfaction with Hydro One, with satisfaction ratings rising steadily over the past few waves.

- **Both scorecard metrics show significant improvement over the previous year.**

  LDC customer ratings of Hydro One are at their highest over time, with a significant increase in satisfaction with HON Keeping Commitments (82%) and Making Decisions Promptly (60%). The latter metric marks one of the largest score improvements this wave.

  Consistent with 2016, Generators continue to identify product and planning issues (outage planning, infrastructure upgrades) as key areas for HON to address in order to increase satisfaction.

- **Large TX customers are satisfied with their most recent contact experience with their Account Executive.**
  - Generators rate increasing satisfaction with their Account Executive (+12, 97%) while LDCs and End Users show dwindling levels of satisfaction.
  - The Ability to Access HON has decreased this wave. End Users and LDCs provide perfect scores for Easy to Reach [HON] during Unplanned Outages with any questions or concerns.

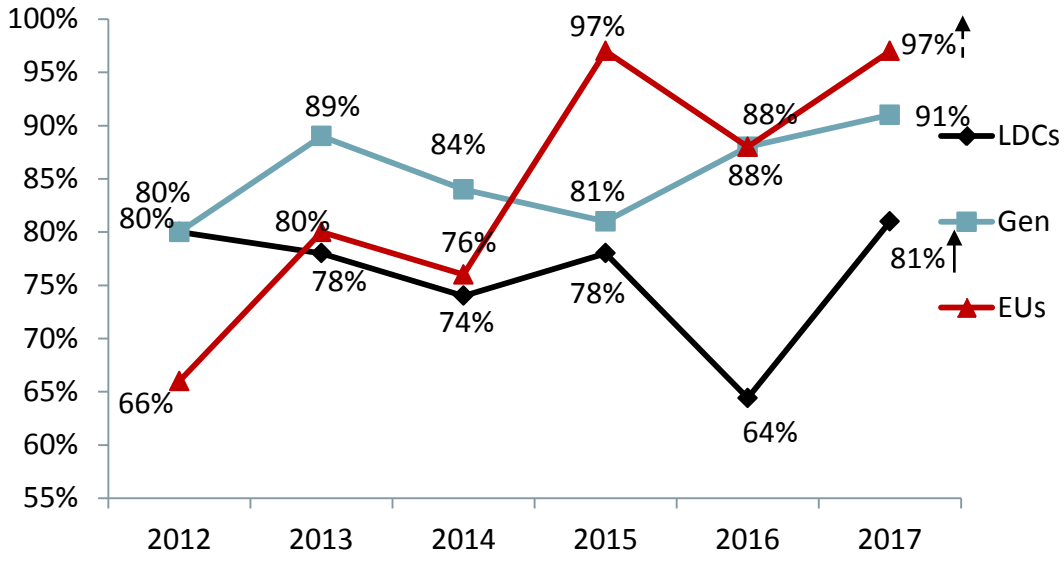
LDC
End Users
Generators

Survey Result Details

Performance Highlights: Overall Satisfaction

All subgroups show higher overall satisfaction this wave, contributing to the highest overall satisfaction scores since tracking began.

Overall Satisfaction (T2B)



Satisfaction Level	2012 (n=145)	2013 (n=137)	2014 (n=128)	2015 (n=116)	2016 (n=111)	2017 (n=111)
Very Satisfied/ Somewhat Satisfied	EU: 66% LDC: 80% Gen: 80%	EU: 80% LDC: 78% Gen: 89%	EU: 76% LDC: 74% Gen: 84%	EU: 97% LDC: 78% Gen: 81%	EU: 88% LDC: 64% Gen: 88%	EU: 97% LDC: 81% Gen: 91%
Neutral	EU: 14% LDC: 15% Gen: 15%	EU: 11% LDC: 7% Gen: 6%	EU: 9% LDC: 14% Gen: 6%	EU: - LDC: 14% Gen: 6%	EU: 3% LDC: 18% Gen: 8%	EU: - LDC: 9% Gen: 3%
Somewhat Dissatisfied/ Very Dissatisfied	EU: 21% LDC: 5% Gen: 5%	EU: 9% LDC: 16% Gen: 6%	EU: 15% LDC: 12% Gen: 9%	EU: 3% LDC: 8% Gen: 13%	EU: 10% LDC: 18% Gen: 4%	EU: 3% LDC: 11% Gen: 6%

*Q2. Overall, how satisfied are you with Hydro One? Would you say you are…? **[5 Point]***

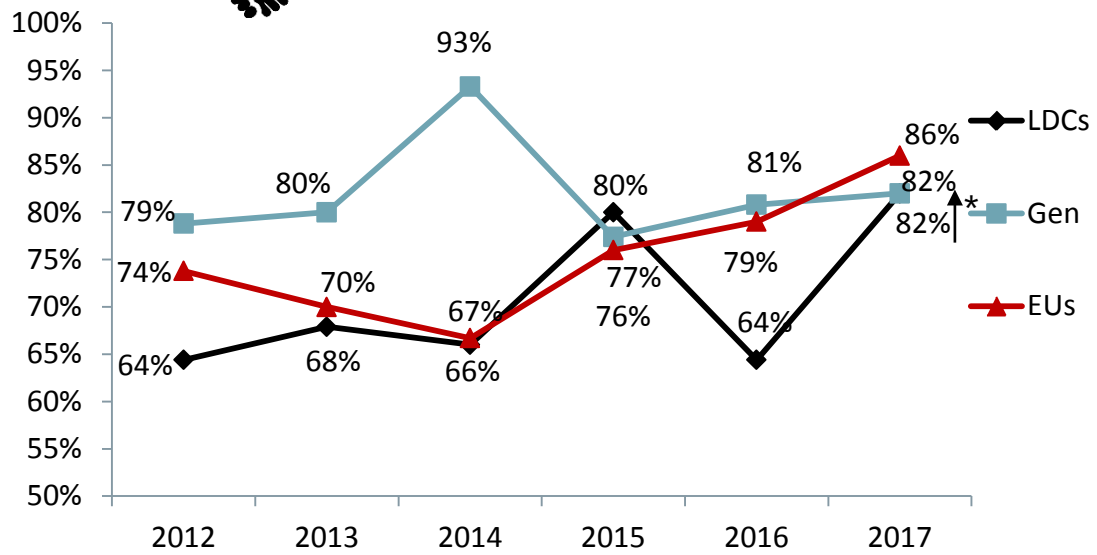
Key Insights

- *End Users have the highest satisfaction levels of all the consumer groups, as shown by the directional 9 point increase in overall levels.*
- *Generators have provided a 3 point rise in satisfaction levels.*
- *LDC customers have shown a significant increase in overall satisfaction, reaching their highest point since tracking began and showing significant improvement since 2016.*
- *Please see Technical Appendix for detailed list on customers providing highest and lowest scores, along with non-responder list.*

Performance Highlights: Keeping Commitments

86% of End Users are satisfied with Hydro One's ability to keep commitments, the highest of any customer segment. There has been a significant increase (18 point) among LDCs this wave.

Keeping Commitments (T4B)



Satisfaction Level	2012 (n=134)	2013 (n=128)	2014 (n=116)	2015 (n=115)	2016 (n=110)	2017 (n=108)
T4B	EU: 74% LDC: 64% Gen: 79%	EU: 70% LDC: 68% Gen: 80%	EU: 67% LDC: 66% Gen: 93%	EU: 76% LDC: 80% Gen: 77%	EU: 79% LDC: 64% Gen: 81%	EU: 86% LDC: 82%↑ Gen: 82%
Neutral	EU: 10% LDC: 27% Gen: 9%	EU: 23% LDC: 19% Gen: 14%	EU: 22% LDC: 26% Gen: 3%	EU: 18% LDC: 6% Gen: 16%	EU: 13% LDC: 20% Gen: 12%	EU: 7% LDC: 13% Gen: 12%
B4B	EU: 17% LDC: 9% Gen: 12%	EU: 8% LDC: 13% Gen: 6%	EU: 11% LDC: 8% Gen: 3%	EU: 6% LDC: 14% Gen: 7%	EU: 8% LDC: 16% Gen: 8%	EU: 7% LDC: 4%↓ Gen: 6%

Key Insights

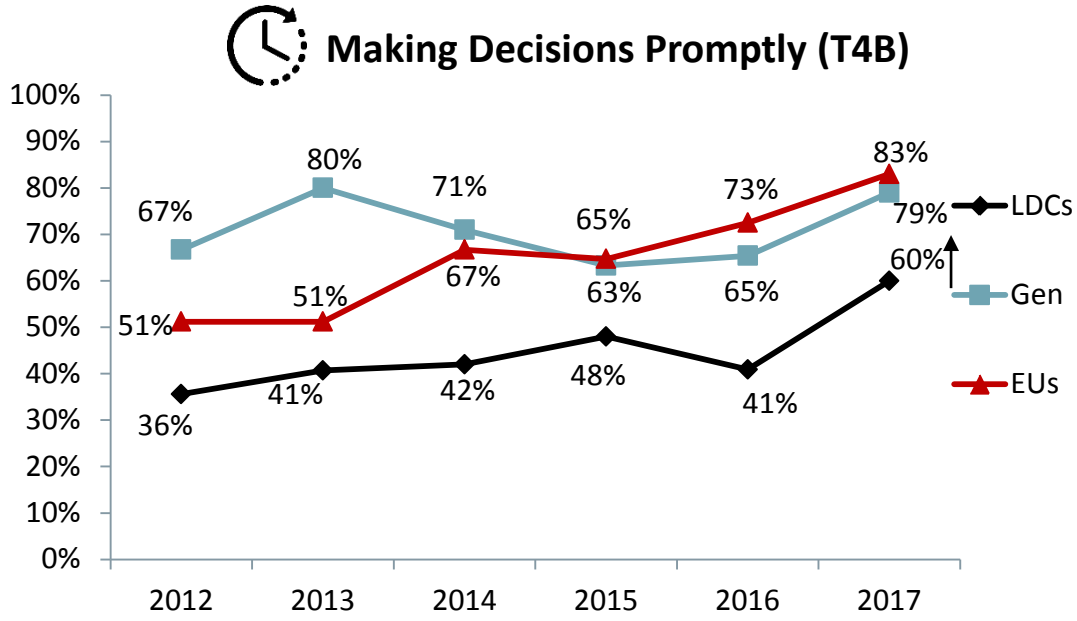
- *End Users continue to note rising levels of satisfaction, and are at their highest since tracking began.*
- *LDCs show a significant incline, rising 18 points to reach their highest point. At 4%, LDCs have the lowest dissatisfaction levels.*
- *Generators continue to be satisfied with Hydro One, with scores on par with last year.*
- *Please see Technical Appendix for detailed list on customers providing highest and lowers scores, along with non-responder list.*

***Note:** the arrow in the graph only refers to a significant increase in Keeping Commitments for LDCs.*

*Q10.A How would you rate HYDRO ONE on the following specific attributes? Please use a 1 to 10 scale, where a **1** means you **disagree completely**, and a **10** means you **agree completely**. You may use a 1, a 10 or any number in between to rate each statement. Keeping Commitments. **[10 point]***

Performance Highlights: Making Decisions Promptly

LDCs and EUs provide their highest scores since tracking began for scores for Hydro One's ability to make decisions promptly. Satisfaction for Generators is now on par with 2013 scores.



Satisfaction Level	2012 (n=133)	2013 (n=130)	2014 (n=117)	2015 (n=114)	2016 (n=110)	2017 (n=108)
T4B	EU: 51% LDC: 36% Gen: 67%	EU: 51% LDC: 41% Gen: 80%	EU: 67% LDC: 42% Gen: 71%	EU: 65% LDC: 48% Gen: 63%	EU: 73% LDC: 41% Gen: 65%	EU: 83% LDC: 60% Gen: 79%
Neutral	EU: 34% LDC: 29% Gen: 15%	EU: 34% LDC: 30% Gen: 9%	EU: 19% LDC: 34% Gen: 26%	EU: 26% LDC: 34% Gen: 17%	EU: 10% LDC: 27% Gen: 27%	EU: 14% LDC: 29% Gen: 12%
B4B	EU: 15% LDC: 36% Gen: 18%	EU: 15% LDC: 30% Gen: 11%	EU: 14% LDC: 24% Gen: 3%	EU: 9% LDC: 18% Gen: 20%	EU: 18% LDC: 32% Gen: 8%	EU: 3% LDC: 11% Gen: 9%

Key Insights

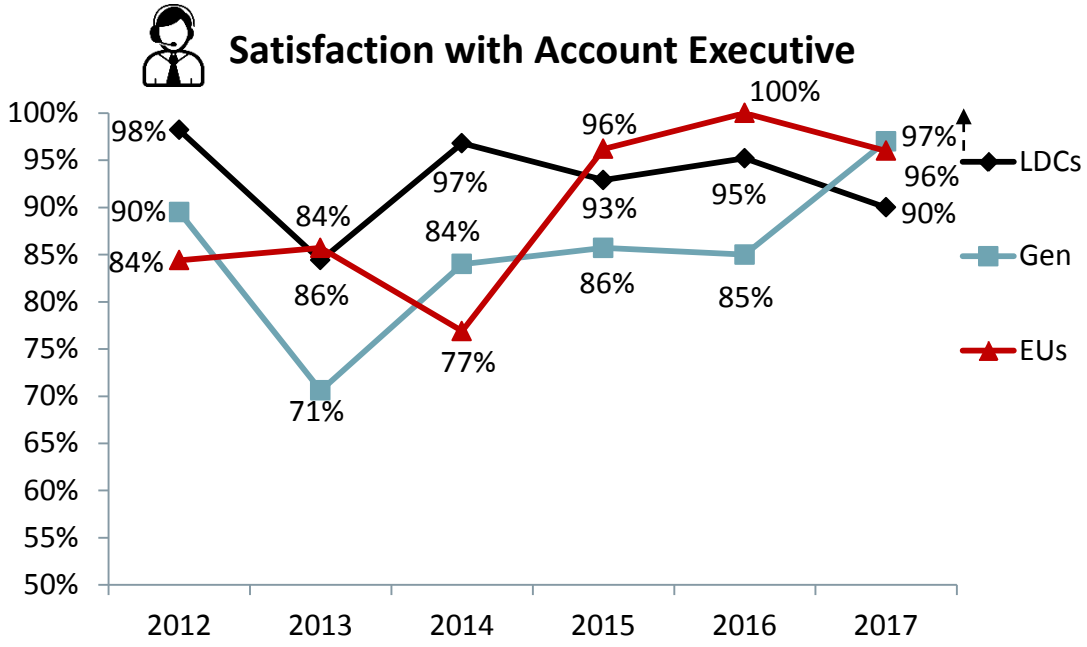
- *This year, End Users are the highest rating customer segment, showing a 10 point increase in satisfaction, along with a significant 15 point decrease in dissatisfaction relative to decision making.*
- *Generator customers show a 14 point positive shift in satisfaction.*
- *LDC customer satisfaction has significantly increased by 19 points this year, with a significant 21 point decrease in the number of those dissatisfied.*

- *Please see Technical Appendix for detailed list on customers providing highest and lowers scores, along with non-responder list.*

*Q10.M How would you rate Hydro One on the following specific attributes? Please use a 1 to 10 scale, where a **1** means you **disagree completely**, and a **10** means you **agree completely**. You may use a 1, a 10 or any number in between to rate each statement. Making decisions promptly. **[10 point]***

Performance Highlights: Satisfaction with Account Executive

Across all segments, customers are satisfied with their most recent contact experience with their Account Executive.



Satisfaction Level	2012 (n=107)	2013 (n=84)	2014 (n=82)	2015 (n=96)	2016 (n=99)	2017 (n=100)
Very Satisfied/ Somewhat Satisfied	EU: 84% LDC: 98% Gen: 90%	EU: 86% LDC: 84% Gen: 71%	EU: 77% LDC: 97% Gen: 84%	EU: 96% LDC: 93% Gen: 86%	EU: 100% LDC: 95% Gen: 85%	EU: 96% LDC: 90% Gen: 97%
Neutral	EU: 13% LDC: 2% Gen: 11%	EU: 9% LDC: 0% Gen: 24%	EU: 8% LDC: 3% Gen: 12%	EU: 4% LDC: 2% Gen: -	EU: - LDC: - Gen: 15%	EU: 4% LDC: 7% Gen: -
Somewhat Dissatisfied/ Very Dissatisfied	EU: 3% LDC: 0% Gen: 0%	EU: 3% LDC: 13% Gen: 6%	EU: 12% LDC: - Gen: 4%	EU: - LDC: 5% Gen: 14%	EU: - LDC: 5% Gen: 3%	EU: - LDC: 2% Gen: 3%

Key Insights

- *Scores for Generators increased directionally by 12 points, now at their highest level since tracking began.*
- *End Users show a 4 point decrease in satisfaction with their contact experience with the Account Executive.*
- *LDCs evidence a 5 point drop in satisfaction with the AE, but remain statistically on par with the previous wave.*

Q24. How satisfied are you with your most recent contact experience with your Account Executive? ***[5 point]***

Performance Highlights: Main Issue to Address to Meet Business Needs

The main issue for Hydro One to address is customer service, followed by outage planning and responsiveness.

Main Issue	Total (n=32)	End User (n=6)	LDC (n=13)	Generator (n=13)
Customer service/Customer oriented	31%	33%	38%	23%
Outage planning/outage notifications	28%	-	8%	62%
Responsiveness/follow up/timely response	22%	33%	23%	15%
Times lines/ deadlines	9%	17%	8%	8%
Slow service	9%	17%	15%	-
Cost/cost effectiveness	9%	33%	8%	-
Difficult to locate the right contact to make decision	9%	-	15%	8%
Attitude Fair/Flexible	9%	-	8%	15%
Reliability/line maintenance/restoration time	6%	17%	-	8%
Communications/proactive phone calls/accessibility	3%	-	8%	-
Agreements/Administrative decisions/Operational decisions	3%	-	-	8%
Load transfers	-	-	-	-
Switching	-	-	-	-
Other	3%	17%	-	-
No issues / Nothing	3%	-	8%	-

Key Insights

- *Generator customers focus on outage planning/notification concerns.*
- *End Users are most concerned with customer service, responsiveness and cost.*
- *LDC customers are experiencing issues surrounding customer relations and responsiveness. This was the only subgroup to also report "no issues."*

Q10P2. What is the main need or issue that HYDRO ONE could address to support your business needs?

Performance Highlights: Overall Satisfaction of "3" or lower – Customer Scores

Among the 9 customers rating their overall satisfaction score a 3 or below, no company requested their answers to be withheld from HON. Opportunities present itself around key metrics such as flexibility as an organization overall, and AE having the authority to make decisions. Of the 9 customers, 7 are LDC customers and 2 are Generator customers.

Company*	Type	Largest Decreases	Lowest Results
Brantford Power Inc.	LDC	• *Q2 Overall satisfaction (-2, 40%)* • *Q18 Ability to access HON (-2, 40%)*	• *Q2 Overall satisfaction (40%, 5 point)* • *Q10M Making decisions promptly (60%, 10 point)* • *Q18 Ability to access HON (40%, 5 point)*
Essex Power Corporation	LDC	• *Q2 Overall satisfaction (-1, 20%)* • *Q18 Ability to access HON (-1, 60%)*	• *Q2 Overall satisfaction (20%, 5 point)* • *Q10A Keeping commitments (30%, 10 point)* • *Q10M Making decisions promptly (30%, 10 point)*
Kruger Energy Port Alma Limited Partnership	Generator	• *Q10A Keeping commitments (-4, 30%)* • *Q24 AE contact experience (-3, 40%)*	• *Q10A Keeping commitments (30%, 10 point)*
Lakeland Power Distribution Ltd.	LDC	• *Q2 Overall satisfaction (-1, 40%)*	• *Q2 Overall satisfaction (40%, 5 point)* • *Q10M Making decisions promptly (70%, 10 point)*

**Please note that above list includes companies willing to share responses with Hydro One.*

Performance Highlights: Overall Satisfaction of "3" or lower – Customer Scores

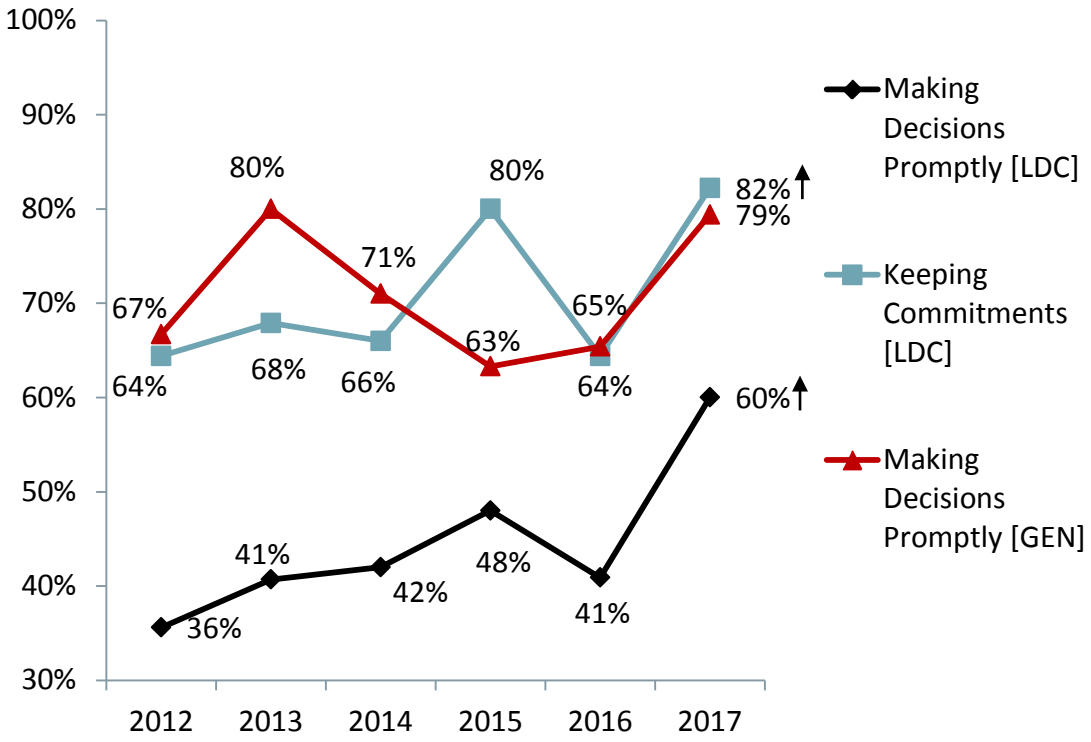
Company*	Type	Largest Decreases	Lowest Results
Alectra Utilities Corporation - Enersource Hydro Mississauga Inc.	LDC		• *Q2 Overall satisfaction (60%, 5 point)* • *Q10A Keeping commitments (70%, 10 point)* • *Q10M Making decisions promptly (70%, 10 point)*
Alectra Utilities Corporation - PowerStream Inc.	LDC		• *Q2 Overall satisfaction (60%, 5 point)* • *Q10A Keeping commitments (40%, 10 point)* • *Q10M Making decisions promptly (40%, 10 point)*
Brookfield Renewable Power - Wawa Operations.	GENERATOR		• *Q2 Overall satisfaction (40%, 5 point)* • *Q10A Keeping commitments (30%, 10 point)* • *Q18 Ability to access HON (40%, 5 point)*
Orangeville Hydro Ltd.	LDC	• *Q2 Overall satisfaction (-2, 20%)* • *Q10M Making decisions promptly (-4, 20%)*	• *Q2 Overall satisfaction (20%, 5 point)* • *Q10A Keeping commitments (50%, 10 point)* • *Q10M Making decisions promptly (20%, 10 point)*
Orillia Power Distribution Corp.	LDC	• *Q18 Ability to access HON (-4, 20%)* • *Q24 AE contact experience (-4, 20%)*	• *Q2 Overall satisfaction (20%, 5 point)* • *Q18 Ability to access HON (20%, 5 point)* • *Q24 AE contact experience (20%, 5 point)*

**Please note that above list includes companies willing to share responses with Hydro One.*

Key Movers: Largest Improvements (Increases)

LDCs account for the two largest improvements seen in the survey, with the sharpest increases of 19% and 18% for Hydro One's ability to make decisions promptly and to keep commitments respectively.

Largest Result Increases



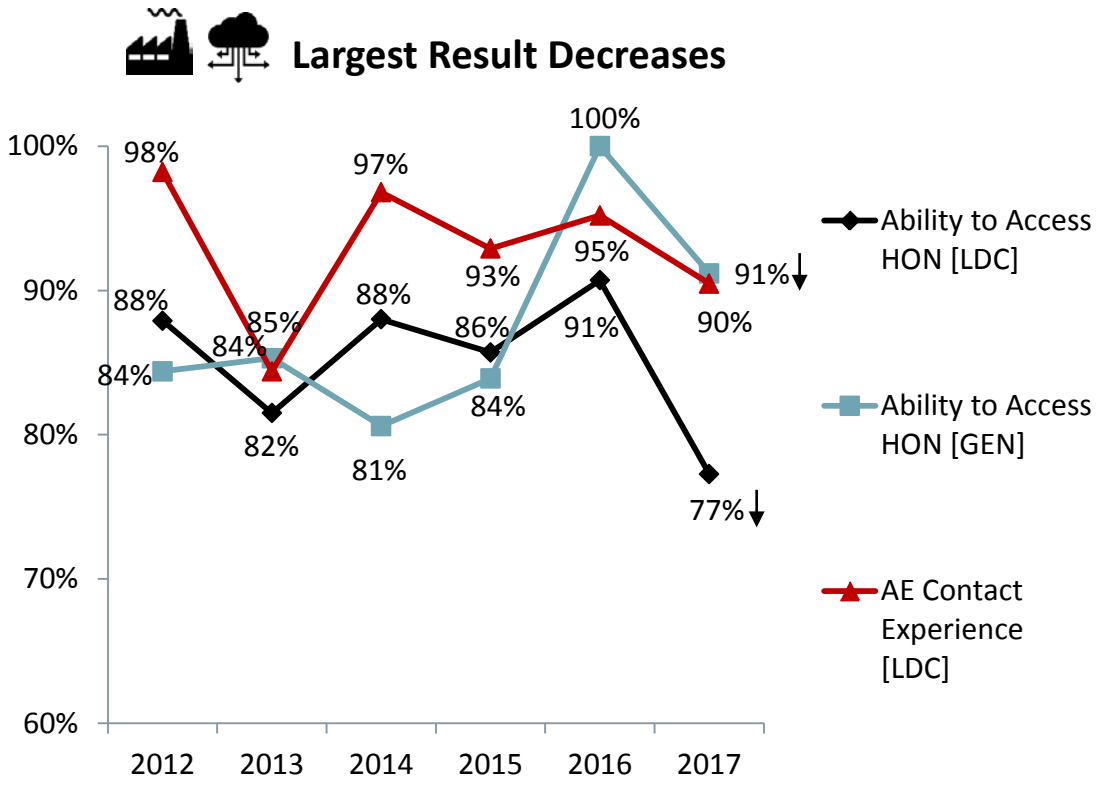
Key Insights

- *The largest increases are seen around Hydro One's ability to make decisions promptly and to keep commitments for LDC customers.*
- *Hydro One appears to be developing a better sense of the LDC business. These satisfaction metrics help drive this group's positive view of Hydro One.*
- *Although not significant, we witness a 14 point increase in HON's ability to make decisions promptly for the Generators.*

*Q10.A How would you rate HYDRO ONE on the following specific attributes? Please use a 1 to 10 scale, where a **1** means you **disagree completely**, and a **10** means you **agree completely**. You may use a 1, a 10 or any number in between to rate each statement. Keeping Commitments. **[10 point]***
*Q10.M How would you rate HYDRO ONE on the following specific attributes? Please use a 1 to 10 scale, where a **1** means you **disagree completely**, and a **10** means you **agree completely**. You may use a 1, a 10 or any number in between to rate each statement. Making Decisions Promptly. **[10 point]***

Key Movers: Largest Declines (Decreases)

The largest decreases are attributable to customer difficulty accessing Hydro One to discuss questions or problems and for LDCs, their most recent contact with an Account Executive.



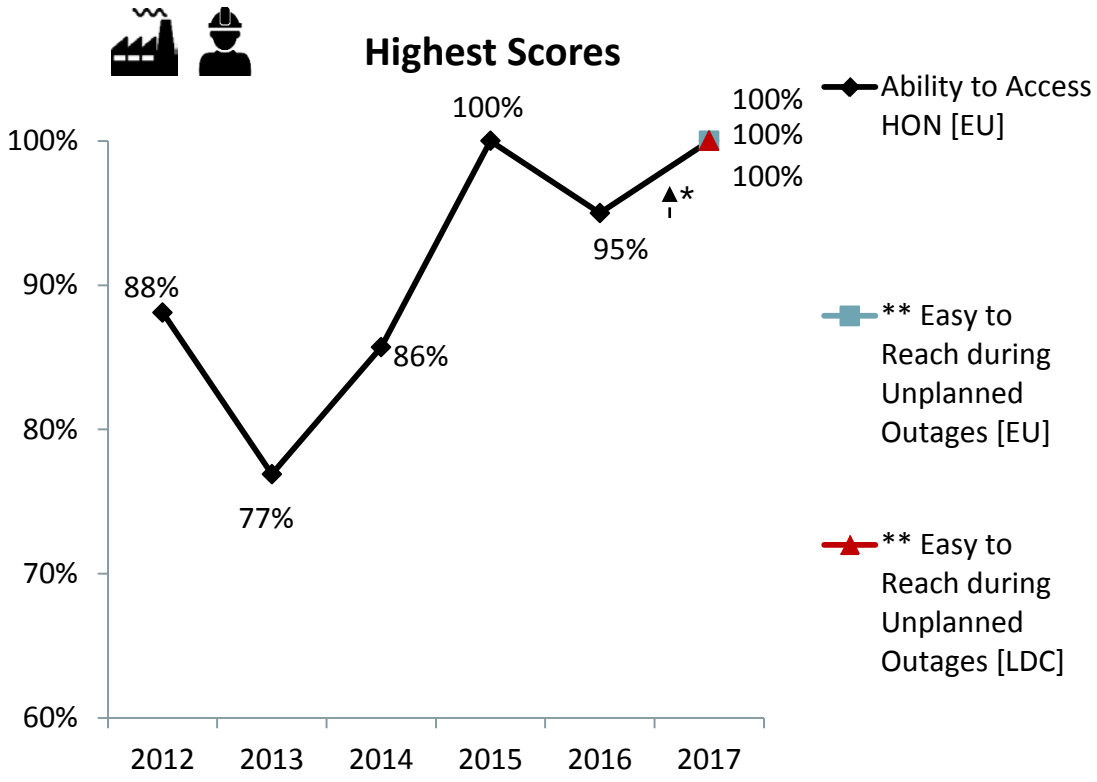
Key Insights

- *LDCs express a significant 14 point drop in satisfaction with their ability to access Hydro One.*
- *The second largest decline also relates to the metric above, with a significant 9 point drop for Generators.*
- *Further, LDC customers are also less satisfied with their most recent contact experience with their Account Executive.*

Q18 Thinking now about your ability to access Hydro One to discuss your questions or problems either over the phone or through a representative, are you very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, or very dissatisfied? ***[5 point]***
*Q24 How satisfied are you with your most recent contact experience with your Account Executive? **[5 point]***
*Note: Percentages represent scores of 4 and 5 on 5-point scale questions

Performance Highlights: Strengths (Highest Scores)

Both LDCs and EUs provide a perfect score, finding HON easy to reach during unplanned outages. Furthermore, EU customers are fully satisfied with their ability to access HON with queries.



Key Insights

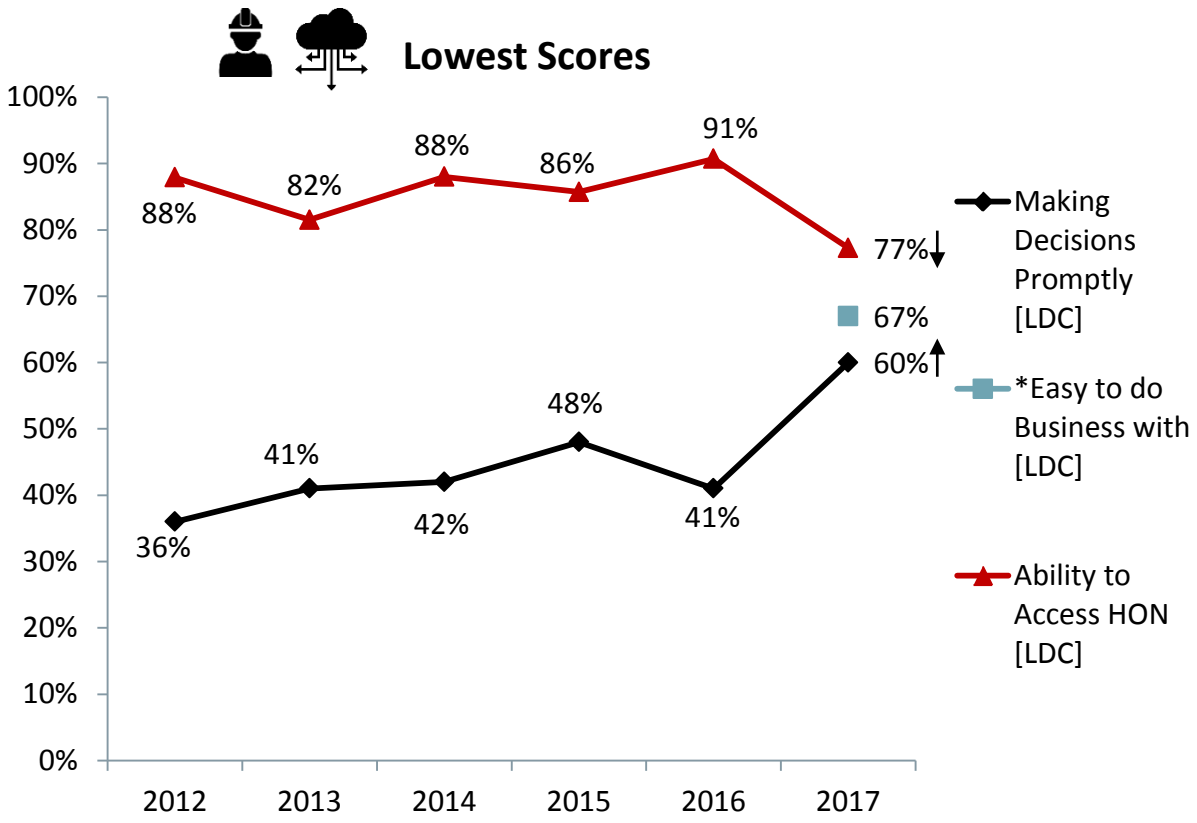
- *EUs provide a perfect score for their ability to access HON to discuss questions and problems.*
- *Both EUs and LDCs rate HON at 100% for Easy to Reach during Unplanned Outages.*

***Note:** the arrow in the graph only refers to a directional increase in Ability to Access HON for EUs.*
****Note:** Easy to Reach during Unplanned Outages is a new metric this year and hence cannot be tracked yet.*

*Q18 Thinking now about your ability to access Hydro One to discuss your questions or problems either over the phone or through a representative, are you very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, or very dissatisfied? **[5 point]***
*Q10 How would you rate Hydro One on the following specific attributes? Please use a 1 to 10 scale, where a 1 means you disagree completely, and a 10 means you agree completely. Easy to reach during unplanned outages **[10 point]***

Performance Highlights: Weaknesses (Lowest Scores)

The lowest scores in the survey are attributable to LDCs, who show a significant decline (-14%) in their ability to access HON, which is at its lowest point since tracking 2012.



Key Insights

- *Continuing with the trend, all three low scores have been provided by LDC customers.*
- *While the worst score was for Making Decisions Promptly, there is, nonetheless, a significant improvement for this metric.*

***Note:** Easy to do Business with is a new metric this year and hence cannot be tracked yet.*

*Q10 How would you rate Hydro One on the following specific attributes? Please use a 1 to 10 scale, where a 1 means you disagree completely, and a 10 means you agree completely. Makes decisions promptly. **[10 point]***

*Q18 Thinking now about your ability to access Hydro One to discuss your questions or problems either over the phone or through a representative, are you very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, or very dissatisfied? **[5 point]***

*Q10 How would you rate Hydro One on the following specific attributes? Please use a 1 to 10 scale, where a 1 means you disagree completely, and a 10 means you agree completely. Ease to do business with. **[10 point]***

Additional Analysis: Key Metrics Analysis

TX Key Metrics Analysis*

Overall TX Key Metrics	2011	2012	2013	2014	2015	2016	2017
Tx: Keeping commitments (NET 7-10)	83%	71%	72%	73%	78%	74%	83%
Tx: Making decisions promptly (NET 7-10)	62%	48%	55%	57%	57%	58%	72%
OGCC staff understand your needs (NET 7-10)	*n/a*	86%	*n/a*	89%	90%	94%	94%
OGCC procedures on planned outages (NET 4-5)	*n/a*	78%	*n/a*	85%	92%	89%	94%
Overall Tx Average Score	**n/a**	**71%**	**n/a**	**76%**	**79%**	**79%**	**86%** ↑

End User Key Metrics	2011	2012	2013	2014	2015	2016	2017
Tx: Keeping commitments (NET 7-10)	83%	74%	70%	67%	76%	79%	86%
Tx: Making decisions promptly (NET 7-10)	68%	51%	51%	67%	65%	73%	83%
OGCC staff understand your needs (NET 7-10)	*n/a*	90%	*n/a*	90%	92%	94%	100%
OGCC procedures on planned outages (NET 4-5)	*n/a*	79%	*n/a*	93%	100%	96%	97%
End User Average Score	**n/a**	**74%**	**n/a**	**79%**	**83%**	**86%**	**92%**

Generator Key Metrics	2011	2012	2013	2014	2015	2016	2017
Tx: Keeping commitments (NET 7-10)	94%	79%	80%	93%	77%	81%	82%
Tx: Making decisions promptly (NET 7-10)	76%	67%	80%	71%	63%	65%	79%
OGCC staff understand your needs (NET 7-10)	*n/a*	81%	*n/a*	92%	90%	97%	96%
OGCC procedures on planned outages (NET 4-5)	*n/a*	75%	*n/a*	85%	95%	87%	97%
Generator Average Score	**n/a**	**75%**	**n/a**	**85%**	**81%**	**83%**	**89%**

LDC Key Metrics	2011	2012	2013	2014	2015	2016	2017
Tx: Keeping commitments (NET 7-10)	76%	64%	68%	66%	80%	64%	82%
Tx: Making decisions promptly (NET 7-10)	49%	36%	41%	42%	48%	41%	60%
OGCC staff understand your needs (NET 7-10)	*n/a*	85%	*n/a*	85%	86%	91%	88%
OGCC procedures on planned outages (NET 4-5)	*n/a*	81%	*n/a*	79%	78%	86%	87%
LDC Average Score	**n/a**	**66%**	**n/a**	**68%**	**73%**	**70%**	**79%** ↑

Key Insights

- *The overall Customer Score for 2017 is 86%, directionally higher than 2016.*
- *In fact, satisfaction scores for all groups are at their highest point since tracking commenced.*
- *LDC customers show a directional increase in satisfaction, with scores at their highest level since tracking began.*
- *This is particularly true for keeping commitments and making decisions promptly.*
- **OGCC customer numbers are obtained from OGCC Customer Feedback Survey.*

Results by Subgroup: LDC

Key Changes and Results of Note

- *Overall satisfaction for LDCs has significantly increased by 17 points, now at its highest point since tracking began.*
- *The increase in satisfaction for this customer group can largely be attributed to Hydro One's significant improvement in keeping commitments and making decisions promptly.*

Risks & Opportunities

- *Overall satisfaction has improved for this group, with commentary focusing on easy communication with HON.*
- *However, LDCs continue to provide the lowest scores of all customer groups, indicating further room for improvement.*
- *HON has an opportunity to further increase satisfaction scores by improving accessibility for queries, which has been a concern this year.*

Verbatim Summary

*They are very **easy to deal with**, if we have a problem we fix everything within a week.*

*obviously we all want an answer "now", but the business world doesn't work that way, takes time. Hydro One has though, **phenomenal communication**, the **Outage reports** are **great!***

*In past years we have been waiting months or years for decisions. **Over the past year** or so, the process of getting decisions made by H1 has been **much faster**.*

Results by Subgroup: End Users

Key Changes and Results of Note

- *Overall satisfaction for End Users has directionally increased by 9 points.*
- *Despite not being significant, the increase in HON's ability to make decisions promptly and keep commitments could explain the rise in overall satisfaction for this subgroup.*
- *Furthermore, this subgroup yields some of the highest scores, including two metrics that reached a perfect score this year.*

Risks & Opportunities

- *While End Users remain largely satisfied with customer relations, the AE contact experience receives lower ratings this year. To prevent a slide for this metric, it would help to address customer concerns with the AE.*

Verbatim Summary

*Well I mean there were some things that needed to be done here, some meetings we've had and some of this has been **delayed** a bit, that's why I didn't give a perfect score.*

*We are **extremely happy** with Hydro One's performance, they get their deliverable and keep their commitments.*

*Decisions regarding outage approvals are **prompt**, but decisions involving engineering support can be **quite slow**.*

Results by Subgroup: Generator

Key Changes and Results of Note

- *Although not significant, Generators show increasing satisfaction with their relationship with Hydro One, with a directional increase in contact experience with Account Executives.*
- *Customers from this subgroup have expressed higher levels of satisfaction regarding Hydro One's ability to make decisions promptly, which could further explain the increase in overall satisfaction.*
- *Generators are less satisfied this year with their ability to access Hydro One with queries.*

Risks & Opportunities

- *Improving Generators' ability to access Hydro One with questions and problems would help further increase satisfaction for this group.*

Verbatim Summary

*The weekly reports are always on time, letting us know when outages are coming. **Very good rapport** with our guy, easy to get a hold of.*

*If we have to do work on MSO, they respond **very quickly** and help us to isolate equipment and support our efforts whenever we require.*

*She has been **very hard** to get a hold of, **not very quick** at a response with content.*

Northstar Conclusions

- Overall customer satisfaction with Hydro One among LTX customers has increased since last year, mainly for End User and LDC customers.
- In fact, LDC customers show a significant increase regarding Hydro One's ability to keep commitments and make decisions promptly.
- Even though satisfaction with reaching Hydro One during unplanned outages is being recorded for the first time and hence cannot be tracked, we can still note that customers from all subgroups are happy with performance on this metric. LDCs and End Users gave Hydro One a perfect score, which can further explain the increase in overall satisfaction for both subgroups.
- Notably, given that the survey was condensed this year, increases in scores for LTX customers might have been engendered by factors that were not asked.
- LDC customers retain the lowest relative score of the three groups. Hydro One has an opportunity to continue to improve relations with LDC customers by addressing their concerns around customer service and responsiveness.
- End User customers have shown improvement for most metrics. The customer group indicates that customer service, responsiveness, and cost continue to be key areas to be addressed by HON to increase satisfaction.
- Relations with Generator customers can be improved by allocating efforts towards outage planning and notification. This is a fundamental requirement for Generators, and addressing this will continue to drive up overall satisfaction for this group.

*Note: these conclusions have not been validated internally at Hydro One

TX APPENDIX

Appendix A
Key Metric Summary Results

Type	Metric	2016	2017	Difference
Performance Highlights	Q10A Keeping Commitments*	EU: 79% LDC: 64% Gen: 81%	EU: 86% LDC: 82% Gen: 82%	EU: +7% **LDC: +18%** Gen: +1%
	Q10M Making Decisions Promptly*	EU: 73% LDC: 41% Gen: 65%	EU: 83% LDC: 60% Gen: 79%	EU: +10% **LDC: +19%** Gen: +14%
Largest Increases	Q10M Making Decisions Promptly*	LDC: 41%	LDC: 60%	**LDC: +19%**
	Q10A Keeping Commitments*	LDC: 64%	LDC: 82%	**LDC: +18%**
	Q10M Making Decisions Promptly*	Gen: 65%	Gen: 79%	Gen: +14%
Largest Decreases	Q18 Ability to Access HON	LDC: 91%	LDC: 77%	**LDC: -14%**
	Q18 Ability to Access HON	Gen: 100%	Gen: 91%	**Gen: -9%**
	Q24 AE Contact Experience	LDC: 95%	LDC: 90%	LDC: -5%
Highest Scores	Q18 Ability to Access HON	EU: 95%	EU: 100%	**Gen: +5%**
	Q10P Easy To Reach During Unplanned Outages		EU: 100%	
	Q10P Easy To Reach During Unplanned Outages		LDC: 100%	
Lowest Scores	Q10M Making Decisions Promptly*	LDC: 41%	LDC: 60%	**LDC: +19%**
	Q10O Easy To Do Business With		LDC: 67%	
	Q18 Ability to Access HON	LDC: 91%	LDC: 77%	**LDC: -14%**

*Significant increases highlighted in **green**, significant decreases highlighted in **red***

**Note: Percentages represent scores of 4 and 5 on 5-point scale questions and 7 to 10 scores on 10-point scale questions*

** Indicates "foundational" question/metric*

Appendix B
All Metric Summary (1/3)

Overall:

Metric	LDC			End-User			Generator		
	2016	2017	Diff	2016	2017	Diff	2016	2017	Diff
Overall Satisfaction	64%	81%	**+17%**	88%	97%	+9%	88%	91%	+3%

Significant increases highlighted in **green**, significant decreases highlighted in **red;** a lighter shade indicates a directional change.
*Note: Percentages represent scores of 4 and 5 on 5-point scale questions and 7 to 10 scores on 10-point scale questions

Appendix B
All Metric Summary (2/3)

Customer Service:

Metric	LDC			End-User			Generator		
	2016	2017	Diff	2016	2017	Diff	2016	2017	Diff
Q18 Ability to Access HON	91%	77%	-14%	95%	100%	+5%	100%	91%	-9%
Q24 AE Contact Experience	95%	90%	-5%	100%	96%	-4%	85%	97%	+12%

Relationship:

Metric	LDC			End-User			Generator		
	2016	2017	Diff	2016	2017	Diff	2016	2017	Diff
Q10A Keeping Commitments*	64%	82%	+18%	79%	86%	+7%	81%	82%	+1%
Q10M Making Decisions Promptly*	41%	60%	+19%	73%	83%	+10%	65%	79%	+14%
Q10O Easy To Do Business With		67%			90%			77%	
Q10P Easy To Reach During Unplanned Outages		100%			100%			93%	
Q10Q Understands Business Needs		87%			89%			82%	

Significant increases highlighted in **green**, significant decreases highlighted in **red;** a lighter shade indicates a directional change.
*Note: Percentages represent scores of 4 and 5 on 5-point scale questions and 7 to 10 scores on 10-point scale questions

Appendix B
All Metric Summary (3/3)

Other:

Metric (% Yes)	LDC			End-User			Generator		
	2016	2017	Diff	2016	2017	Diff	2016	2017	Diff
Q19 Incidence of PY Contact by HON Account Exec.	96%	93%	-3%	93%	93%	-	88%	89%	+1%

Significant increases highlighted in **green**, significant decreases highlighted in **red;** a lighter shade indicates a directional change.
*Note: Percentages represent scores of 4 and 5 on 5-point scale questions and 7 to 10 scores on 10-point scale questions

INNOVATIVE RESEARCH GROUP

2018 Large Tx Customer Satisfaction

Understanding Dimensions of Satisfaction and Dissatisfaction

Hydro One
483 Bay Street
Toronto, ON M5G 2P5

hydro one

October 2018

Table of Contents

Methodology

The findings presented in this report are based on an online and telephone survey carried out by Innovative Research Group (INNOVATIVE) for Hydro One.

The online survey was conducted among large transmission customers of Hydro One, from July 4th to August 6th, 2018 (a breakdown of customer segments is included in the tables below). Participants were able to complete the survey online or schedule a phone interview. In total, 112 participants completed the survey.

The below table shows the surveyed customer segments and their sample sizes:

Segment Size	TOTAL LTX	LDCs	Generators	End-Users
Total Population Size	201	66	63	72
Surveyed	112	45	33	34
% Captured	56%	69%	52%	47%

Analysis Notation:

Throughout this report “Don’t know” was **included** as a valid response. As this presents a change from the previous methodology, tracking slides report the results in two ways—with and without “Don’t know”.

For clarification, a note at the bottom of each slide will denote if "Don't know" was included as a valid response.

NOTE: *Graphs may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers.*

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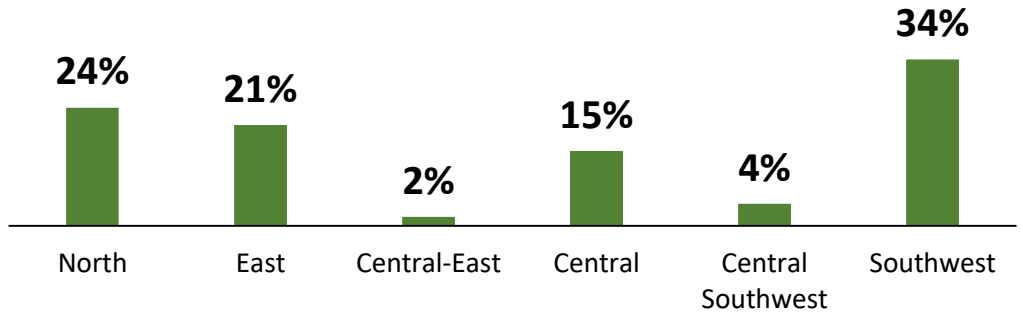
Firmographics: *LTX Customer Profile*

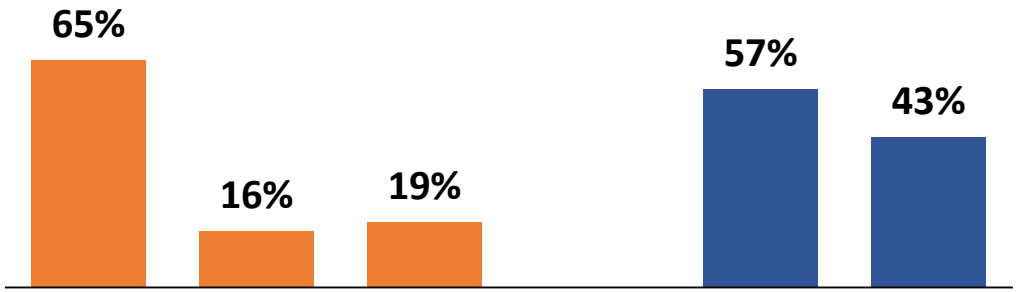
2017 Average Monthly Revenue

[Results shown are based on customers for whom revenue data was available; n=86]

Region



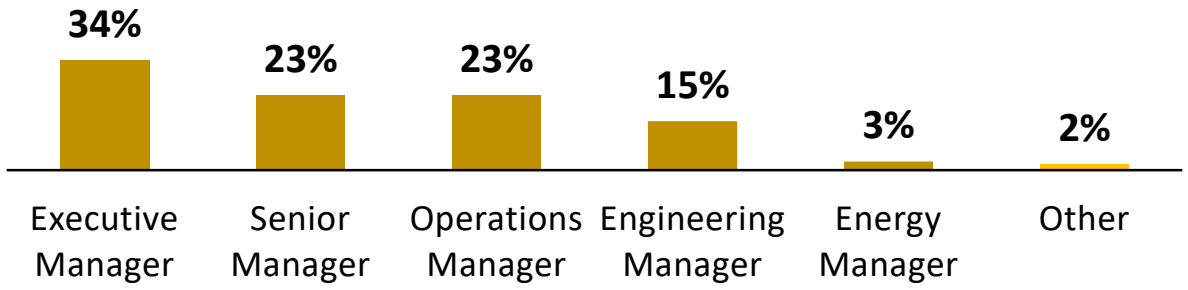
Connection Type



Circuit Type

[Results shown are based on customers for whom circuit type (n=88) is known]

Role at Organization



Executive Summary

A Note Regarding Survey Changes

In an effort to create a clear snapshot of performance comparable across all customer groups, INNOVATIVE has worked with Hydro One to reorganize the LTX survey to better reflect and quantify customer experience.

Due to changes in survey questions over recent years, tracking for measures within dimensions of satisfaction, and in general, is inconsistent. ***In this report, we therefore limit tracking to key scorecard measures that were unaffected by changes.***

A number of fundamental changes have been made for the 2018 LTX survey:

- Implementation of a standardized survey instrument that works for both LTX and LDA customers
- Removal of non-actionable question metrics
- Inclusion of new questions (environmental controls, NPS, and *other value-added metrics*)
- Re-organization of questions under general themes (i.e. Price/Billing, Customer Service, Product Quality/Reliability, Brand)
- Implementation of standardized Likert scales for metrics under general themes.

For a detailed overview of changes to the survey between 2017 and 2018, please see the appendix.

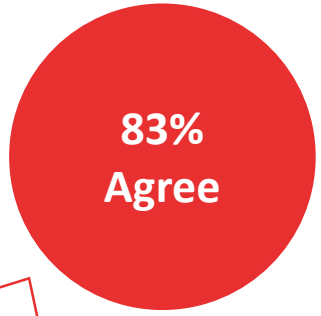
Impact of Survey Changes on Tracking

Overall satisfaction is the only metric that was not impacted by changes made to the survey in 2018. The consistency with how this question was asked allows results to be tracked over time, with confidence that any changes are real and not a potential result of how the question was asked.

In many cases, the question wording stayed the same, but the response scale was changed from agree/disagree to satisfied/dissatisfied. For example, among LDA customers, there has been a decline of 20 percentage points on the duration of unplanned outages. But a strong argument can be made that this decline is a result of changing how the question was asked.

2017

"Minimizing the duration of unplanned outages"
[10pt agree/disagree]



"I believe Hydro One is doing what they can to reduce the duration of unplanned outages"

Confidence in actions of Hydro One

…is not the same as…

2018

"The duration of unplanned outages"
[5pt satisfied/dissatisfied]

"I am satisfied with the duration of unplanned outages"

Experience of outage

Summary: *2018 LTX Report*

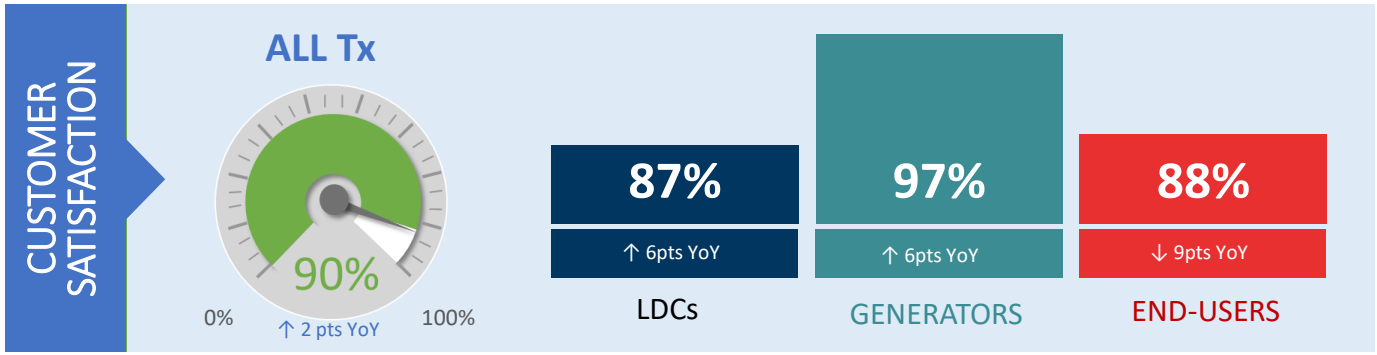
1. **Hydro One's CSAT continues its upward trend and reaches an all-time high, with marginal improvement among Generators and LDCs effectively neutralizing a sizeable decrease among End-Users.**

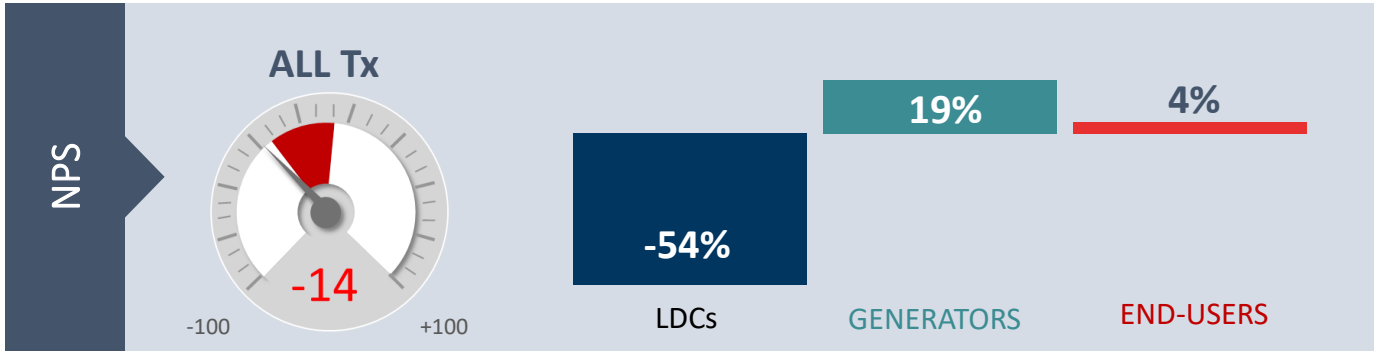
2. ***Customer Service* is the dimension on which Hydro One has the highest levels of satisfaction.**

3. ***Product Quality & Reliability* shows room for improvement, particularly on customers' experience of unplanned outages.**

4. **NPS is a newly introduced metric in 2018. NPS among Generators and End-Users is positive, but LDCs currently have a strongly negative NPS.**

5. **Environmental controls were introduced in 2018 to gauge the impact of economic and political factors that are outside of Hydro One's influence.**





HIGHEST PERFORMING ATTRIBUTES

- Overall customer service (93%)
- Communication methods (93%)
- Service received from account executive (90%)
- Accessibility (87%)
- Understanding business needs (85%)

OPPORTUNITIES FOR IMPROVEMENT

- Duration of unplanned outages (48%)
- Number of unplanned outages (50%)
- Good value for money (58%)
- Communication during outages (62%)
- Time to restore power (66%)

Summary (CSAT): *2018 LTX Report*

1. **Hydro One's CSAT continues its upward trend and reaches an all-time high, with marginal improvement among Generators and LDCs effectively neutralizing a sizeable decrease among End-Users.**

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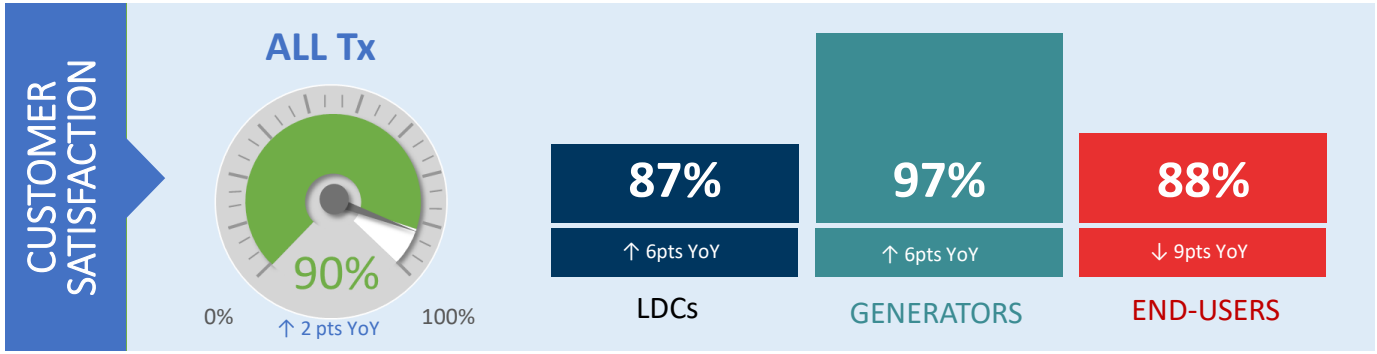

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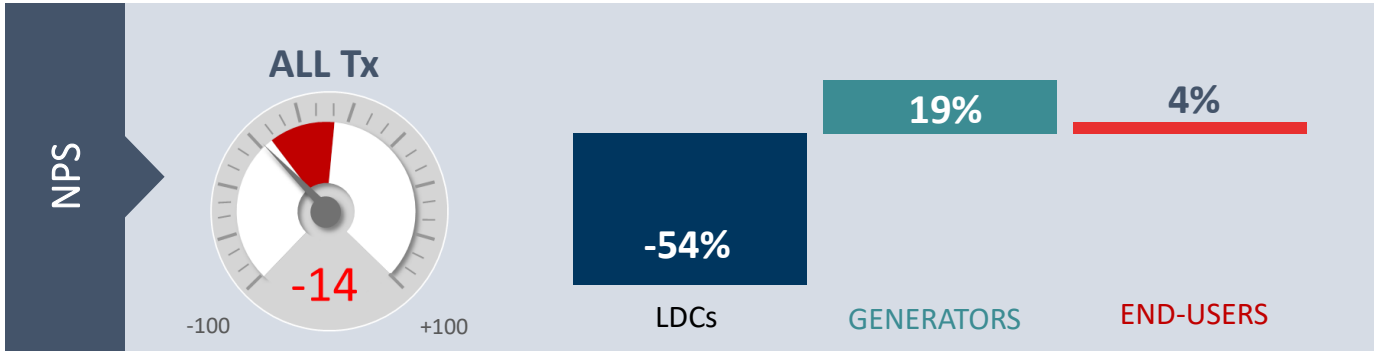

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- Duration of unplanned outages (48%)
- Number of unplanned outages (50%)
- Good value for money (58%)
- Communication during outages (62%)
- Time to restore power (66%)

Insights: Drivers of CSAT and NPS

CSAT

- *Customer Service* is the strongest driver of CSAT. This factor has an emphasis on communication:
  - communication methods
  - overall communication
  - service from Key Account Executive
- Being able to recall an unplanned outage has a negative effect on CSAT, which highlights the need to improve customers' experience of unplanned events.

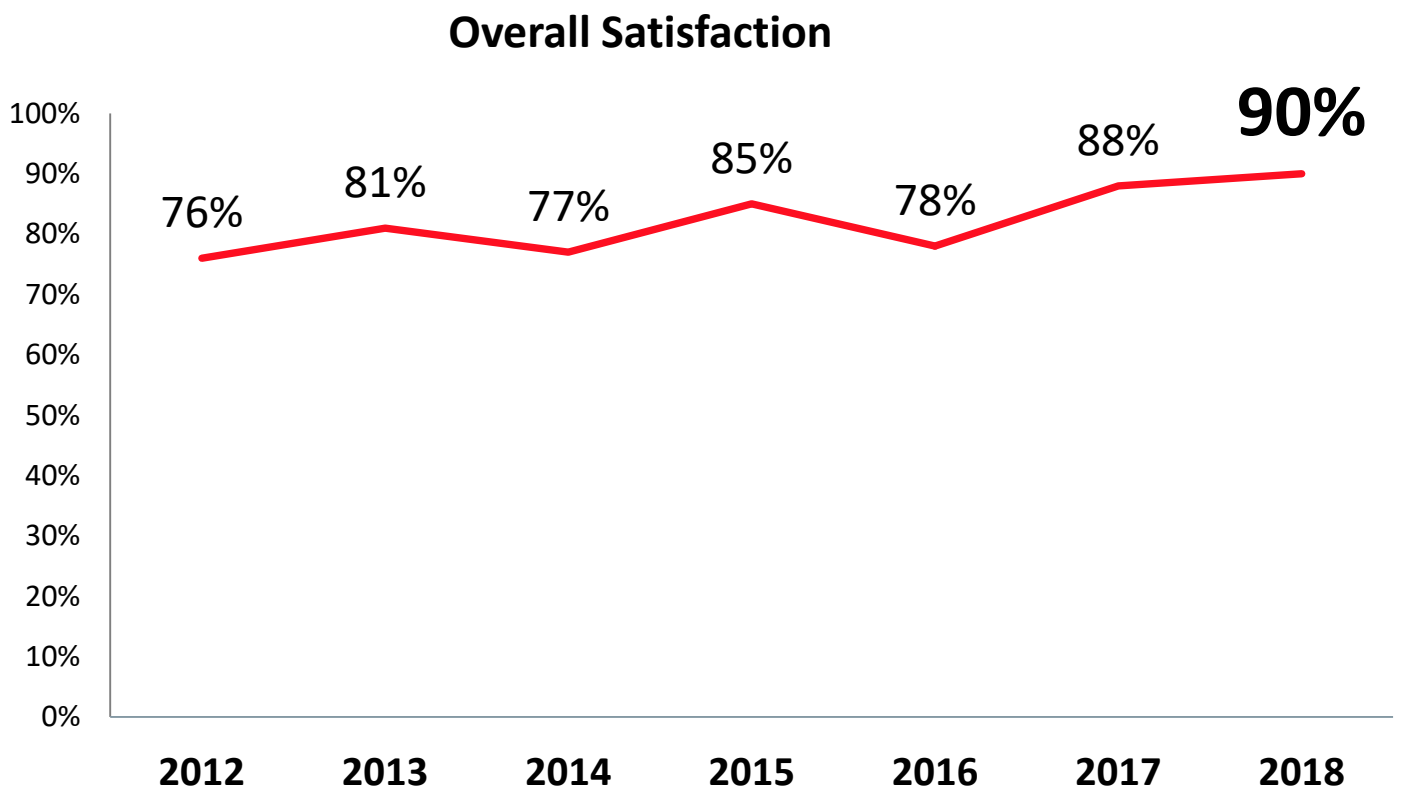
NPS

- *Help & Commitment* and *Customer Service* are the two strongest drivers of NPS. *Help & Commitment* speaks to a stronger emotional bond between Hydro One and the customer, where the customer feels they can depend on the utility to help them in their business.
- *Satisfaction with handling of unplanned outages* improves NPS at almost the same rate.
- The positive coefficient for *recall of planned outage* suggests that, as long as planned outages are clearly communicated, they do not lower NPS. To the contrary, they have the potential to improve it.
- One driver outside of Hydro One's control is feeling well-protected in terms of the price, quality and reliability of electricity services in Ontario.
- In addition, *Customer Type* has an effect on NPS (NPS is higher among Generators and End-Users). While Hydro One cannot control *Customer Type*, identifying differences between LDCs and Gens/EUs on the drivers which Hydro One can control may provide insights on how to improve NPS among LDC customers.

Overall Satisfaction (All Tx): Overall satisfaction continues to trend upwards from 2016, landing at an all-time high of 90%

Q **C2.** Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?

[Asked of all respondents, n=112; valid responses n=112]



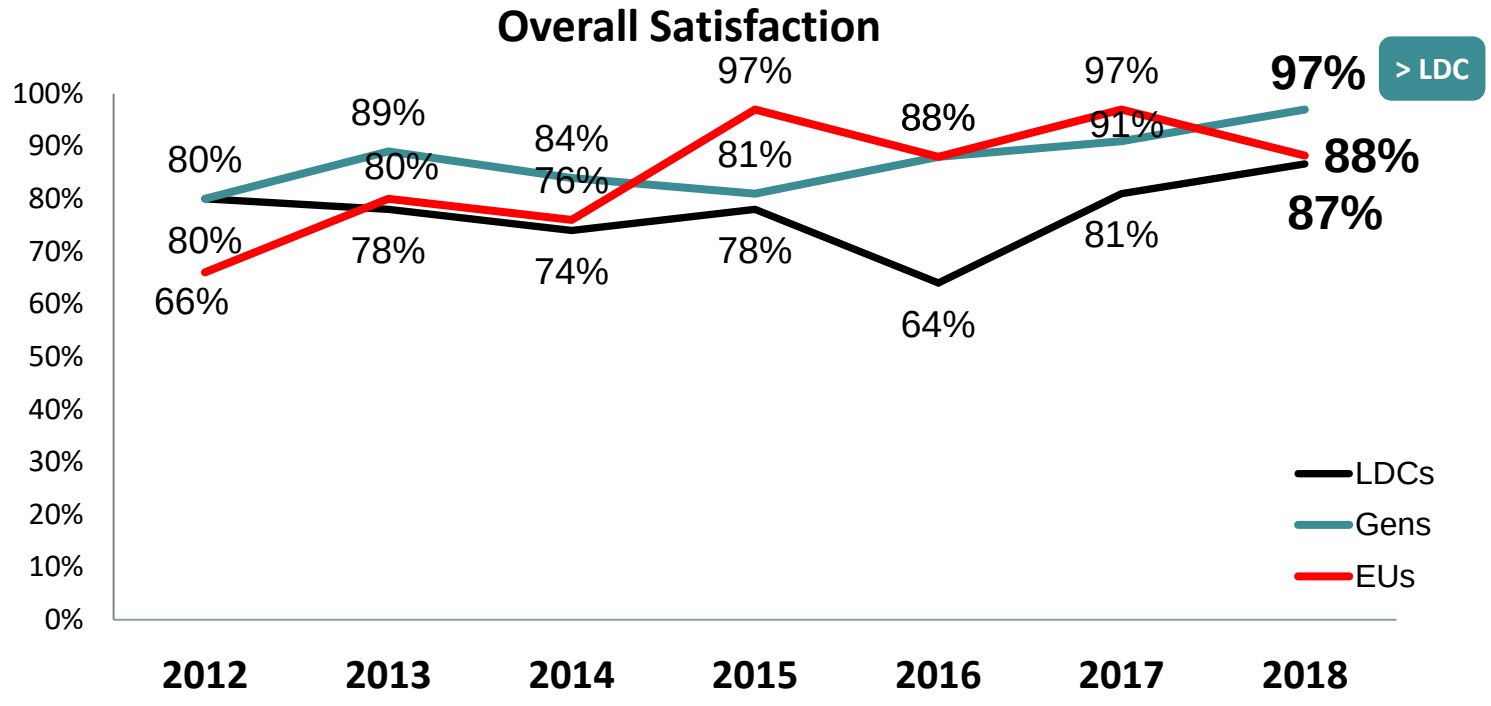
Key Insights

- Overall satisfaction continues to trend upwards from 2016, landing at an all-time high of 90%.
- Because there were no respondents who said "don't know" to this question in 2017 and 2018, the results are reliably trackable. Therefore, we know that there has not been a significant change since 2017.

NOTE: Response "Don't know" (0% in 2017 & 2018) was excluded from this analysis. Statistically significant changes compared to the results from 2017 are indicated by ↑↓.

Overall Satisfaction (By Customer Type): Satisfaction among Generators and LDCs hits all-time high in 2018; End-Users down 9pts from 2017

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?



	2012	2013	2014	2015	2016	2017	2018
LDCs	80%	78%	74%	78%	64%	81%	87%
Gens	80%	89%	84%	81%	88%	91%	97%
EUs	66%	80%	76%	97%	88%	97%	88%

Key Insights

- Upwards trend of Generator satisfaction continues from 2015, surpassing both other customer groups in 2018.
- LDCs continue to increase from their record low in 2016, albeit less sharply than in 2017.
- End-Users down 9 points from 2017. Due to the small sample size (n=34), this is not a statistically significant change.
- The increase among LDCs and decrease among End-Users has closed the gap between those two groups.

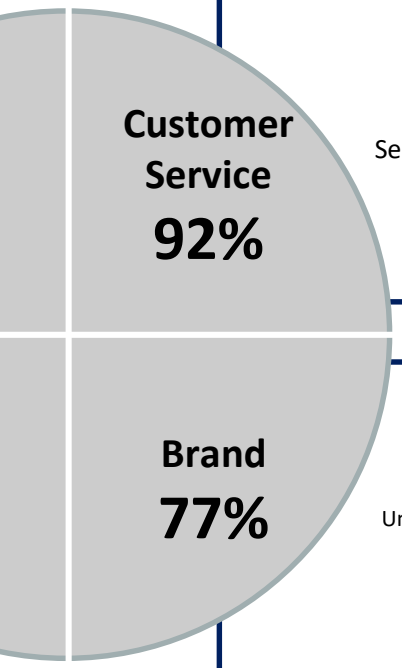
LTX Customer Type	Total Population	Sample Size
LDCs	66	45
Generators	63	33
End-Users	72	34

NOTE: Response "Don't know" (0% in 2017 & 2018) was excluded from this analysis. Statistically significant changes compared to the results from 2017 are indicated by ↑↓. Differences between customer type that are statistically significant at a 95% confidence interval are indicated.

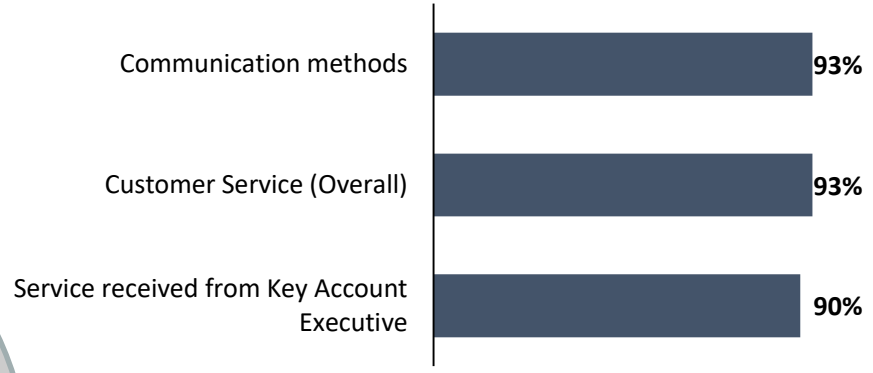
Survey Findings: Dimensions of Satisfaction (LTX – All Segments)

Price/Billing

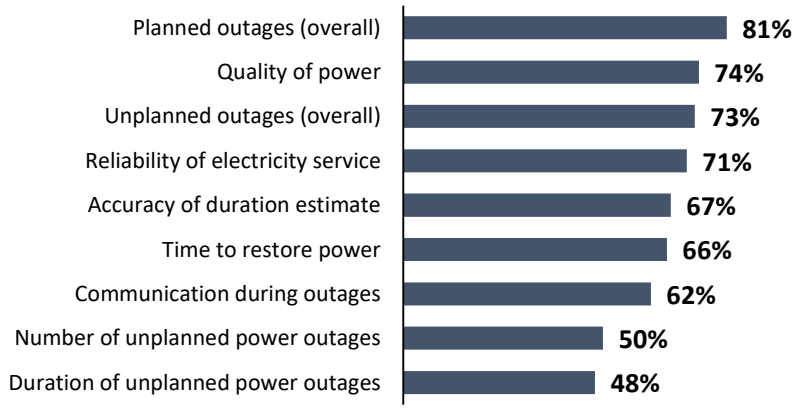
No price/billing questions pertaining to experience with Hydro One were asked of LTX customers



Customer Service



Product Quality/Reliability



Brand

NOTE: Percentages represent total satisfied (very and somewhat satisfied)
Response "Don't know" was included in this analysis.

Survey Findings: Dimensions of Satisfaction (LTX Segments)

Key Insights

- Generators are the most satisfied customer group across all dimensions.
- LDCs are the least satisfied, but just marginally.
- Customer service is the highest-scoring dimension across all LTX customer groups, whereas Product Quality/Reliability is the lowest.

Customer Service – 92%

LDCs	Generators	End-Users
2018	2018	2018
90%	96%	92%

Product Quality/Reliability = 66%

LDCs	Generators	End-Users
2018	2018	2018
62%	77%	64%

Brand – 77%

LDCs	Generators	End-Users
2018	2018	2018
73%	88%	73%

NOTE: Percentages represent total satisfied (very and somewhat satisfied).
No pricing questions were asked of LTX customers.
Response "Don't know" was included in this analysis.

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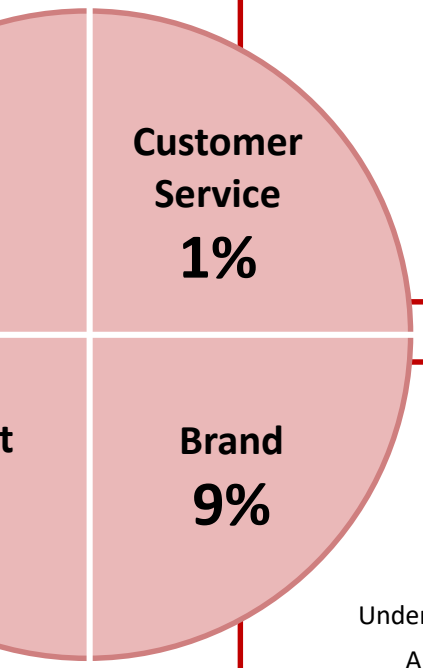
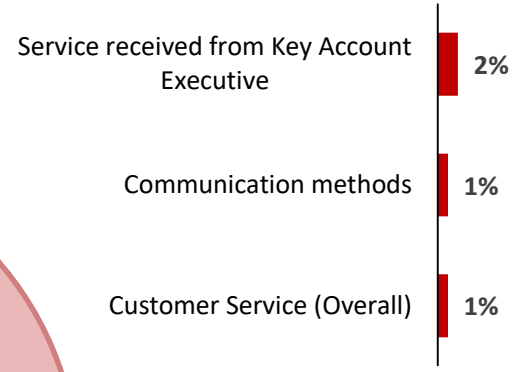
Survey Findings: Dimensions of Dissatisfaction (LTX – All Segments)

Price/Billing

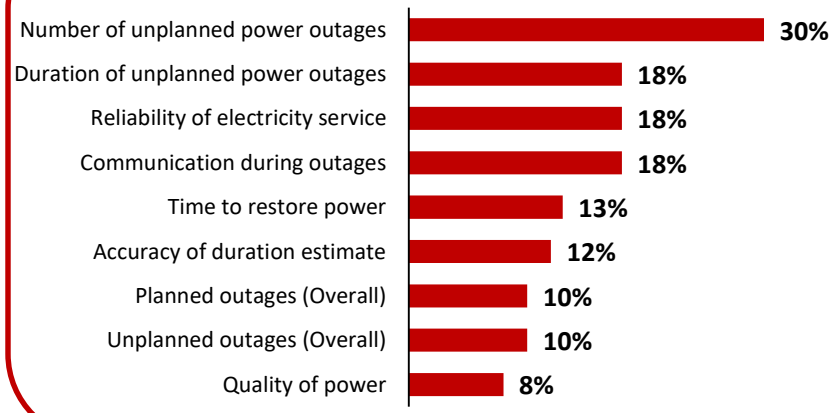
No price/billing questions pertaining to experience with Hydro One were asked of LTX customers



Customer Service



Product Quality/Reliability



Brand

NOTE: Percentages represent total dissatisfied (very and somewhat dissatisfied). Response "Don't know" was included in this analysis.

Survey Findings: Dimensions of Dissatisfaction (LTX Segments)

Key Insights

- Dissatisfaction with customer service is nearly non-existent within these customer groups.
- Overall, Generators seem less dissatisfied than other customer groups, which aligns with their overall increase in overall customer satisfaction.
- 1-in-5 LDC and End-Users are dissatisfied with product quality and reliability in 2018. This is five times higher than dissatisfaction among Generators.

Customer Service – 1%

LDCs	Generators	End-Users
2018	2018	2018
1%	1%	1%

Product Quality/Reliability – 15%

LDCs	Generators	End-Users
2018	2018	2018
19%	4%	19%

Brand – 9%

LDCs	Generators	End-Users
2018	2018	2018
10%	4%	11%

NOTE: Percentages represent total dissatisfied (very and somewhat dissatisfied) or total disagreement (strongly and somewhat disagree).
No Price/Billing dimension exists for LTX customers.
Response "Don't know" was included in this analysis.

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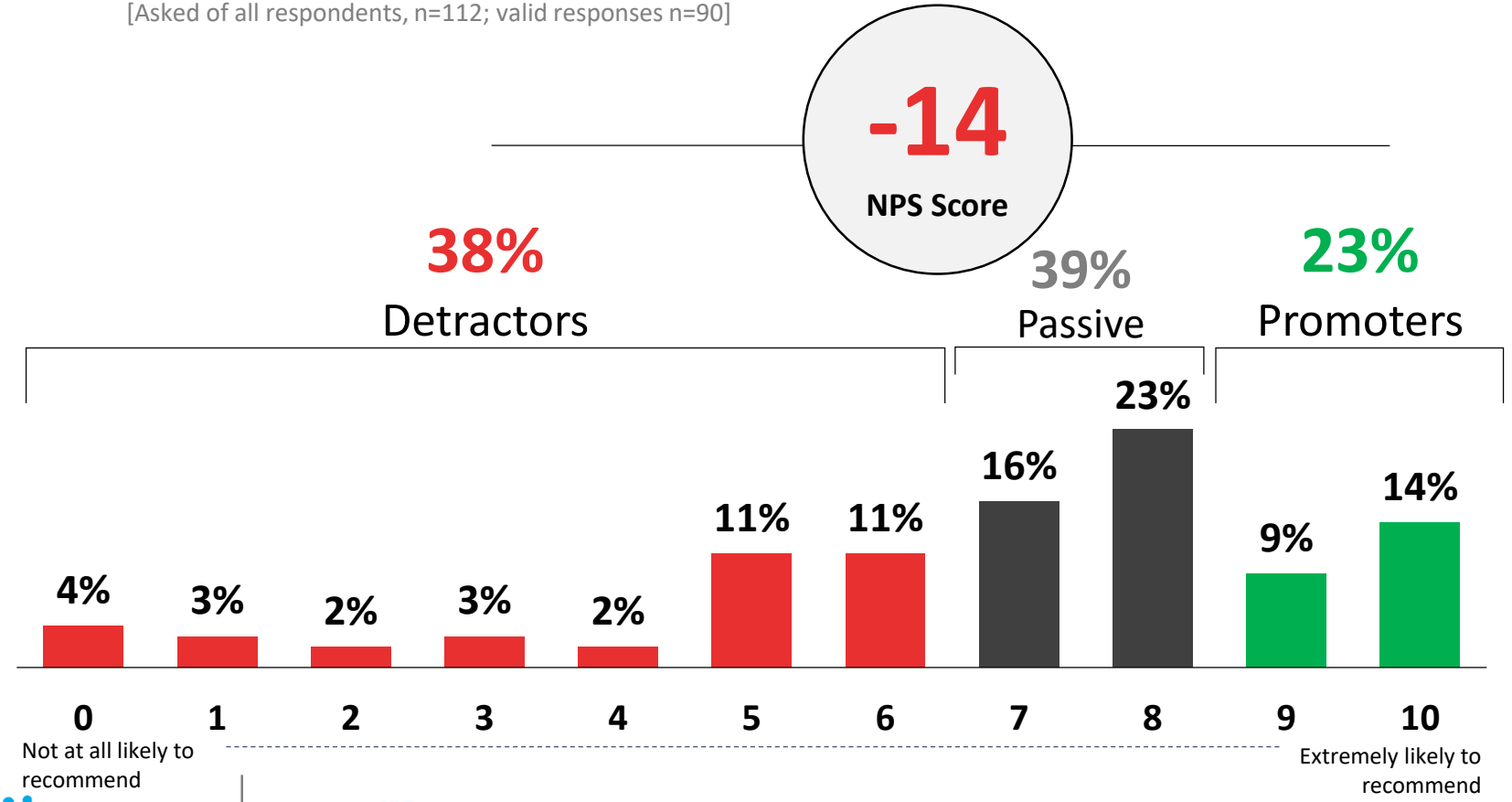
Net Promoter Score: NPS among LTX customers is slightly negative; almost one-quarter (23%) land just shy of being promoters

H54. If you had a choice between several possible providers of electricity, how likely would you be to recommend Hydro One to your colleagues and peers as the preferred electricity utility? Please use a scale from 0 to 10, where 0 means you would not be at all likely to recommend Hydro One to others and 10 means you would be extremely likely to recommend.

[Asked of all respondents, n=112; valid responses n=90]



Key Insights

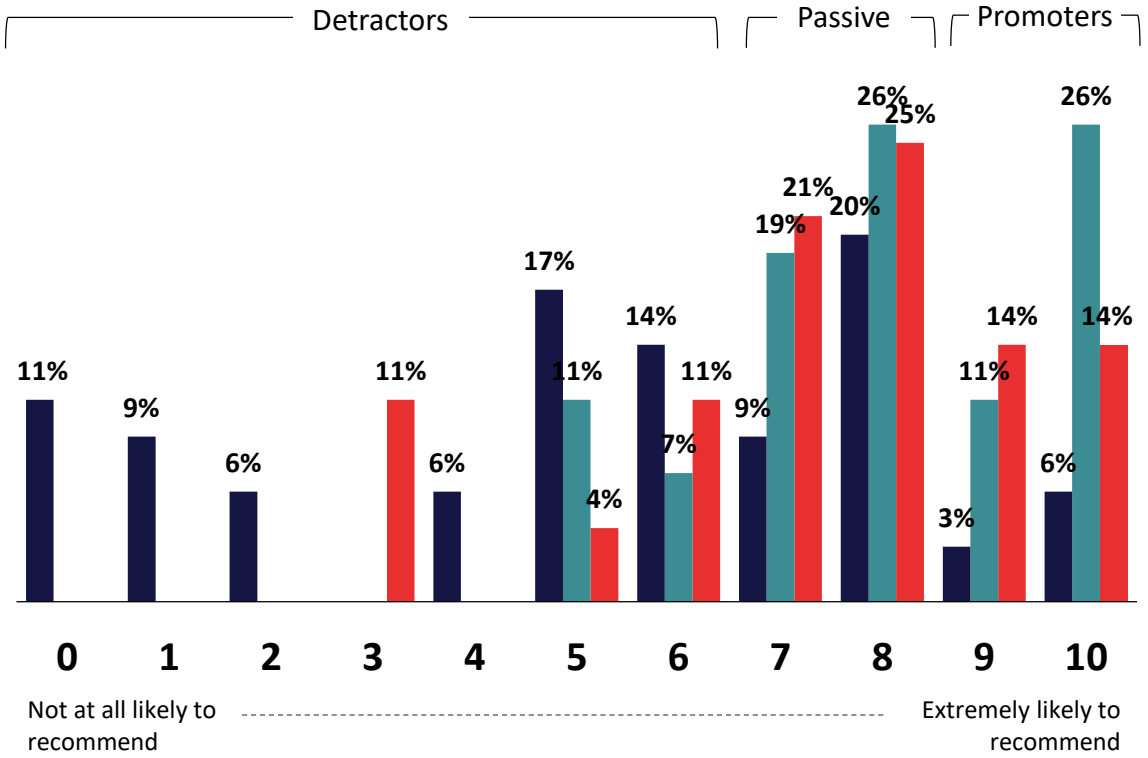
- Although NPS is slightly negative (-14%) among LTX customers, the proportion of strong promoters (14% who gave a response of 10), neutralizes the strong detractors (14% who gave a response of 0-4).
- About 1-in-5 detractors verge on being passive, and 1-in-4 passives verge on being promoters.

NOTE: New question in 2018. NPS scores run on a scale from -100 to +100. Response "Don't know" was excluded from this analysis

Net Promoter Score, by LTX segment: Generators are most likely to recommend Hydro One; LDCs least likely

H54. If you had a choice between several possible providers of electricity, how likely would you be to recommend Hydro One to your colleagues and peers as the preferred electricity utility? Please use a scale from 0 to 10, where 0 means you would not be at all likely to recommend Hydro One to others and 10 means you would be extremely likely to recommend.

[LDCs: Asked of all respondents, n=45; valid responses n=35]
[Generators: Asked of all respondents, n=33; valid responses n=27]
[End-Users: Asked of all respondents, n=34; valid responses n=28]



	NPS	=	Promoters	-	Detractors	Passive
LDCs	-54	=	9%	-	63%	29%
Generators > LDC	+19	=	37%	-	19%	44%
End-Users	+4	=	29%	-	25%	46%

Key Insights

- Noticeable differences between LDCs and the rest of the LTX customer base; LDC customers are more likely to be detractors than other customer groups.
- Generators and End-Users have a much higher proportion of passives, and no customer in either of these groups gave a rating of less than 3.

NOTE: New question in 2018. NPS scores run on a scale from -100 to +100.
Response "Don't know" was excluded from this analysis.
Differences between customer type that are statistically significant at a 95% confidence interval are indicated.

New to LTX :: *Environmental Controls*
Potential drivers of CSAT outside of Hydro One's control

It is important to distinguish between what is within, and what is outside of Hydro One's influence or control when it comes to drivers of customer satisfaction.

Perceptions of electric companies often tend to move with general perceptions of ***provincial government management in the sector*** rather than in response to the local utility.

In addition, perceptions of utilities are also strongly correlated with **financial circumstances**. In tough times perception and preference can change because customers are struggling with their bills, not because of anything the company has, or has not, done.

Control questions help distributors distinguish between:

a) utility driven programs that impact CSAT; and

b) uncontrollable external drivers that impact CSAT.

When conducting **brand research** in the energy sector, INNOVATIVE often tests multiple environmental control to assess what role predispositions (customer values and beliefs – which can be difficult and costly to change) play in the formation of a utility's brand health and reputation.

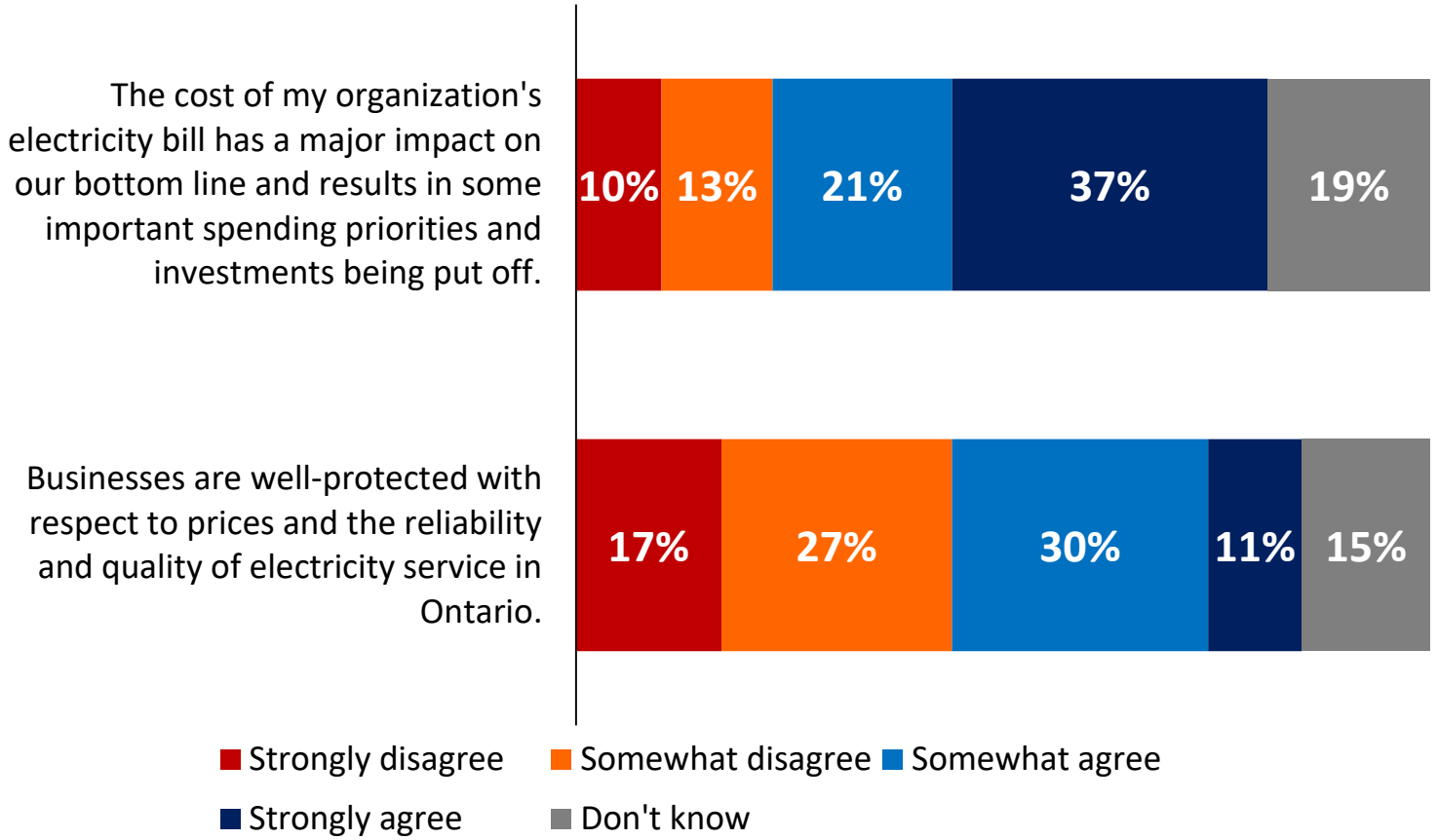
However, in **CSAT research**, we usually limit our environmental controls to two key questions to help capture external phenomena:

Government Management of the Electricity System: *Businesses are well-protected with respect to prices and the reliability and quality of electricity service in Ontario.*

Financial Circumstances: *The cost of my organization's electricity bill has a major impact on our bottom line and results in some important spending priorities and investments being put off.*

Environmental Controls: Most (58%) LTX customers say their electricity bill is impacting their bottom line; opinion is divided on government protection

Q **H55 & H56.** For each statement please tell me if you would strongly agree, somewhat agree, somewhat disagree or strongly disagree.
[Asked of all respondents, n=112]

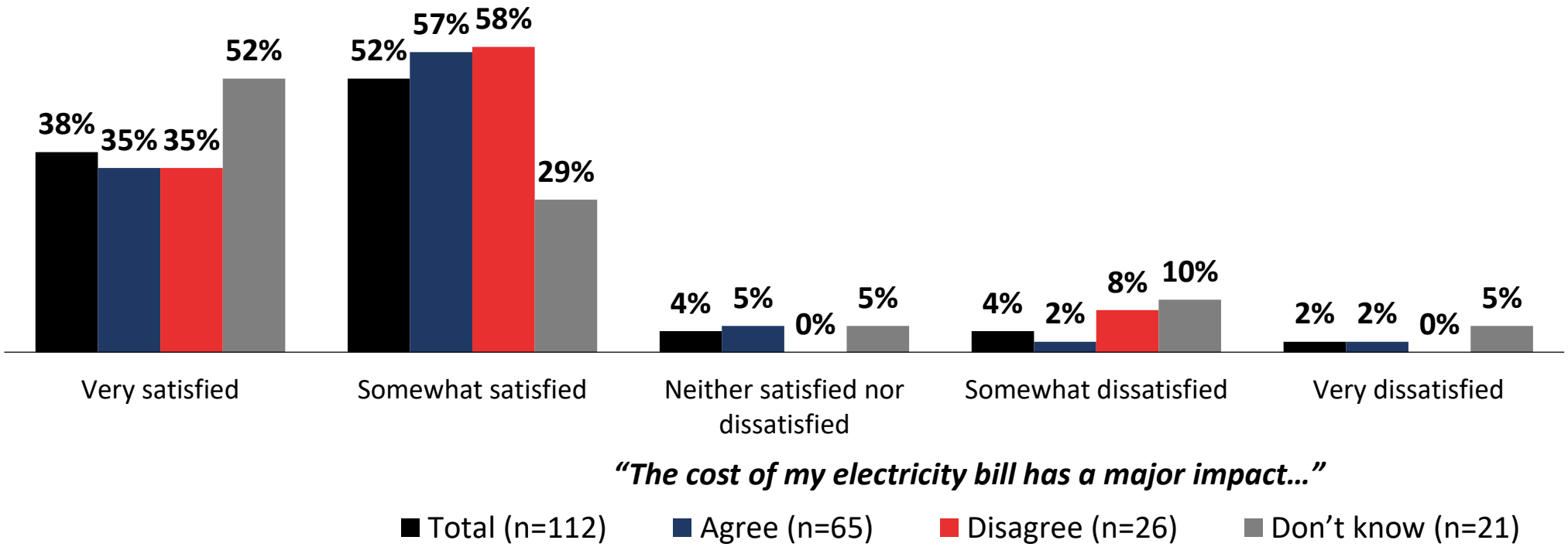


Key Insights

- A majority (58%) of LTX customers say their bottom line is being impacted by their electricity bill. Almost two-in-five (37%) *strongly* agree that this is the case.
  - LDCs: 36% agree
  - Generators: 55% agree **> LDC**
  - End-Users: 91% agree **> LDC, GEN**
- Opinion on whether or not businesses are protected in terms of prices, reliability ad quality of electricity service in Ontario is divided: 41% agree, and 44% disagree. However, the level of *strong* disagreement (17%) is marginally higher than the level of *strong* agreement (11%).
  - LDCs: 40% agree
  - Generators: 52% agree **> EU**
  - End-Users: 32% agree

NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated.

External Economic Dimension of Satisfaction: Financial impact of electricity bill does not erode customer satisfaction



Total satisfied w/ Hydro One	90%	92%	92%	81%
Total dissatisfied w/ Hydro One	6%	3%	8%	14%
Net satisfied w/ Hydro One	84%	89%	85%	67%

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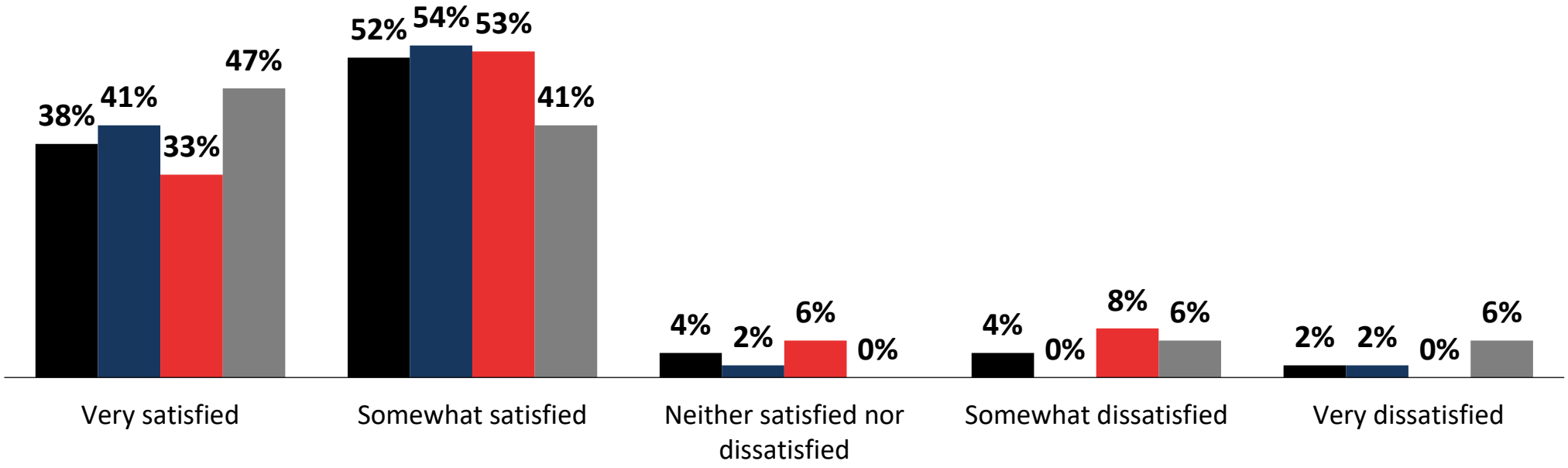
External Political Dimension of Satisfaction: Those who feel businesses are well-protected are most likely to feel satisfied with Hydro One



"Businesses are well-protected with respect to prices and the reliability and quality of electricity service in Ontario"

■ Total (n=112) ■ Agree (n=46) ■ Disagree (n=49) ■ Don't know (n=17)

Total satisfied w/ Hydro One	90%	96%	86%	88%
Total dissatisfied w/ Hydro One	6%	2%	8%	12%
Net satisfied w/ Hydro One	84%	93%	78%	76%

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A Closer Look:
Overall Customer Satisfaction

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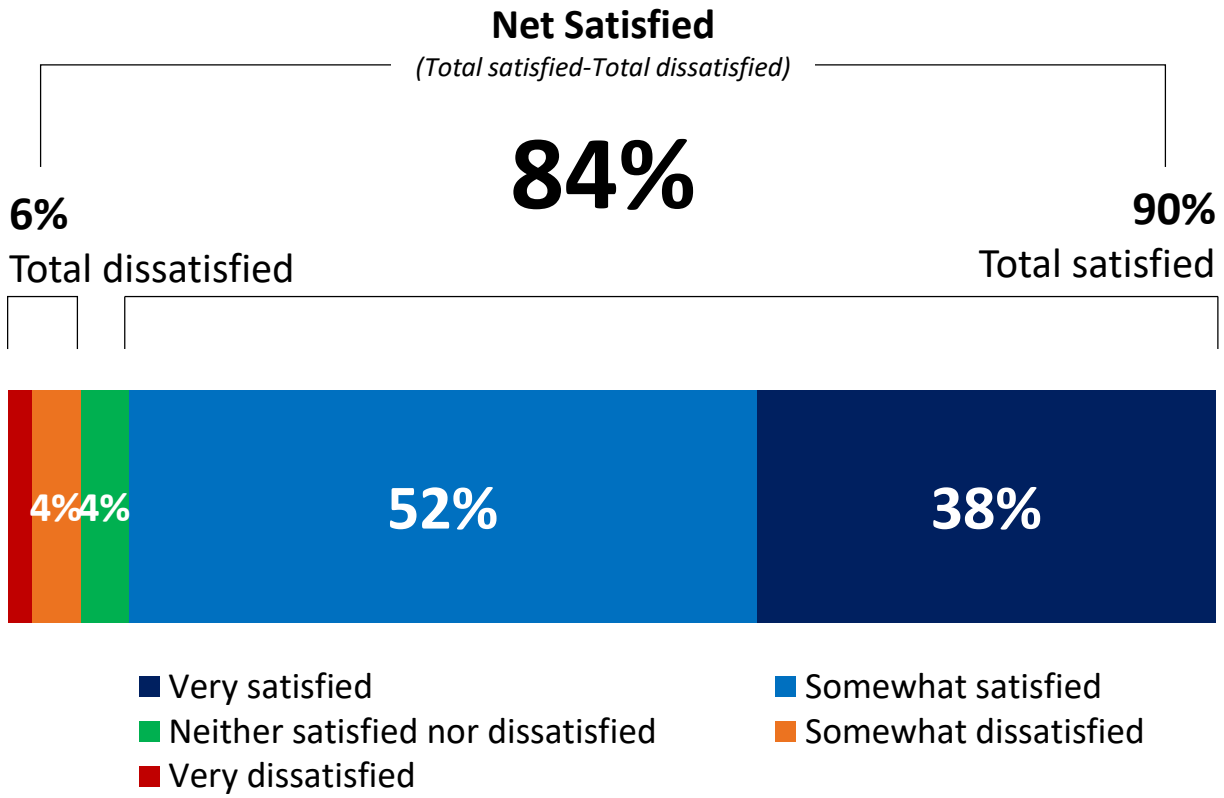
Overall Satisfaction: 9-in-10 (90%) LTX customers are satisfied with the service they receive from Hydro One

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?
[Asked of all respondents, n=112]



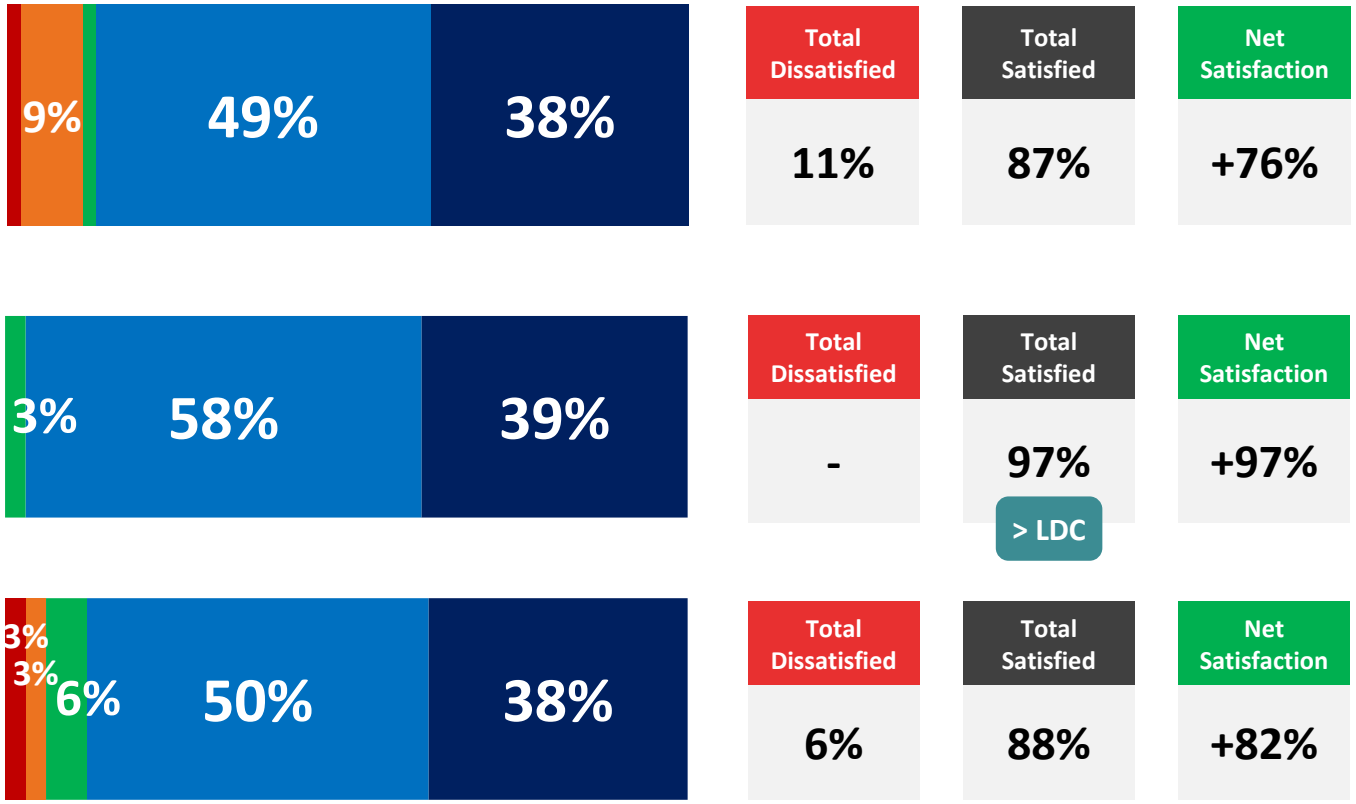
Key Insights

- Overall satisfaction with Hydro One among LTX customers is verging on universal, but there is room for improvement on intensity. Currently, half (52%) are *somewhat* satisfied, while 38% are *very* satisfied.

NOTE: Response "Don't know" (0%) was included in this analysis

Overall Satisfaction (By Customer Type): Nearly 9-in-10 customers are satisfied across all customer groups; satisfaction highest among Generators

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?
[Asked of all respondents]



Key Insights

- The level of intense satisfaction is virtually identical across all three customer segments.
- The higher proportion of somewhat satisfied and complete absence of dissatisfied Generators results in universal satisfaction among that customer group.
- The proportions are small, but there are some dissatisfied LDC (11%) and End-User (6%) customers.

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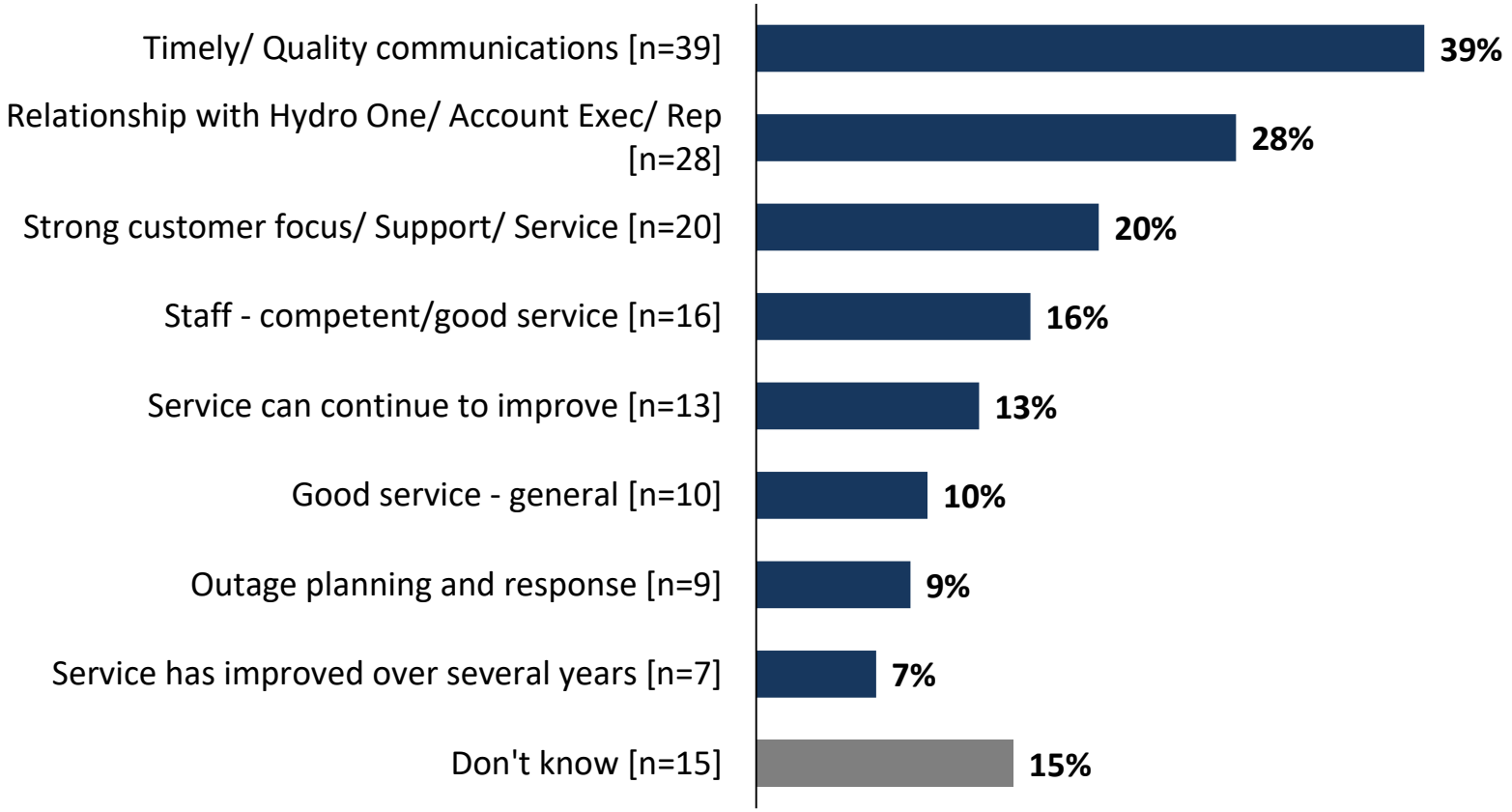
NOTE: Response "Don't know" (0%) was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Reasons for Satisfaction: Most LTX customers attribute their satisfaction to communications or their relationship with their Account Executive

C3. Is there any particular reason why you're satisfied with the service your organization receives from Hydro One?

[Asked of those that are somewhat or very satisfied, open-ended, n=101]



Key Insights

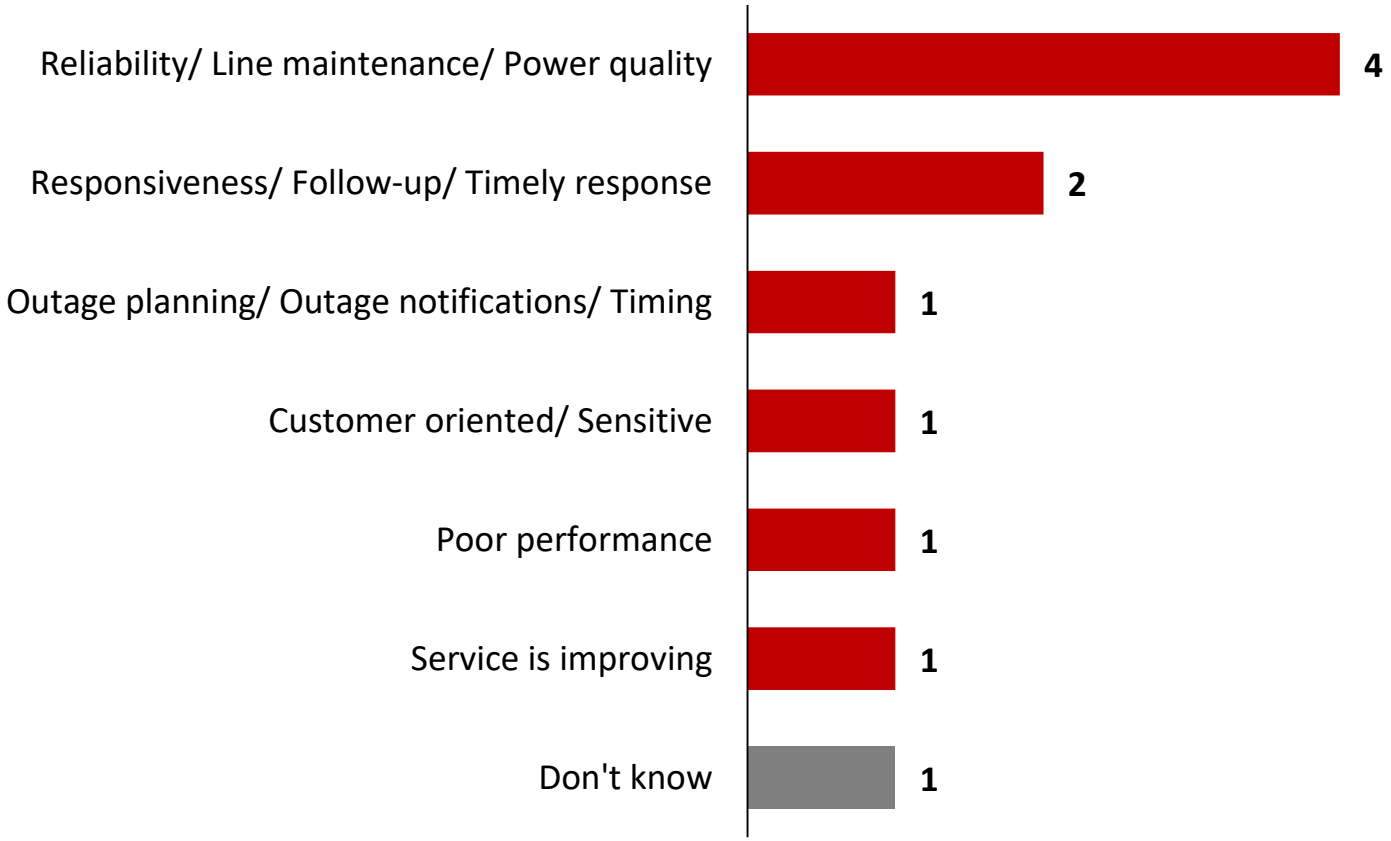
- About 2-in-5 (39%) satisfied LTX customers attribute their satisfaction to "timely/quality communications".
- Second on the list (28%) is "relationship with Account Executive", followed by "strong customer focus" (20%).
- While 13% feel that "service can continue to improve", 7% feel that "service has improved over several years".

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%. Response "Don't know" was included in this analysis.

Reasons for Dissatisfaction: Very few are dissatisfied. Those who are attribute it to reliability or quality issues, or responsiveness

Q **C4.** Is there any particular reason why you're dissatisfied with the service your organization receives from Hydro One?

[Asked of those who were somewhat or very dissatisfied, open-ended, n=7]



Key Insights

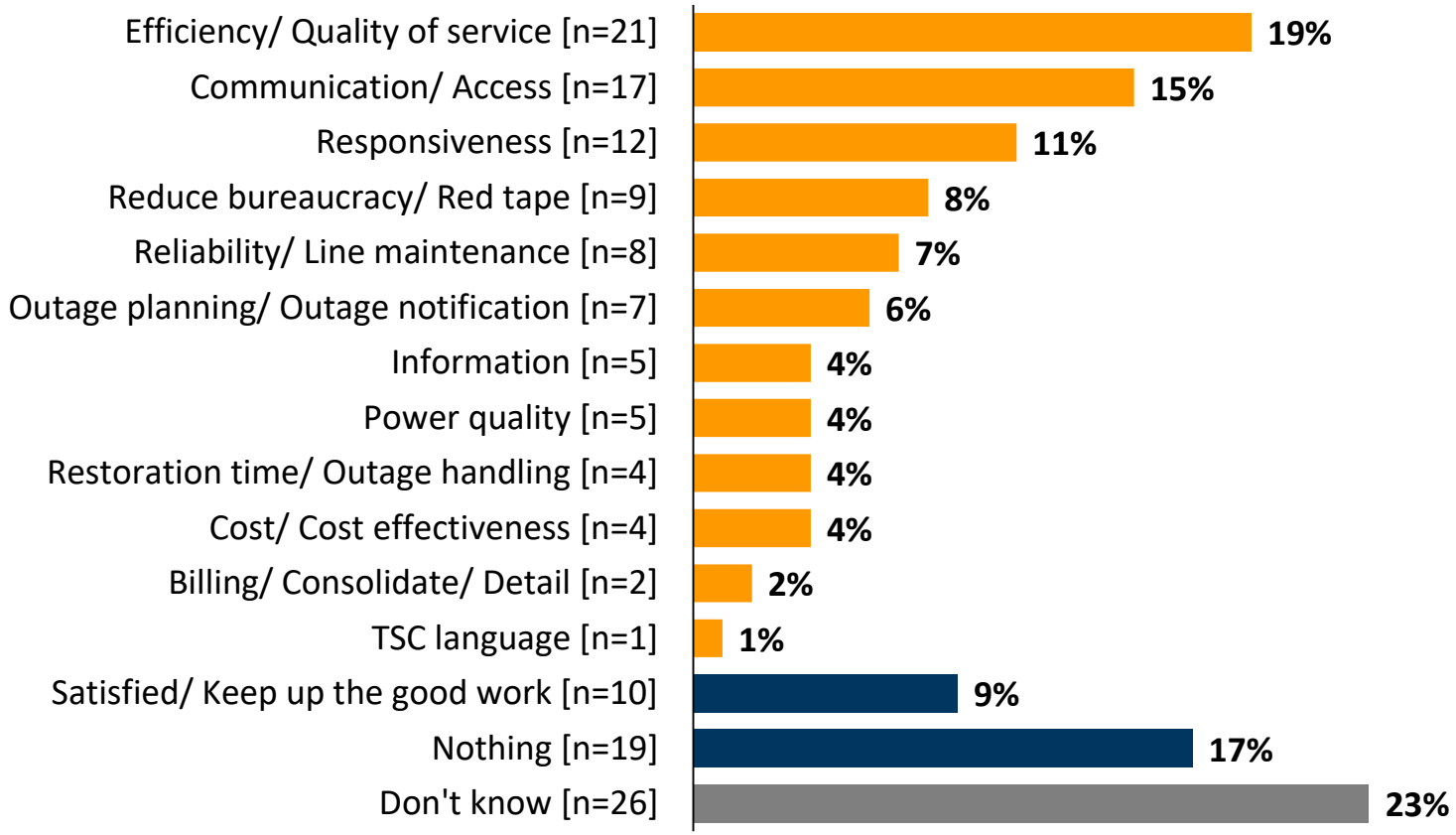
- Due to the very small sample size, any insights on reasons for dissatisfaction are entirely qualitative in nature.
- It is interesting to note that product (reliability/quality) is mentioned (4 times) almost as much as issues with customer service (5 mentions).

NOTE: Multiple mentions were recorded in this open-ended question. As such, numbers may add up to more than n=7 Response "Don't know" was included in this analysis.

Overall Areas of Improvement: One-in-five (19%) would like to see an increase in efficiency/quality of service; half (49%) have nothing to suggest

Q **C5.** Is there anything in particular that Hydro One can do to improve its services to your organization?

[Asked of all respondents, open-ended, n=112]



Key Insights

- Half (49%) of LTX customers have nothing to suggest (17%), or they are satisfied (9%), or they just don't know (23%) how Hydro One could improve their service.
- "Efficiency/quality of service" tops the list of suggestions at 19%, followed by "communication/access" (15%), and "responsiveness" (11%).
- Product (reliability: 7%, quality: 4%) is mentioned by about 1-in-10.

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%. Response "Don't know" was included in this analysis.

Dimensions of Customer Satisfaction

Dimension of Satisfaction

Customer Service

Metrics Included:

- Customer Service (Overall): 93%
- Communication Methods: 93%
- Service received from Key Account Executive: 90%

Average Customer Service Satisfaction Score

Average Customer Service Dissatisfaction Score

Summary Findings

- Across all LTX customers, customer service dimension metrics have satisfaction levels of 90% or higher:
  - Generators have the highest average score (96%), with universal (100%) satisfaction on overall customer service and communication methods. A relative weak area for these customers is service from Key Account Reps (85%).
  - End-Users mirror Generators, with near-universal satisfaction overall and on communication methods (94%), and a marginally lower result for KAR service (88%).
  - LDCs, though still very satisfied, are the least satisfied customer type. Unlike the other two, KAR service is ranked higher (96%) than the other two metrics (87% each).

Insights

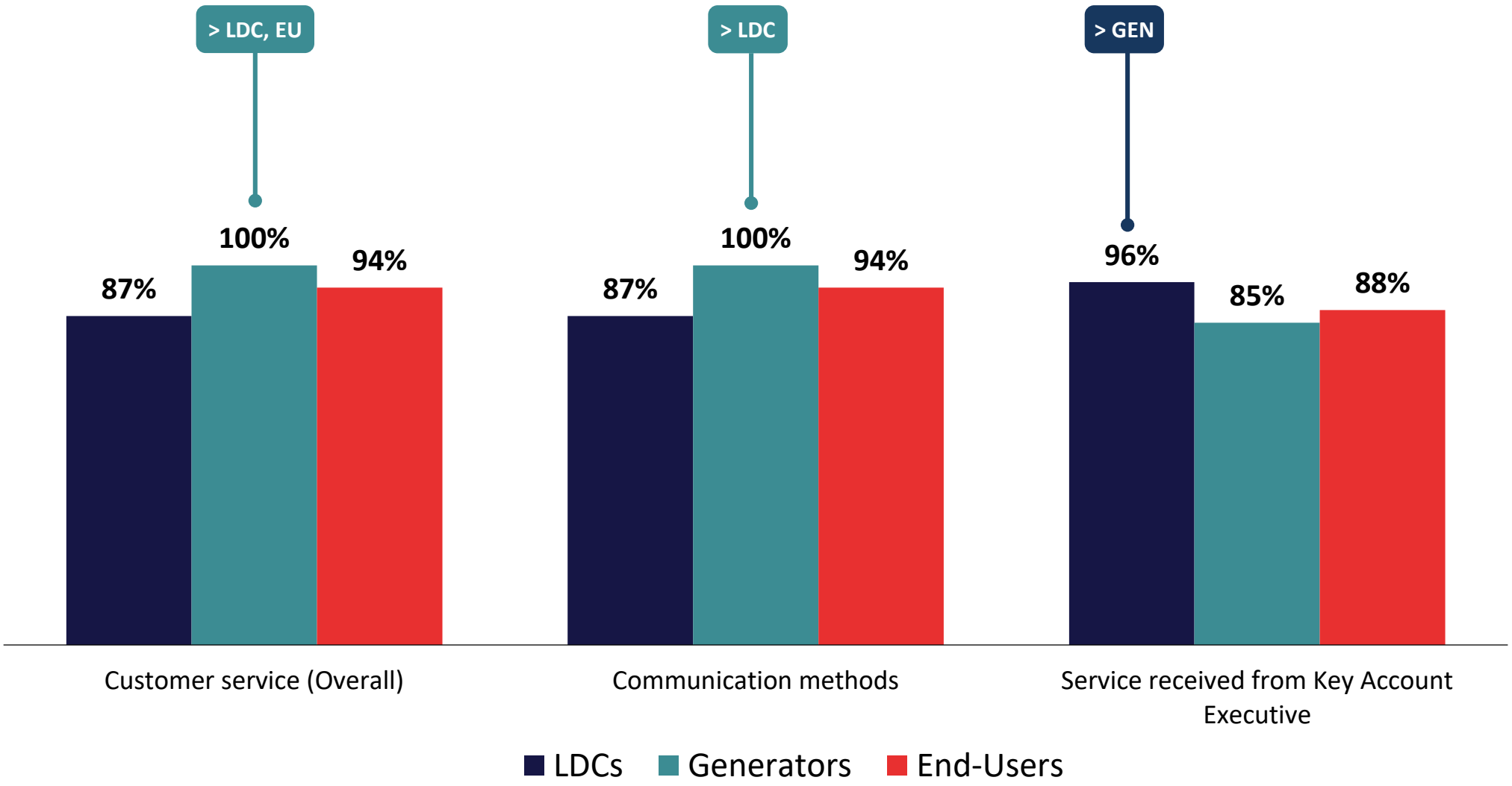
Customer Service (Overall): With overall satisfaction at 93%, and a majority (52%) who are *very* satisfied, Hydro One is performing extremely well on this metric. Customers appreciate the quality of service, the account reps, and responsiveness.

Communication Methods: Satisfaction on this metric is even more intense (57% *very* satisfied) than overall customer service. Rather than make any changes, the best strategy is probably to stay the course.

Service from Key Account Executive: Two-thirds (67%) are *very* satisfied with the service they receive from their Key Account Executive. That is the highest level of intensity across all metrics in this survey. There is some room for gains among Generators and End-Users, and it may be a matter of increasing the level of engagement with these customers. At the end of the survey, three-in-ten Generators (30%) and End-Users (32%) say they want more engagement with their Account Executive.

In summary, there is no need for changes in how things are done. Just increase engagement with Gens and EUs.

Dimensions of Satisfaction: Customer Service by Customer Type



Average Customer Service Satisfaction Scores

2018 **90%**

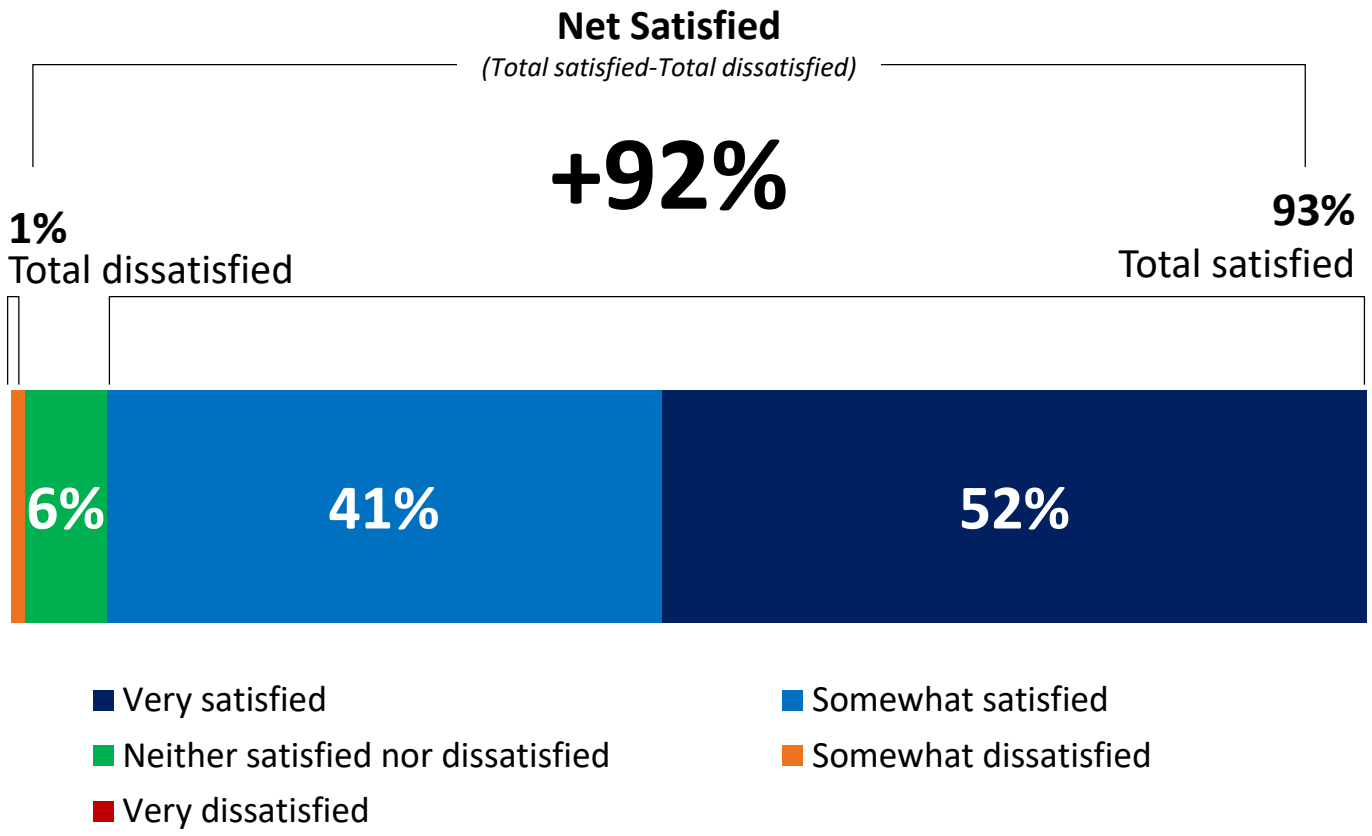
2018 **96%**

2018 **92%**

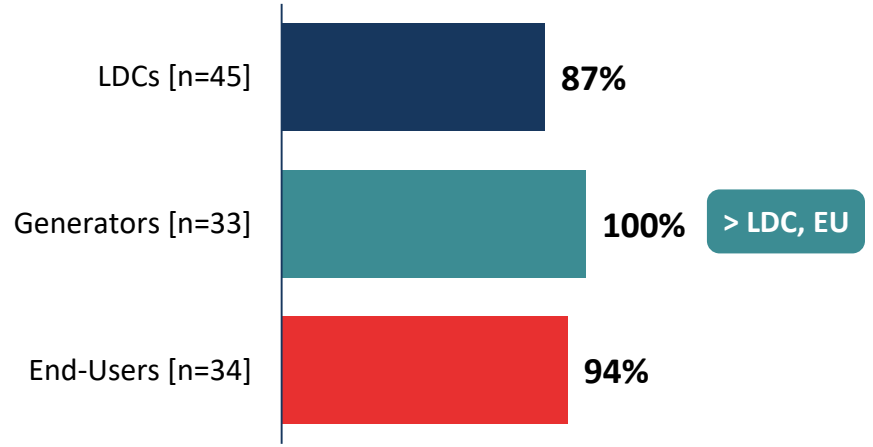
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Overall Satisfaction, Customer Service: 9-in-10 (93%) are satisfied with Hydro One's customer service; half (52%) are *very* satisfied

Q **F30.** Overall, how satisfied or dissatisfied are you with the **customer service** provided to your organization by Hydro One?
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



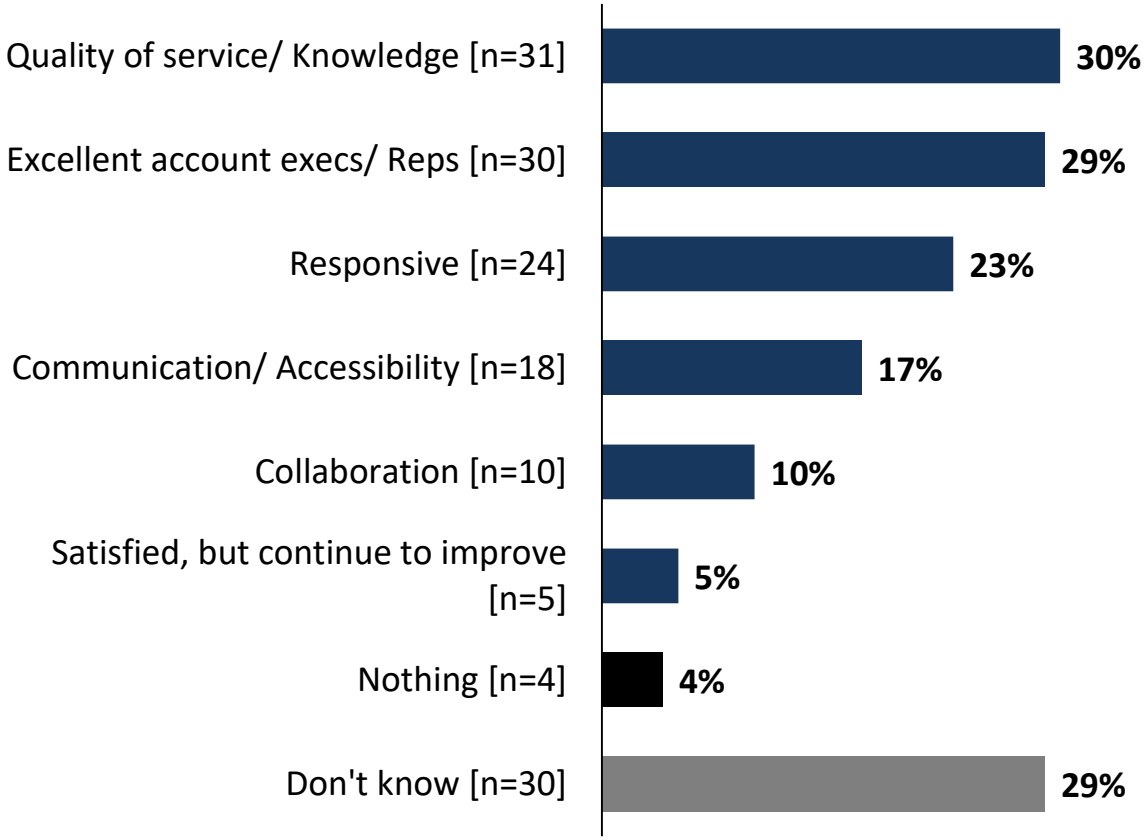
Key Insights

- Satisfaction with customer service among LTX customer is solid; half (52%) say they are *very* satisfied, and another 2-in-5 (41%) are *somewhat* satisfied.
- Among Generators, satisfaction with customer service is universal (100%). It is marginally lower among End-Users (94%) and lowest among LDCs (87%).

NOTE: Response "Don't know" (0%) was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Reasons for Satisfaction and Dissatisfaction: The quality of customer service and the Account Reps are the primary reasons cited by satisfied customers

F31. Is there any particular reason why you're **satisfied** with the customer service provided by Hydro One?
[Asked of those that are somewhat or very satisfied, open-ended, n=104]



F32. Is there any particular reason why you're **dissatisfied** with the customer service provided by Hydro One?
[Asked of those that are somewhat or very dissatisfied, open-ended, n=1]

Key Insights

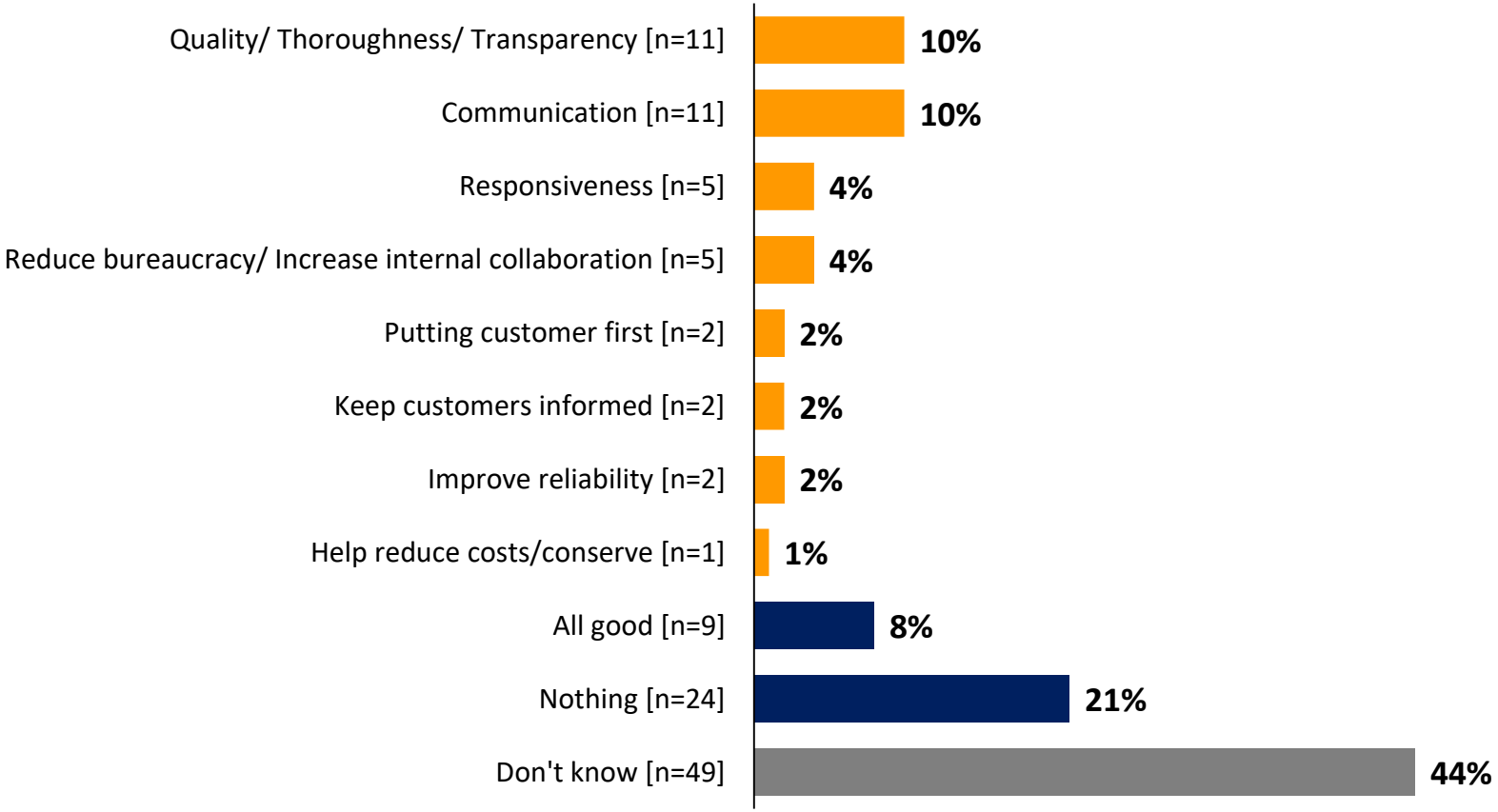
- "Quality of service" (30%) and "excellent account execs" (29%) are tied as the main reason that customers are satisfied with the customer service they receive from Hydro One.
- At 23%, "responsive" is not far behind, followed by "communication/accessibility" (17%) and "collaboration" (10%).
- 3-in-10 (29%) don't know why they are satisfied.
- The single LTX customer who is dissatisfied with Hydro One's customer service did not specify a reason.

NOTE: Multiple mentions were recorded in these open-ended questions. As such, percentages may add up to over 100%. Response "Don't know" was included in this analysis.

Areas of Improvement, Customer Service: Very few LTX customers have suggestions for how Hydro One could improve their customer service

F33. Is there anything in particular that Hydro One can do to improve your organization's customer service experience?

[Asked of all respondents, n=112]



Key Insights

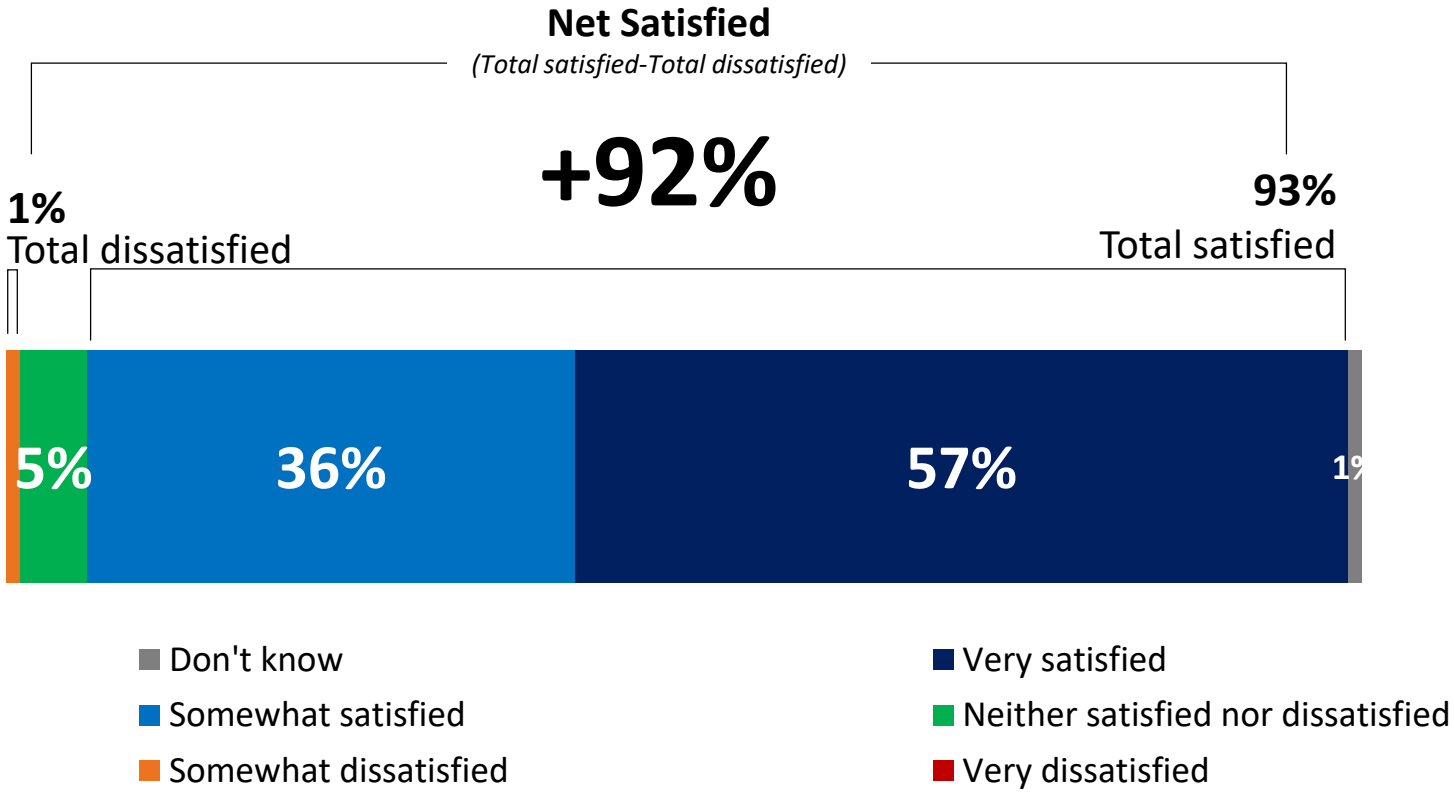
- Almost half (44%) of LTX customers "don't know" how Hydro One could improve customer service. Another 3-in-10 either don't have anything to suggest (21%) or they say it's "all good" (8%).
- The lack of ready suggestions for improvements is a reflection of the high level of satisfaction with customer service and confirms that there are no obvious problem areas.
- The "quality" of service and "communication" (10% each) top the list of suggested improvements, followed by "responsiveness" and "reduce bureaucracy" (4% each).

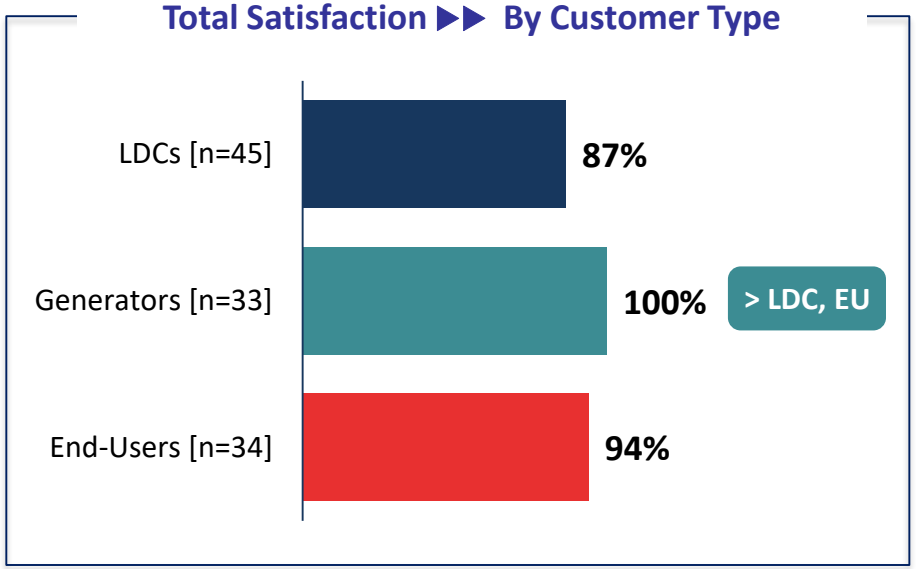
NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.
Response "Don't know" was included in this analysis.

Communication: 9-in-10 (93%) are satisfied with Hydro One's customer service; half (57%) are very satisfied

F34. Thinking about your organization's interactions with Hydro One over the **past year** -- either via email, over the telephone, at the Large Customer Conference, or with in-person meetings – how satisfied or dissatisfied are you with the way Hydro One communicates with you and your organization?

[Asked of all respondents, n=112]





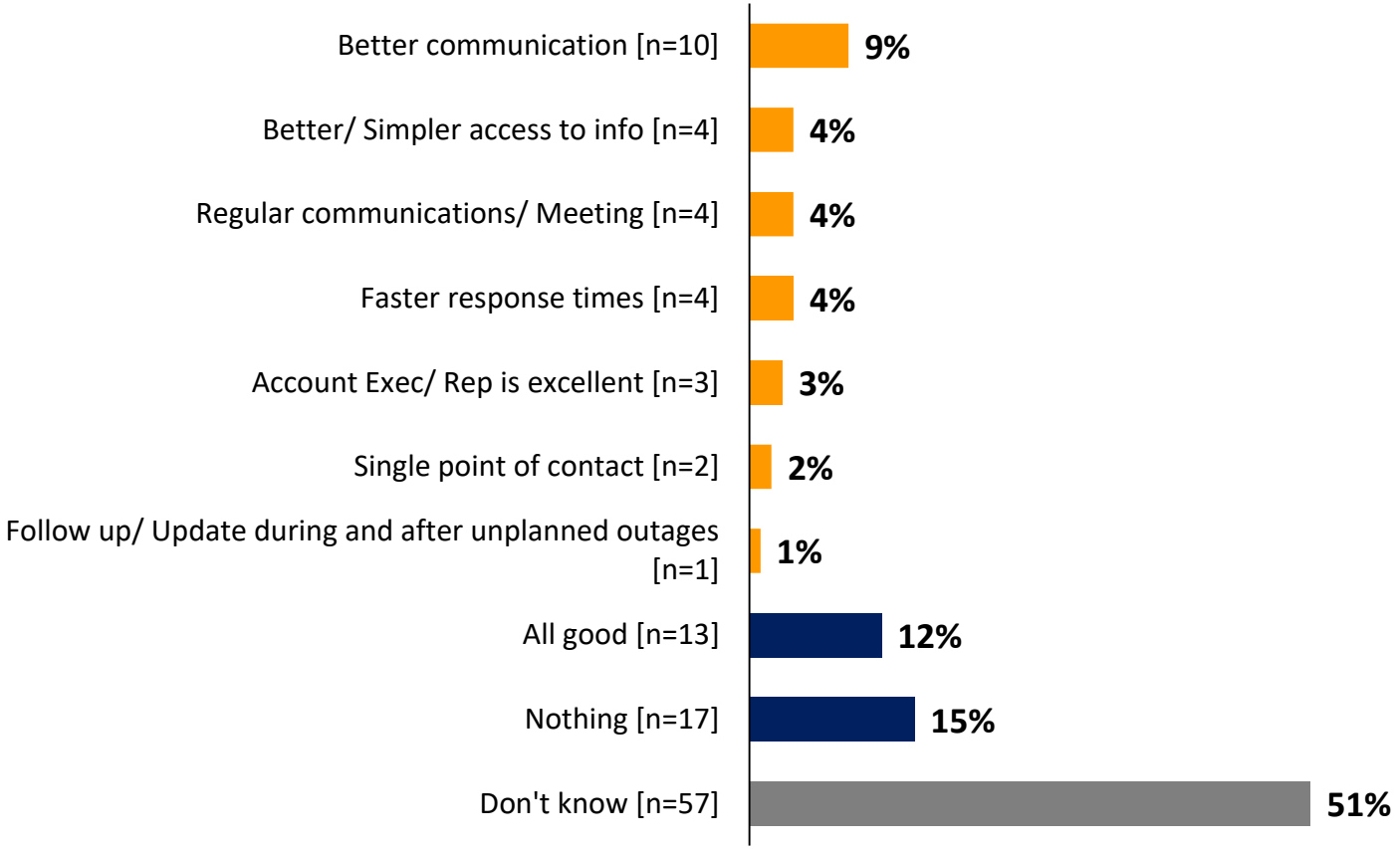
Key Insights

- Similar to overall customer service, satisfaction with communication among LTX customer is solid; most (57%) say they are *very* satisfied, and another third (36%) are *somewhat* satisfied.
- Among Generators, satisfaction with communication is universal (100%). It is marginally lower among End-Users (94%) and lowest among LDCs (87%). An exact replication of satisfaction with customer service overall.

NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Areas of Improvement, Communication: Most LTX customers are not able to suggest how Hydro One can improve their communication

F33. Is there anything in particular that Hydro One can do to improve the way it communicates with your organization?
[Asked of all respondents, open-ended, n=112]



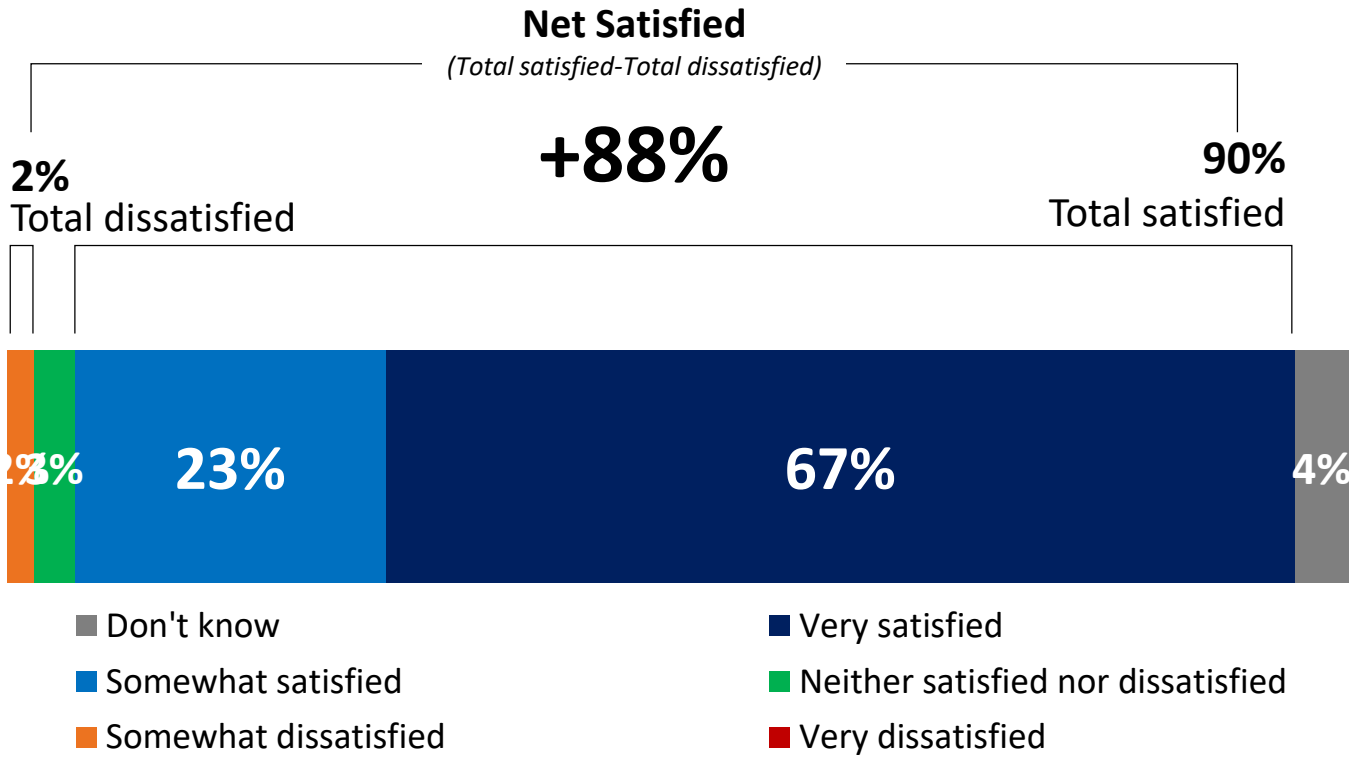
Key Insights

- Fully half (51%) of LTX customers "don't know" how Hydro One can improve the way it communicates with them. Another 15% say "nothing" and 12% say it's "all good".
- As noted with overall customer service, the lack of ready suggestions for improvements is a reflection of the high level of satisfaction with communication and confirms that there are no obvious problem areas.
- Rather than identifying areas for improvement, the response suggest that LTX customers want Hydro One to keep doing what they are doing, but just do it better. This presents an opportunity to solidify current practices and look for tweaks to optimize things like clarity, response time, timeliness and simplicity.

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.
Response "Don't know" was included in this analysis.

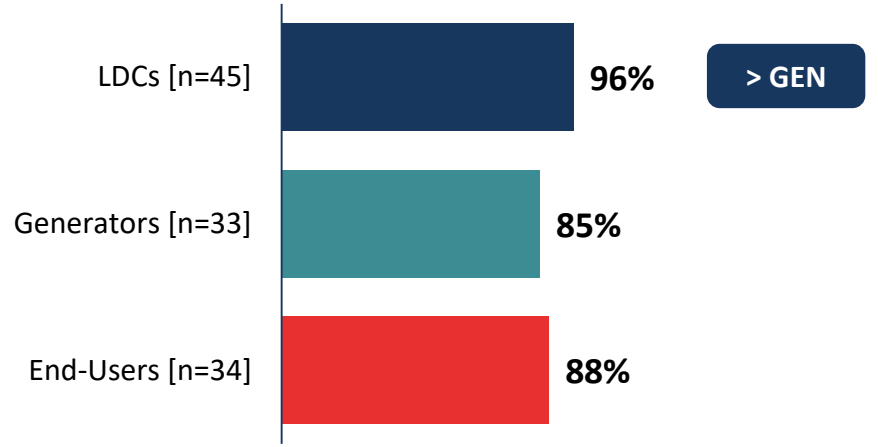
Satisfaction with Key Account Executive: Solid (90%) and intense (67% *very* satisfied) satisfaction with Key Account Executives

F36. How satisfied or dissatisfied are you with the service you receive from your Hydro One Key Account Executive?
[Asked of all respondents, n=112]



Not shown: 1% have never had an interaction with their Key Account Executive

Total Satisfaction ▶▶ By Customer Type



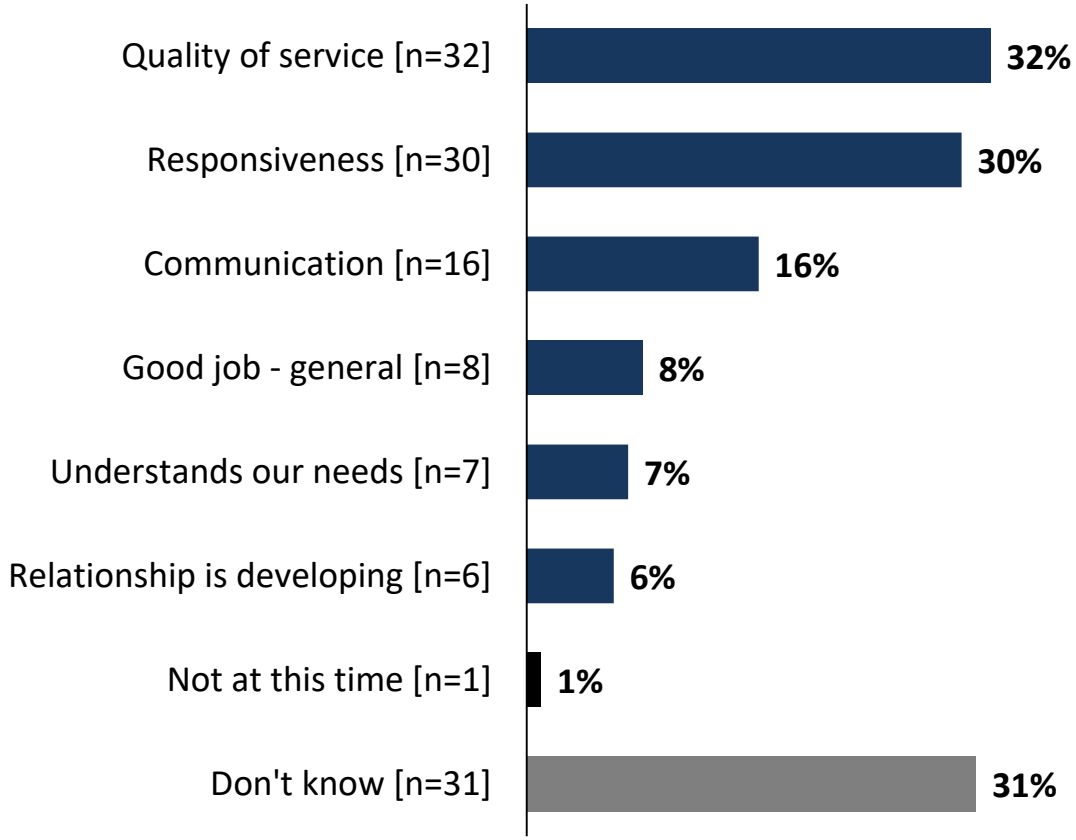
Key Insights

- Not only is satisfaction with the service from Key Account Executives solid (90%), it is also intense (67% *very* satisfied).
- The intensity of satisfaction here is higher than it is for any other metric in the survey.
- LDCs are almost universally satisfied (96%), with End-Users and Generators (88% and 85%, respectively) very solid, but not quite as satisfied.

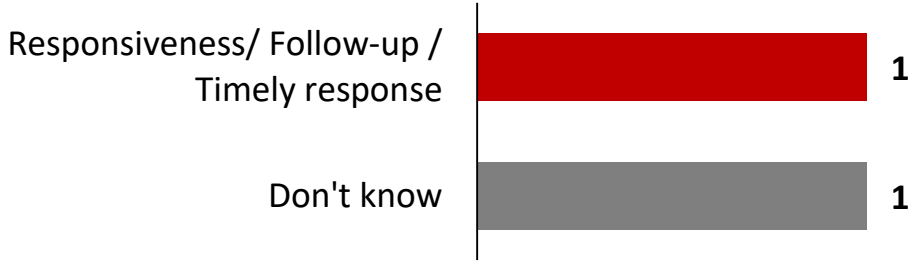
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Reasons for Satisfaction and Dissatisfaction: Satisfaction with KAEs is attributed primarily to the quality of service (32%) and responsiveness (30%)

Q **F37.** Is there any particular reason why you're **satisfied** with your Hydro One **Key Account Executive**?
[Asked of those that are somewhat or very satisfied, open-ended, n=101]



Q **F38.** Is there any particular reason why you're **dissatisfied** with your Hydro One **Key Account Executive**?
[Asked of those that are somewhat or very dissatisfied, open-ended, n=2]



Key Insights

- 3-in-10 LTX customers who are satisfied with their KAE attribute it to "quality of service" (32%) or "responsiveness" (30%).
- As many (31%) do not specify a reason for their satisfaction.
- Only one of the two customers who are dissatisfied with their KAE cite a reason: "responsiveness".

NOTE: Multiple mentions were recorded in these open-ended questions. As such, percentages may add up to over 100%.
Response "Don't know" was included in this analysis.

Areas of Improvement, Key Account Executive: 4-in-5 "suggestions" for KAE improvement confirm that there are no major weaknesses

F39. What, if anything, can your **Key Account Executive** do to better serve you and your organization?

[Asked of all respondents who have had an interaction with their Key Account Executive, open-ended, n=110]

Key Insights

- 4 out of 5 responses to an invitation to provide feedback on how KAEs can improve their service are a reflection of how highly satisfied LTX customers are on this metric:
  - 55% "don't know"
  - 15% "nothing"
  - 10% "keep up the good work"
- A limited amount of interaction is as likely to be mentioned as "communication" (6% each).
- Responses to this invitation for feedback confirm how solidly and intensely satisfied LTX customers are with their Key Account Executives.

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%. Response "Don't know" was included in this analysis.

Dimension of Satisfaction

Product Quality/ Reliability

Metrics Included:

- Planned outages (overall): 81%
- Quality of power: 74%
- Unplanned outages (overall): 73%
- Reliability of electricity service: 71%
- Accuracy of duration estimate: 67%
- Time to restore power: 66%
- Communication during outages: 62%
- Number of unplanned power outages: 50%
- Duration of unplanned power outages: 48%

Average Quality/Reliability Satisfaction Score

Average Quality/Reliability Dissatisfaction Score

Summary Findings

- This dimension provides the greatest opportunity for improvement, as this is the area in which LTX customers are *least* satisfied, and – notably – most dissatisfied.
- For the most part, Generators are more satisfied than LDCs and End-Users on the metrics that make up this dimension – in many cases the differences are statistically significant. Quality of power (70%) and the number of unplanned outages (71%) are the relative weaknesses for this group.
- End-Users are *least* satisfied with their experience with unplanned outages – the number of them (42%), the duration of them (42%), and communication during them (58%).
- LDCs are similar to End-Users, with frequency (46%), duration (37%) and communication (56%) receiving the lowest satisfaction scores.

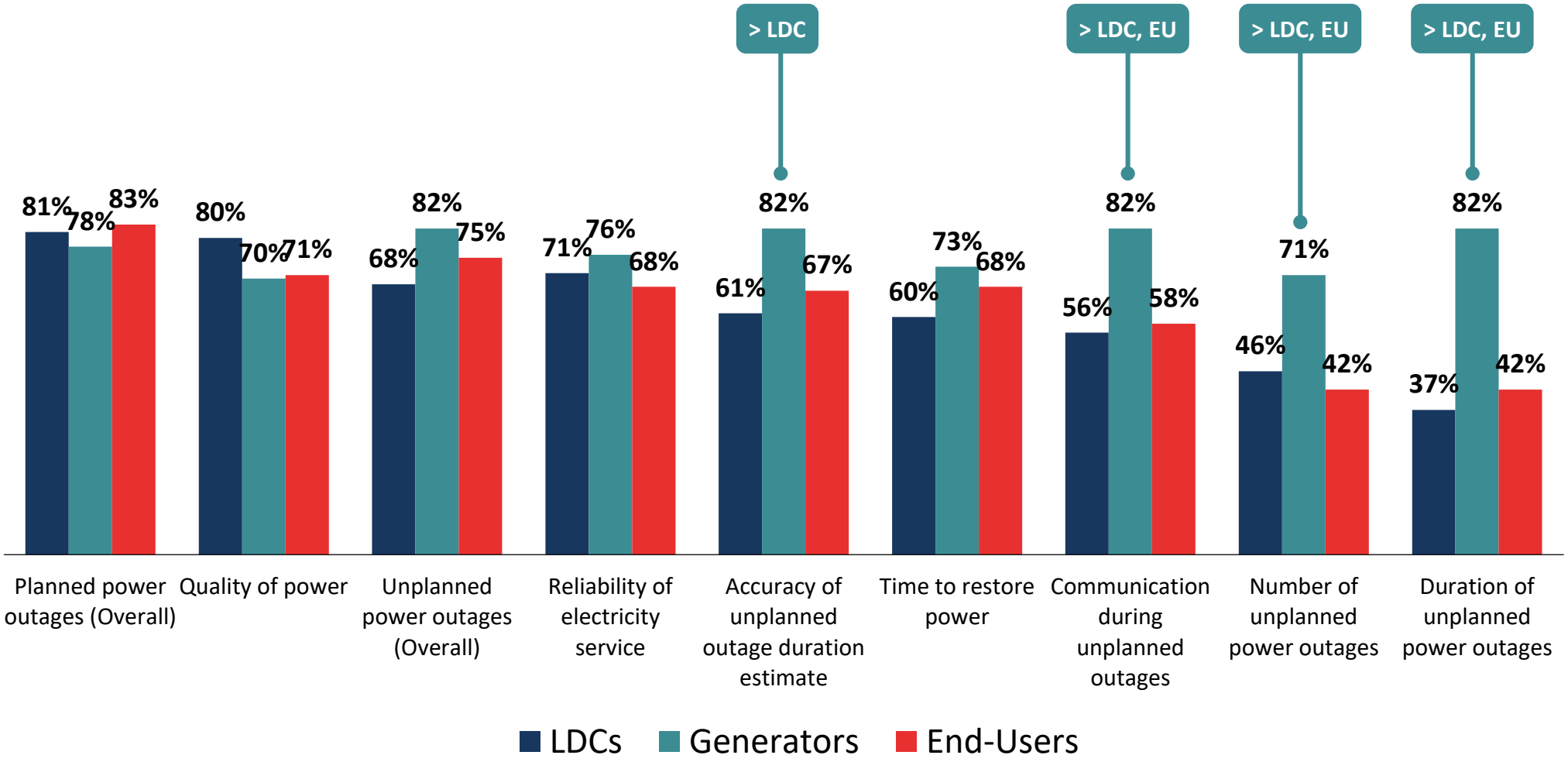
Insights

Planned Outages: Planned outages are less of an issue among LTX customers. Recall of planned outages is marginally lower than recall of an unplanned outage. Most (56%) who have experienced planned outages are *very* satisfied with how they are managed by Hydro One.

Unplanned Outages: Unplanned outages can have a real financial impact on business customers, so it's no surprise that they are not highly satisfied in this area. The frequency and duration of unplanned outages are not something Hydro One can control (aside from infrastructure changes), so how customers are supported during unplanned outages becomes critical. Communication and accuracy of duration essentially become lifelines to businesses, especially LDCs and End-Users who are more likely than generators to recall experiencing unplanned outages and need to decide whether to shut operations down for the day and send employees home, or to wait it out.

Hydro One can't control external forces, but improvement on the metrics that are under Hydro One's control will likely result in an improvement on satisfaction on frequency and duration due to a better customer experience.

Dimensions of Satisfaction: Product Quality/Reliability by Customer Type



Average Quality/Reliability Satisfaction Scores

2018 **62%**

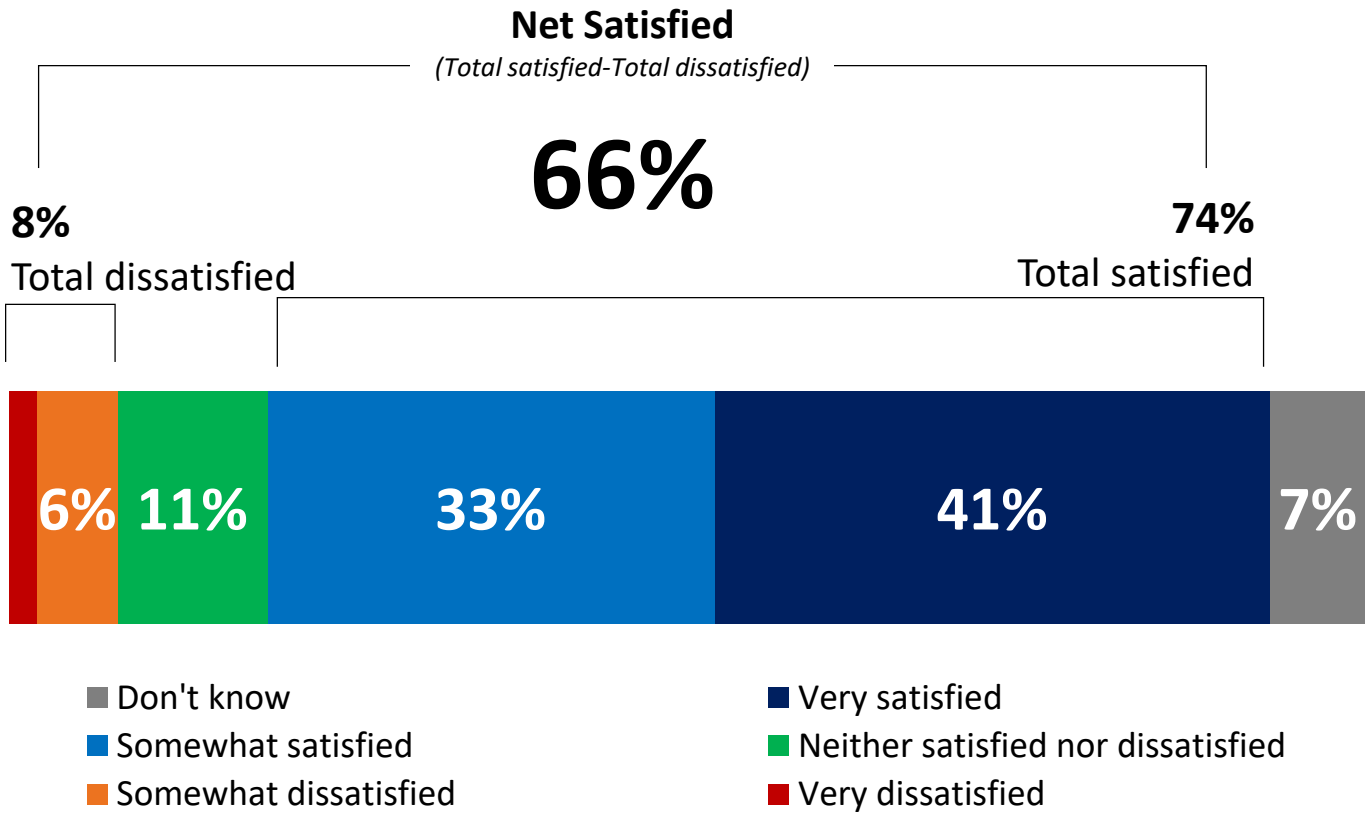
2018 **77%**

2018 **64%**

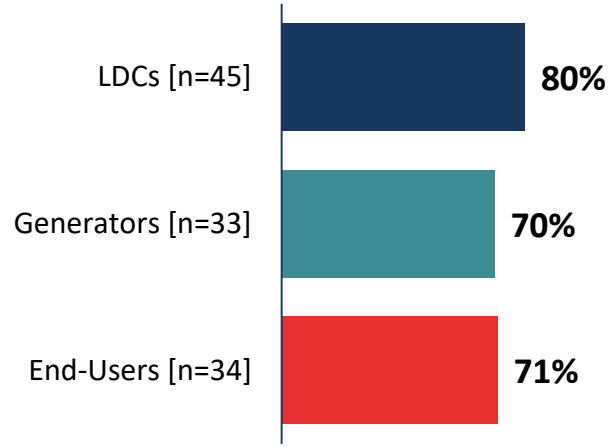
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Quality of Power: Three-quarters (74%) of LTX customers are satisfied with the quality of the power delivered to their organization

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E15. The quality of power delivered to your organization (as judged by the absence of voltage fluctuations that may affect your organization's facilities and equipment).
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



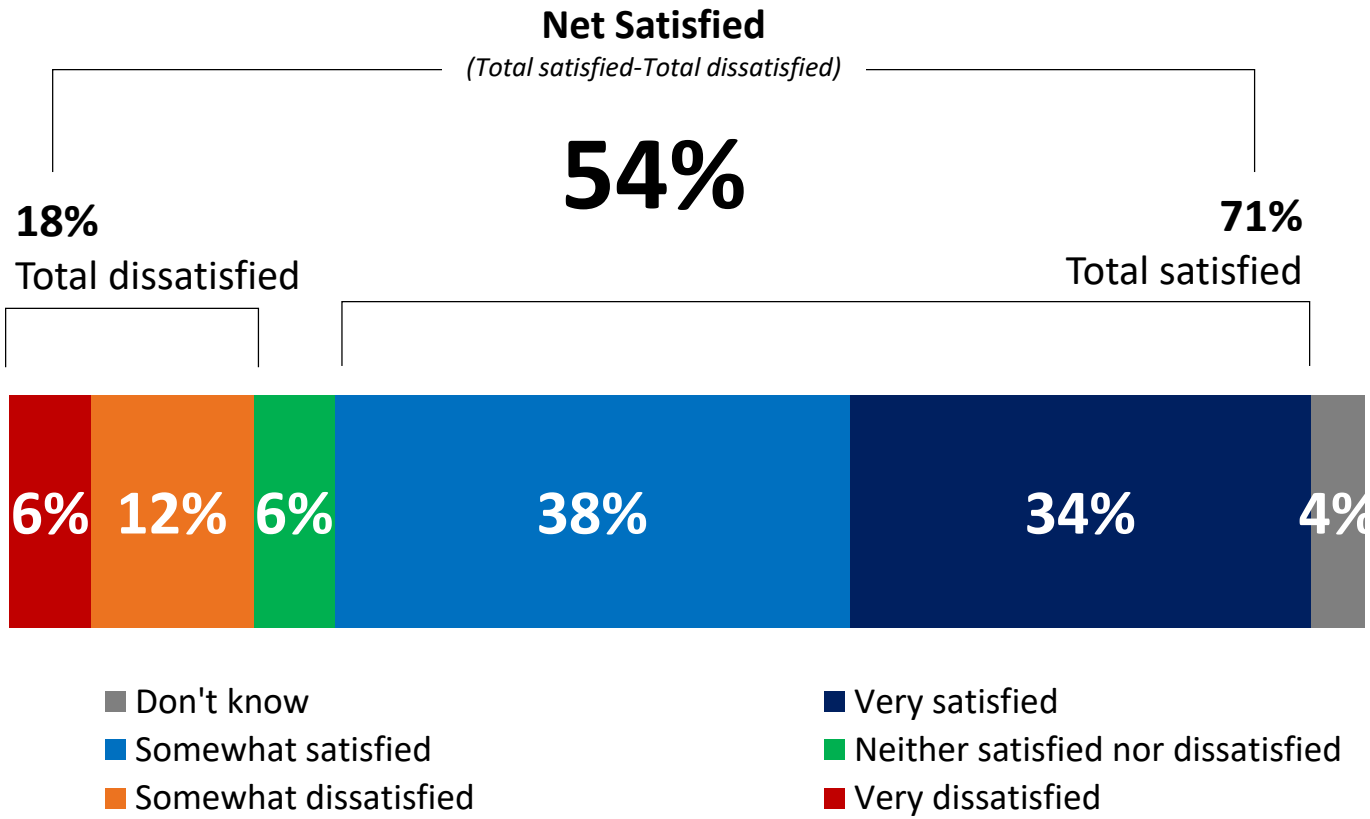
Key Insights

- Three-quarters (74%) of LTX customers are satisfied with the quality of the power delivered to their organization.
- LDCs are the most satisfied with their power quality (80%), with Generators (70%) and End-Users (71%) about ten points behind.

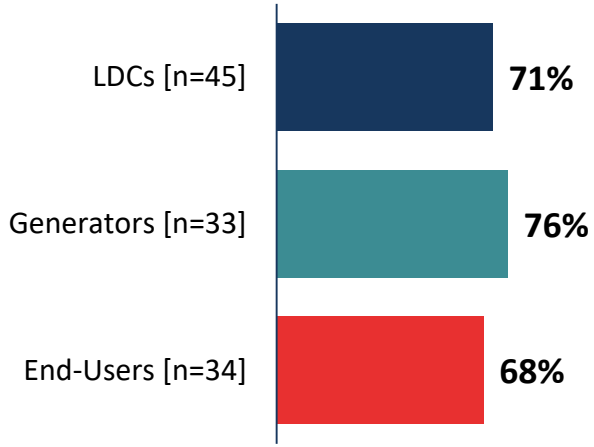
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Reliability of Electricity Service: Most (71%) LTX customers are satisfied with the reliability of their electricity service

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E16. The reliability of your electricity service (as judged by the number of unplanned power outages your organization experiences).
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



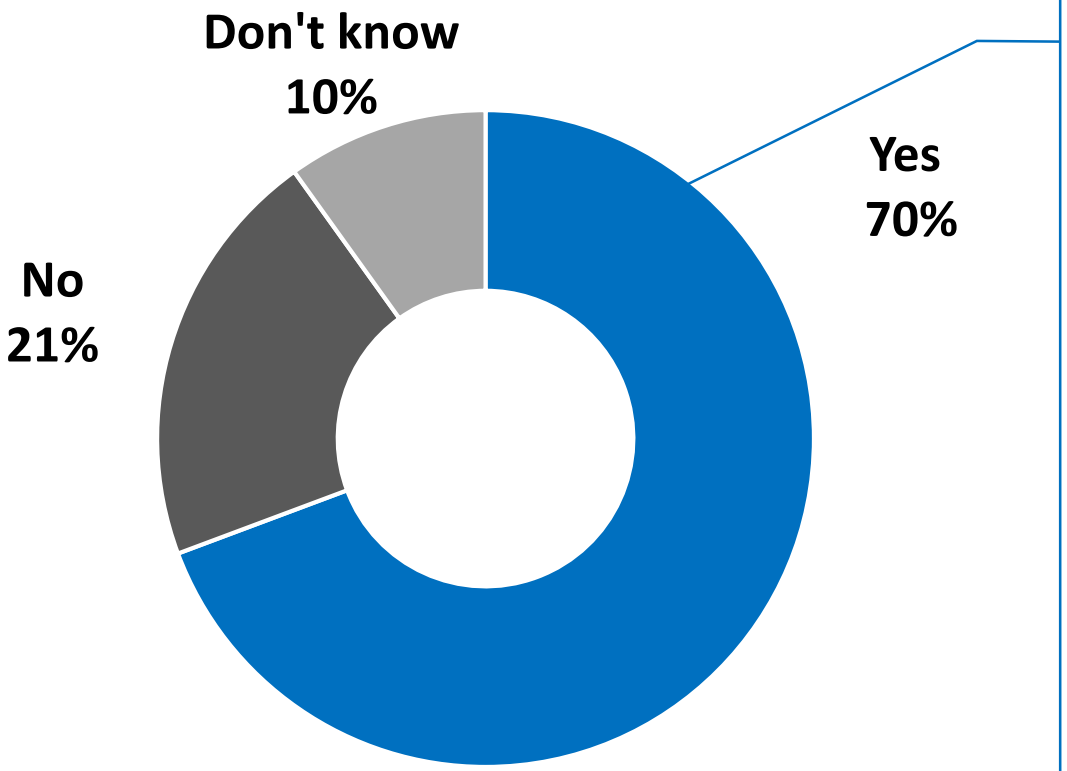
Key Insights

- There is room for improvement on intensity, but most (71%) LTX customers are satisfied with the reliability of their electricity service.
- LDCs are on par with the average (71%), while Generators are marginally higher (76%) and End-Users are marginally higher (68%).

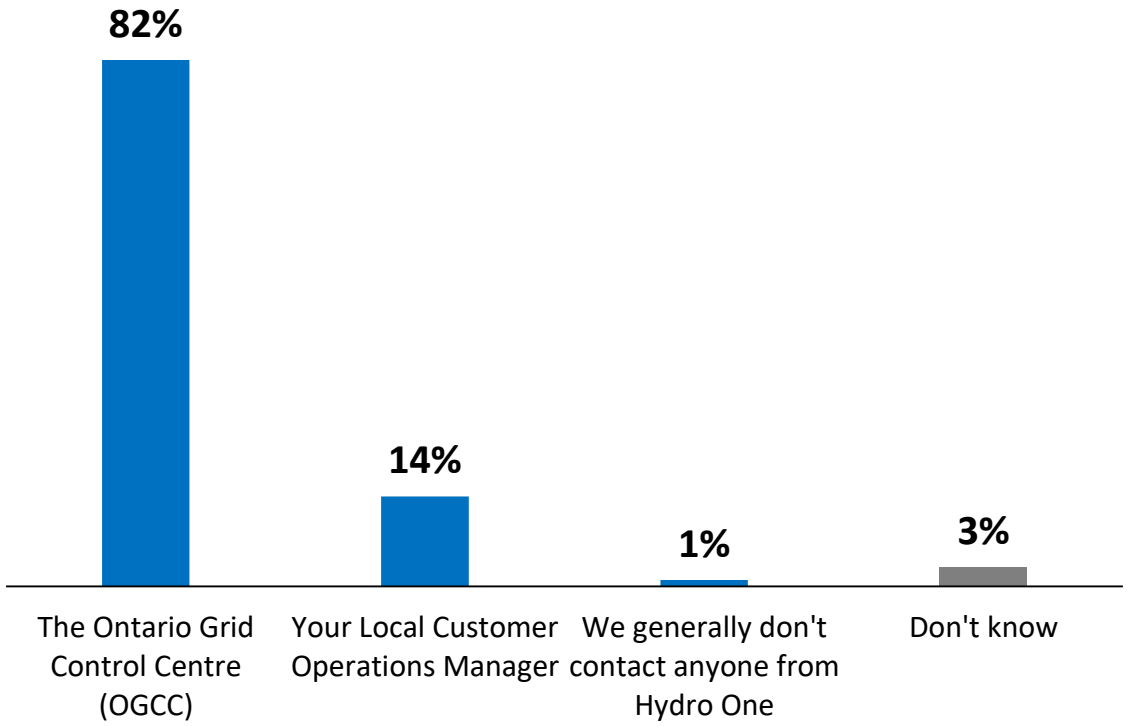
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Experience with Planned Outages: 7-in-10 (77%) LTX customers recall experiencing a *planned* power outage; OGCC is the main point of contact

Q **E26.** In the past year, has your organization experienced any **planned power outages (or loss of supply)** with Hydro One?
[Asked of all respondents, n=112]



Q **E27.** When your organization experiences an **unplanned power outage**, who does your organization typically contact to either *report the power outage* or *request estimated time of restoration updates*?
[Asked of those who could recall experiencing an planned power outage in the past year, n=78]

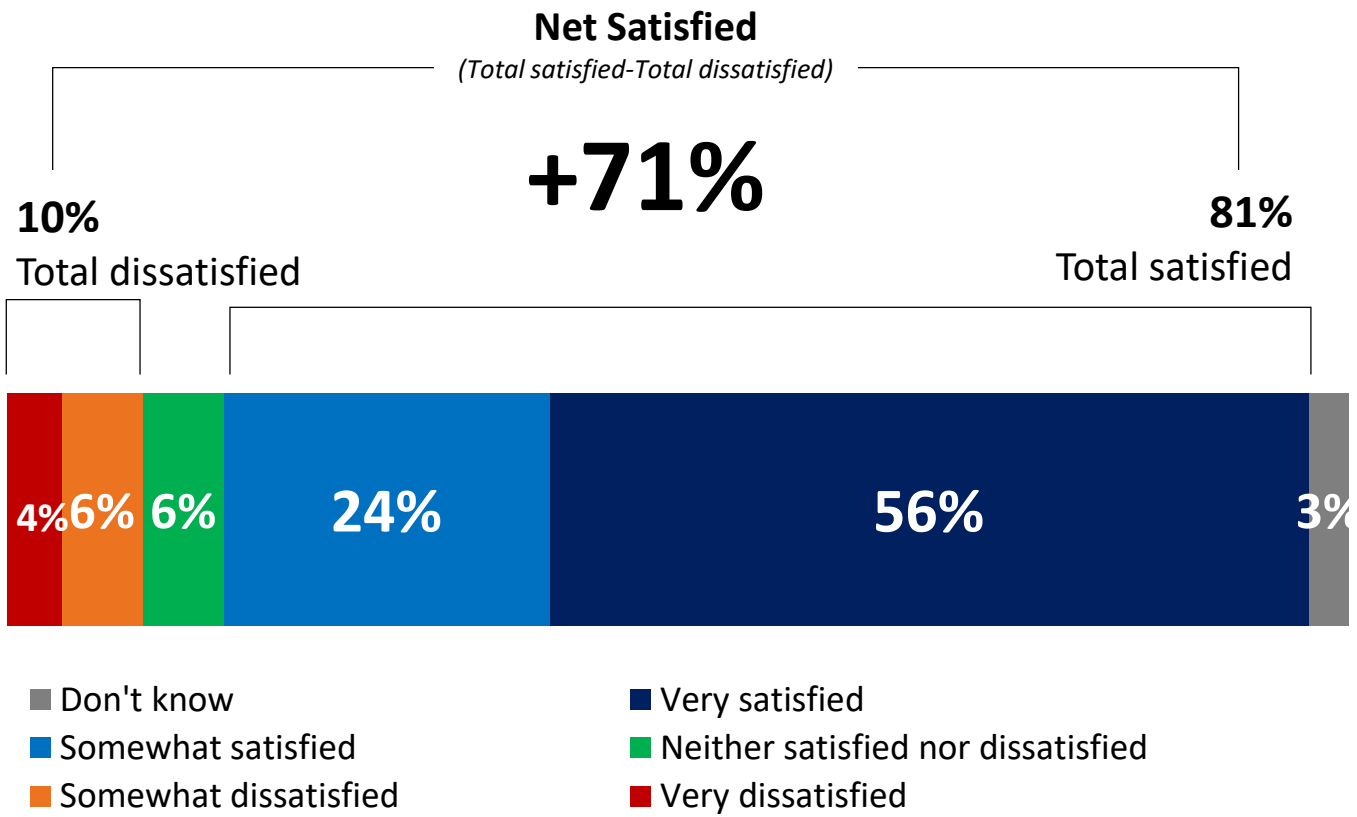


NOTE: Response "Don't know" was included in this analysis

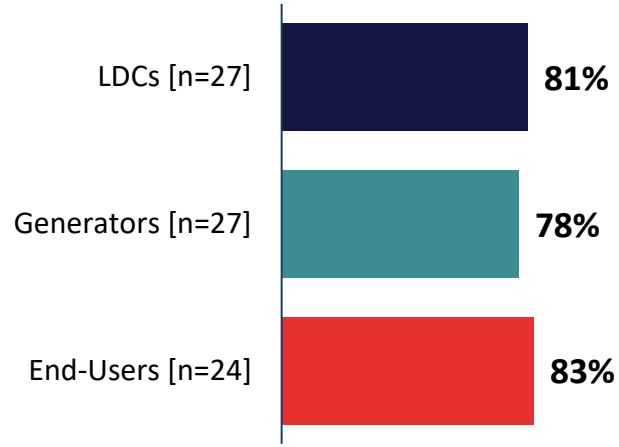
Satisfaction with Planned Outages: Among those who recall a planned outage, 8-in-10 are satisfied with Hydro One's management

Q **E28.** Generally, how satisfied or dissatisfied are you with the way your **planned power outages** are managed by Hydro One?

[Asked of those who could recall experiencing a planned outage in the past year, n=78]



Total Satisfaction ▶▶ By Customer Type



Caution: *small sample sizes*

Key Insights

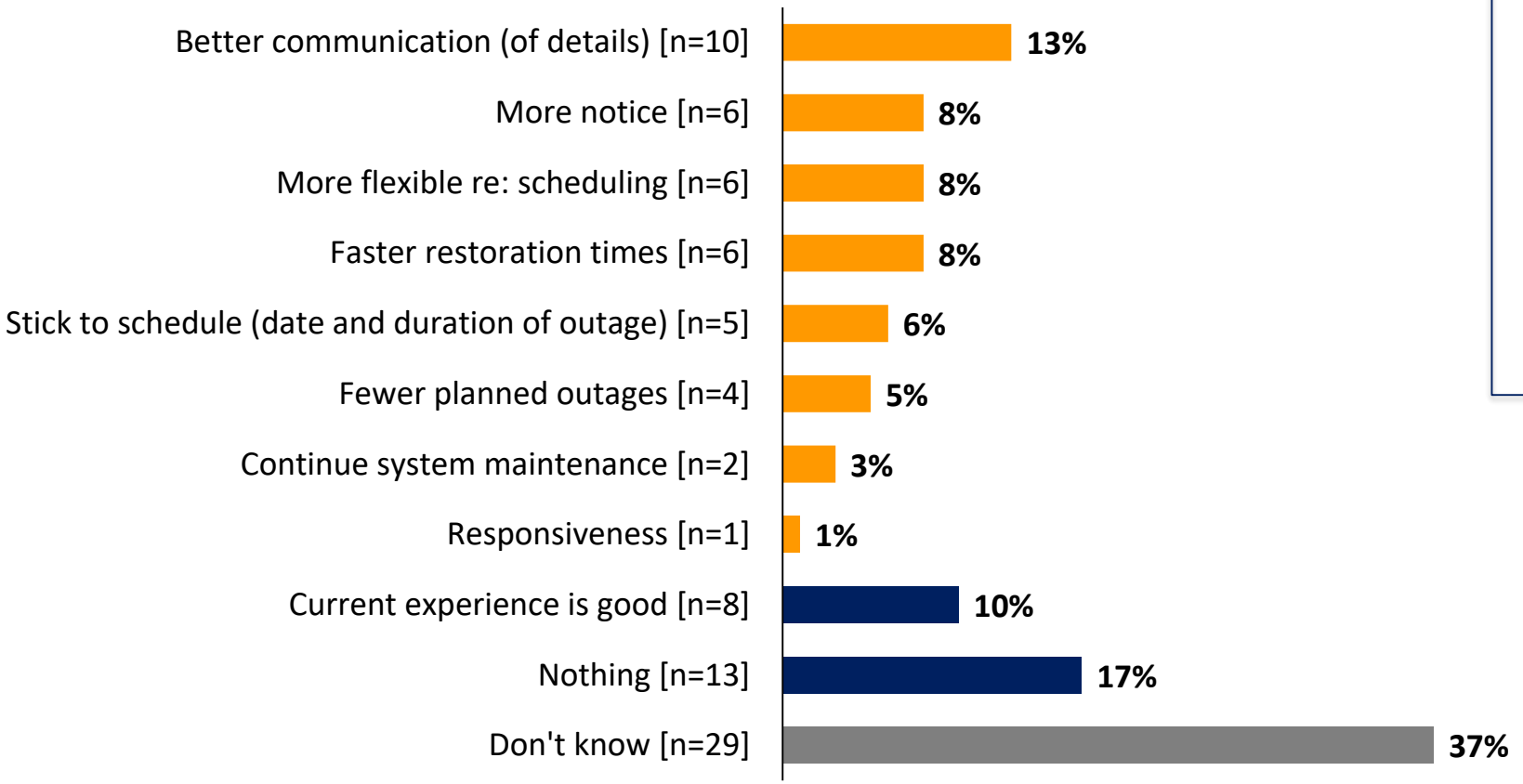
- LTX customers who have experienced a planned outage are highly satisfied (81% total satisfaction) with how they are managed by Hydro One. In fact, most (56%) are *very* satisfied.
- Taking the small sample sizes into account, the level of satisfaction across the three customer types is essentially equal.

NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Areas of Improvement, Planned Outages: Some want more detailed and accurate information, but most don't have any specific suggestions

E28. Is there anything in particular Hydro One can do to improve your organization's experience during planned outages?

[Asked of those who could recall experiencing a planned outage in the past year, open-ended, n=78]



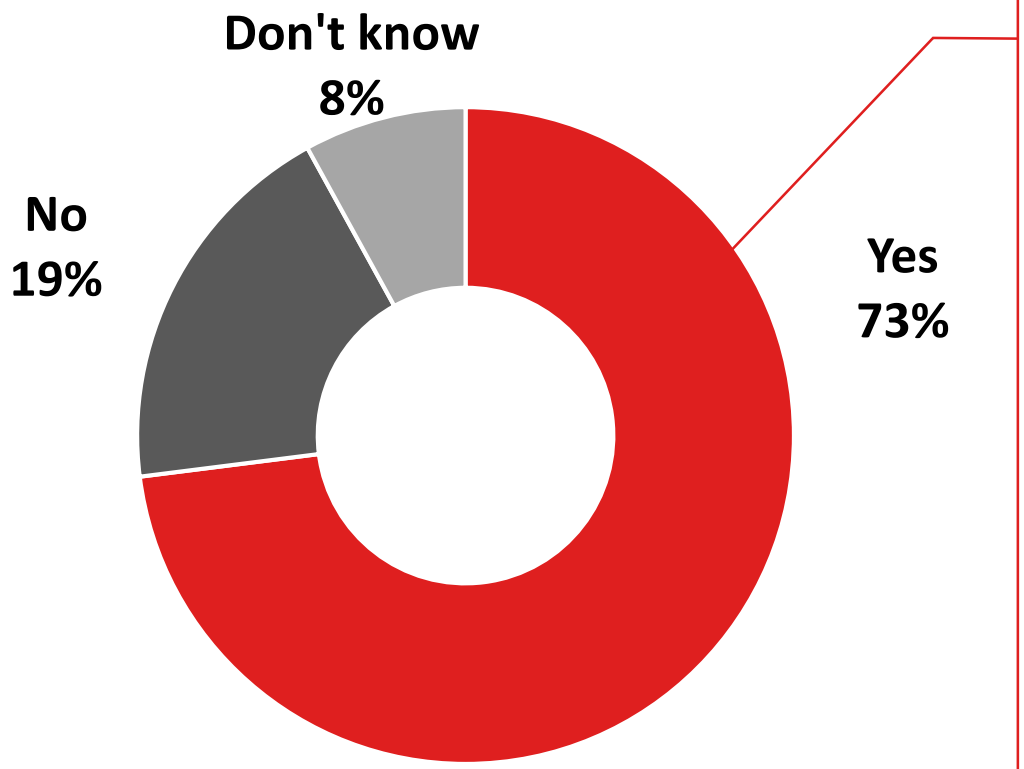
Key Insights

- Most LTX customers who have experienced a planned outage don't have any particular suggestions for improving Hydro One's service:
  - 37% "don't know"
  - 17% "nothing"
  - 10% "current experience is good"
- The suggestions given tend to focus on the quality and timeliness of information.

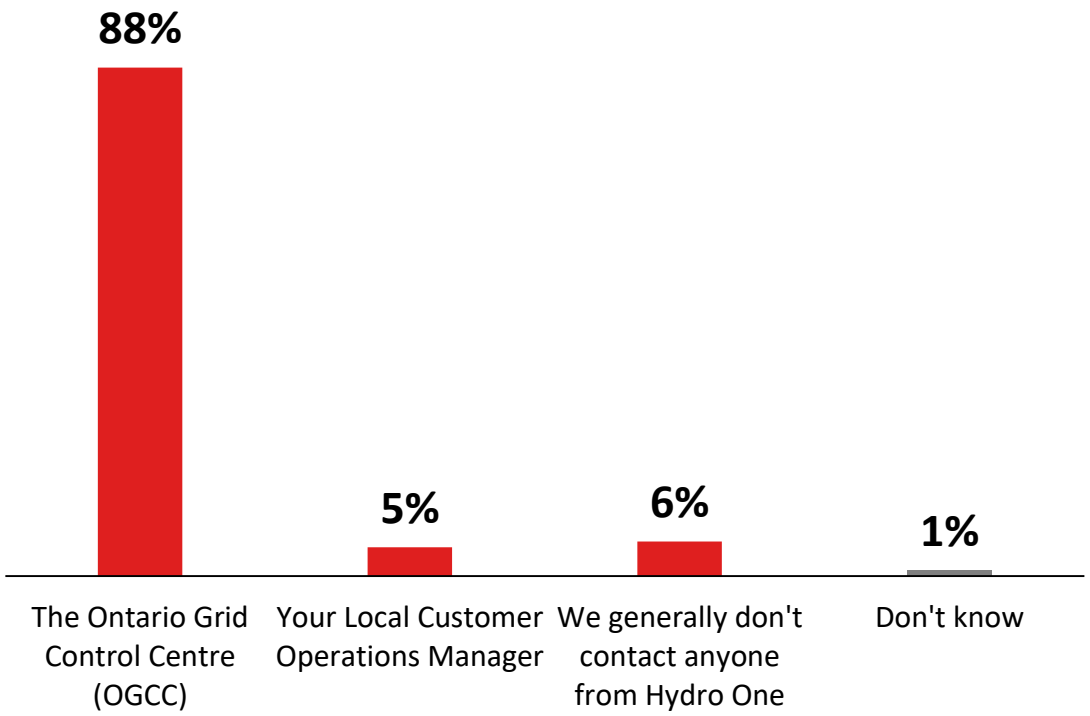
NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%. Response "Don't know" was included in this analysis.

Experience with Unplanned Outages: Three-quarters (73%) recall experiencing an unplanned outage in the past year; most contact OGCC

Q **E18.** In the past year, has your organization experienced any **unplanned power outages (or loss of supply)** with Hydro One?
[Asked of all respondents, n=112]



Q **E19.** When your organization experiences an **unplanned power outage**, who does your organization typically contact to either *report the power outage* or *request estimated time of restoration updates*?
[Asked of those who could recall experiencing an unplanned power outage in the past year, n=82]

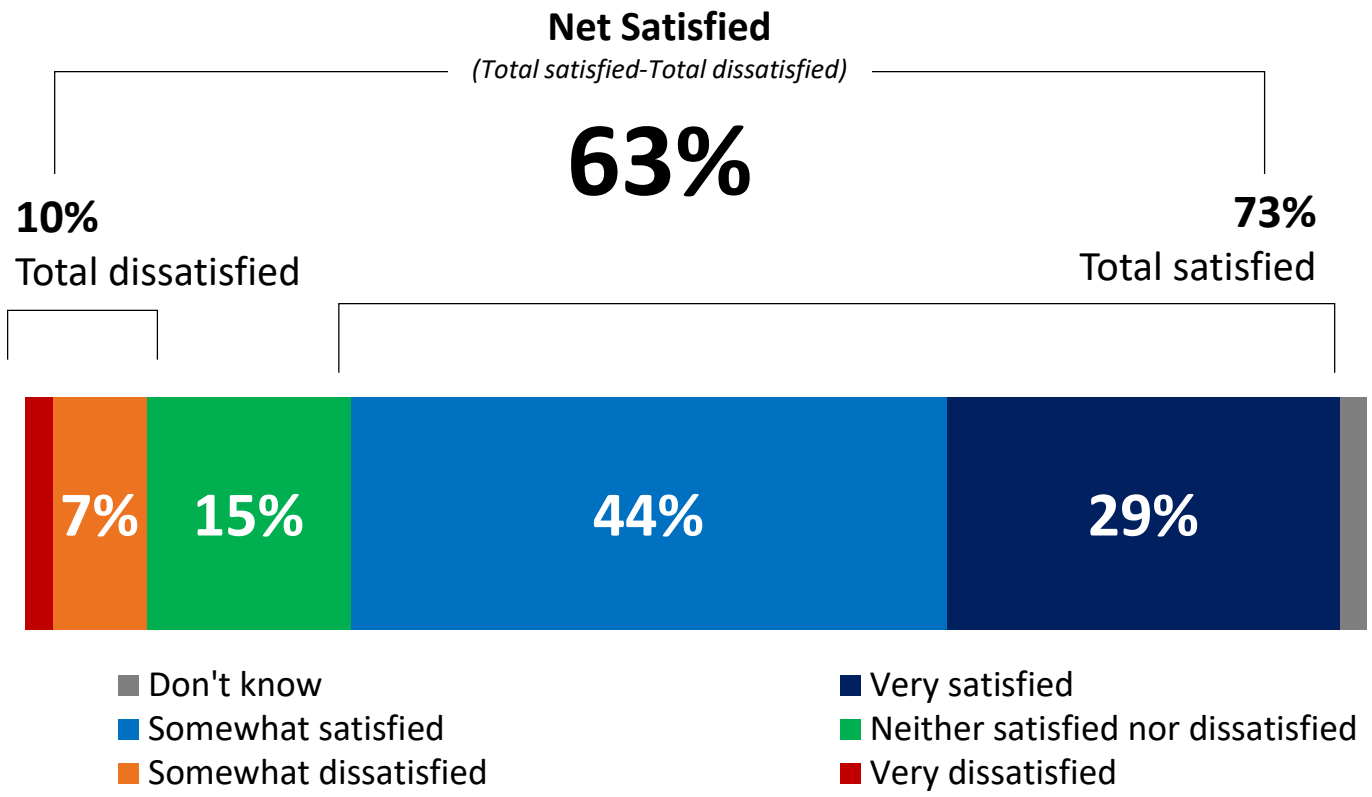


NOTE: Response "Don't know" was included in this analysis

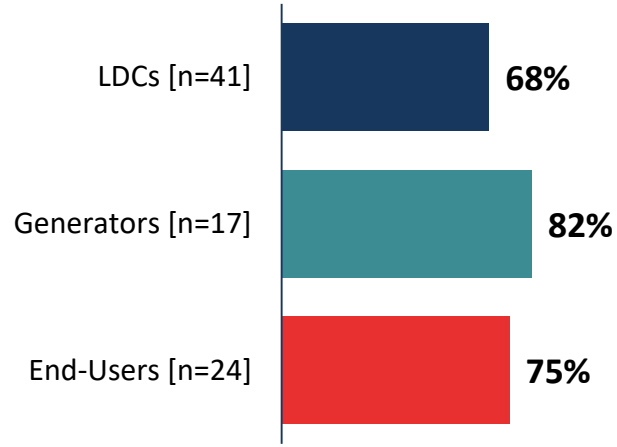
Satisfaction with Unplanned Outages: Of those who have experienced an unplanned outage, most (73%) are satisfied with how it was managed

E20. Generally, how satisfied or dissatisfied are you with the way your **unplanned power outages** are managed by Hydro One?

[Asked of those who could recall experiencing an unplanned outage in the past year, n=82]



Total Satisfaction ▶▶ By Customer Type



Caution: *small sample sizes*

Key Insights

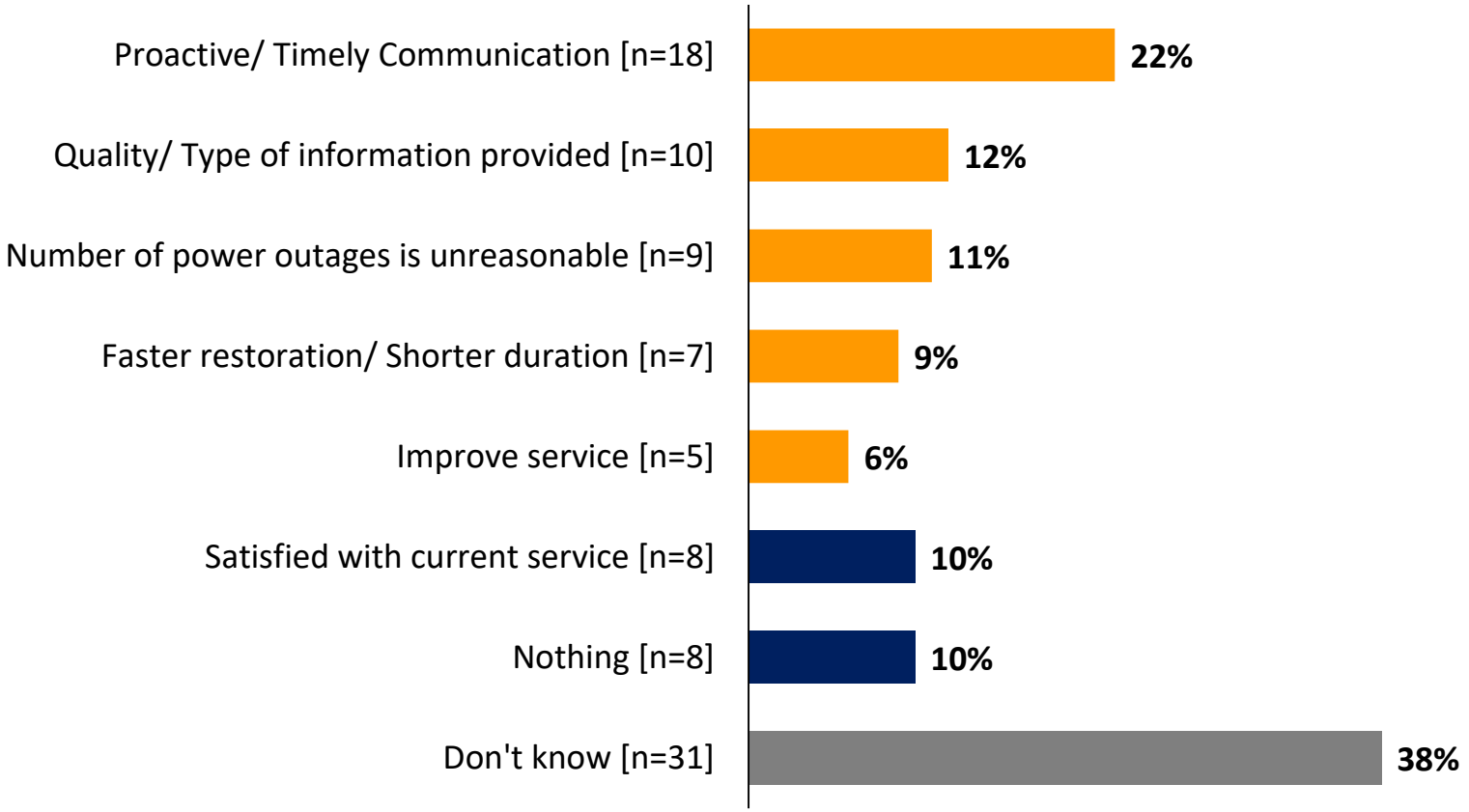
- Most (73%) are satisfied with how Hydro One manages unplanned power outages, but there is an opportunity to shift customers from *somewhat* (44%) to *very* (29%) satisfied.
- End-users (75%) are on par with the LTX average. Generators (82%) are marginally higher, and LDCs (68%) are marginally lower.

NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Areas of Improvement, Unplanned Outages: Some (22%) would like improvement on “proactive/timely communication”; a plurality (38%) don’t know

Q **E25.** Is there anything in particular Hydro One can do to improve your organization’s experience during unplanned outages?

[Asked of those who could recall experiencing an unplanned outage in the past year, open-ended, n=82]



Key Insights

- Many LTX customers who recall experiencing an unplanned outages don’t have a specific suggestion on how Hydro One could improve (38% “don’t know”, 10% “nothing”, 10% “satisfied with current service”). This confirms that there are no obvious weaknesses.
- Some would like improvements on “proactive/timely communication” (22%), “quality of information” (12%), or they feel that “the number of outages is unreasonable” (11%).

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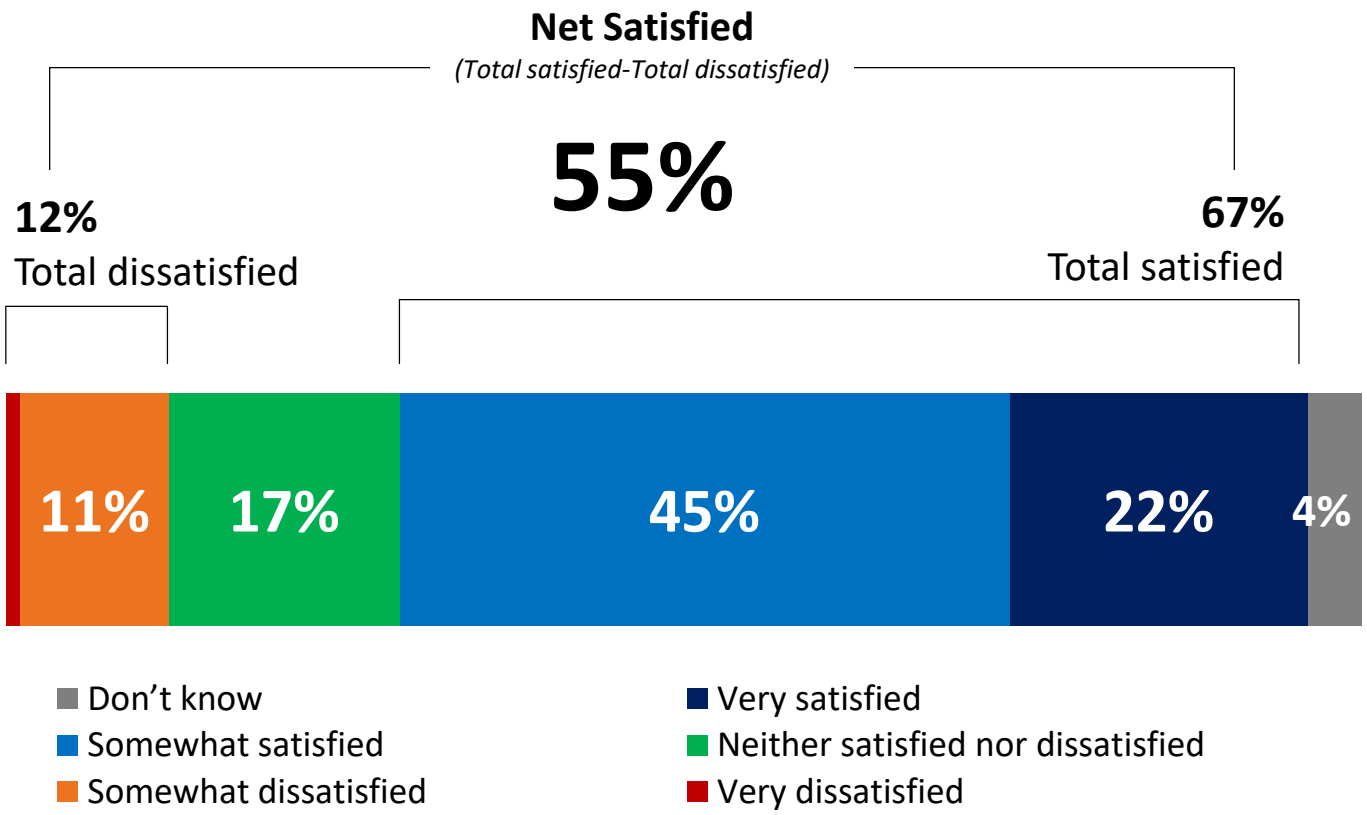
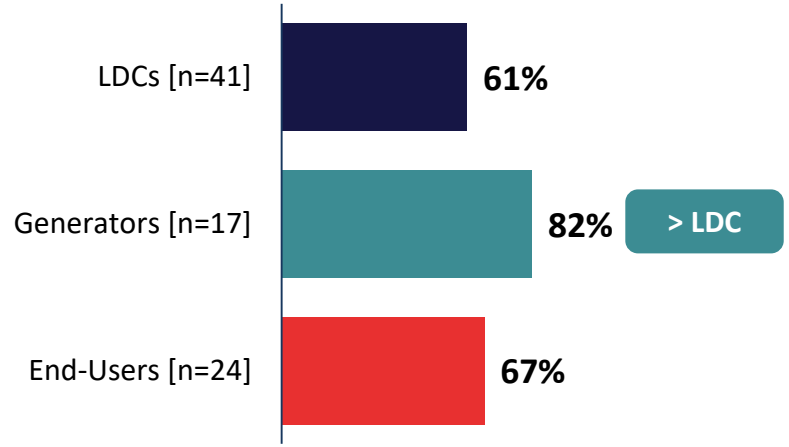
NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%. Response "Don't know" was included in this analysis.

Accuracy of Duration Estimate: Most (67%) who have experienced an unplanned outage, are satisfied with duration estimate accuracy

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E23. The accuracy of information provided regarding the duration of unplanned outages.
[Asked of those who could recall experiencing an unplanned outage in the past year, n=82]



Total Satisfaction ▶▶ By Customer Type



Caution: *small sample sizes*

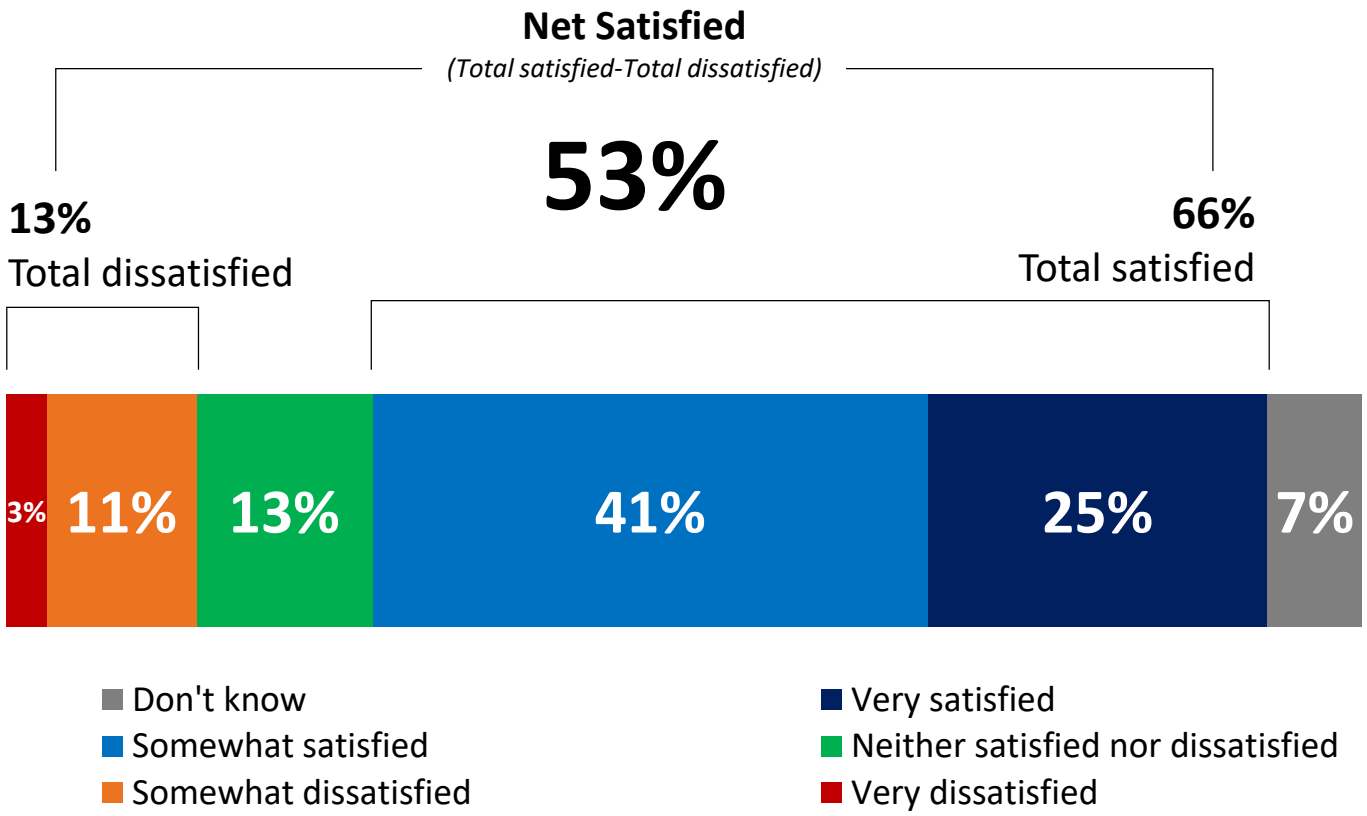
Key Insights

- Two-thirds (67%) are satisfied with the accuracy of information regarding the duration of unplanned outages. There is room for improvement here as customers are twice as likely to be *somewhat* satisfied (45%) rather than *very* satisfied (22%).
- Satisfaction with duration estimates is higher among Generators (82%) than among End-Users (67%) and LDCs (61%).

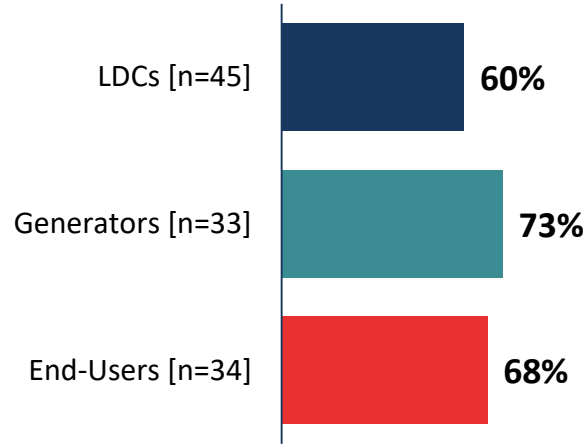
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Time to Restore Power: Two-thirds (66%) are satisfied with the time it takes to restore power after an unplanned outage

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E17. The amount of time it takes to restore power when unplanned power outages occur.
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



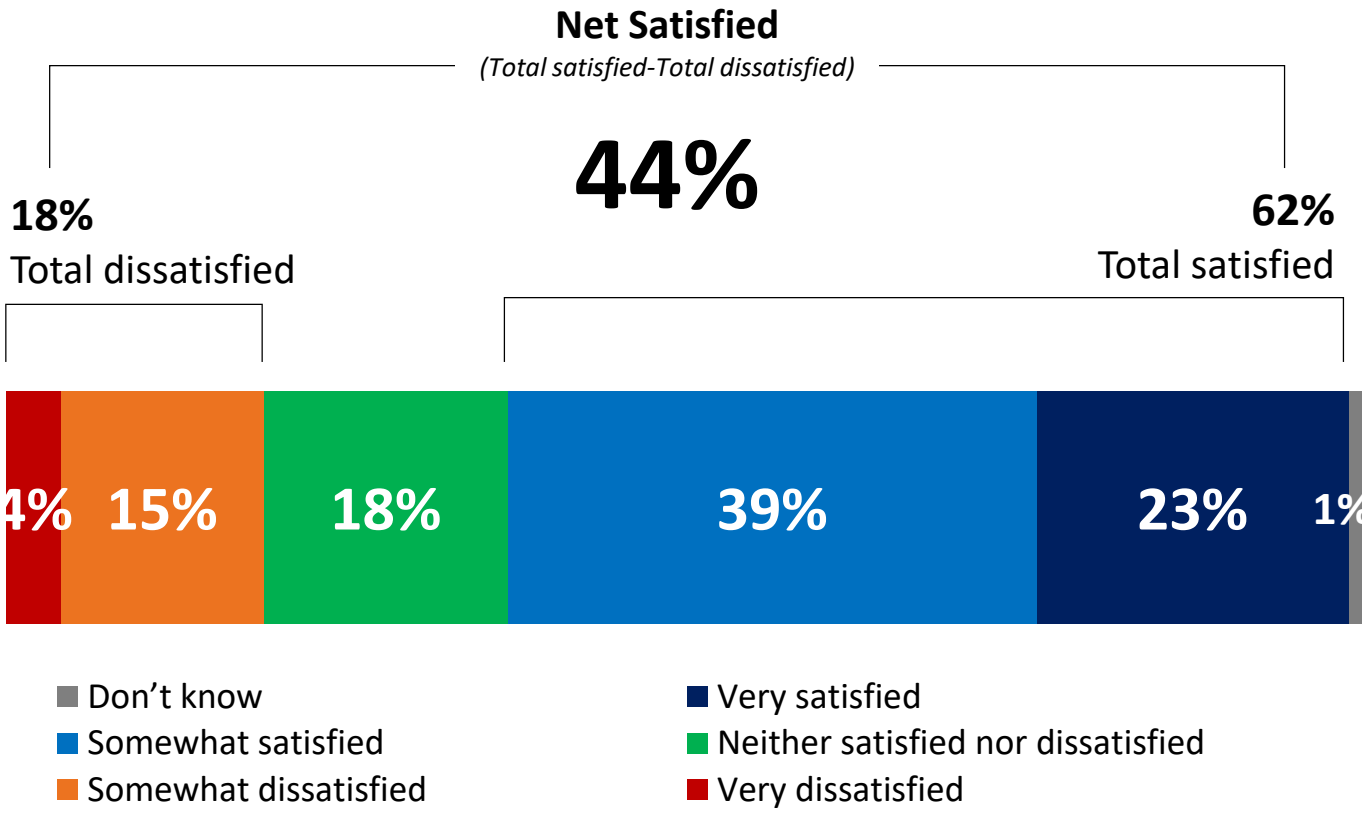
Key Insights

- Satisfaction is not very intense (25% *very* vs 41% *somewhat* satisfied), but two-thirds are satisfied with the time it takes to restore power after an unplanned outage.
- End-Users (68%) and Generators (73%) are at, or marginally higher than, the rate class average, while LDCs are marginally lower (60%).

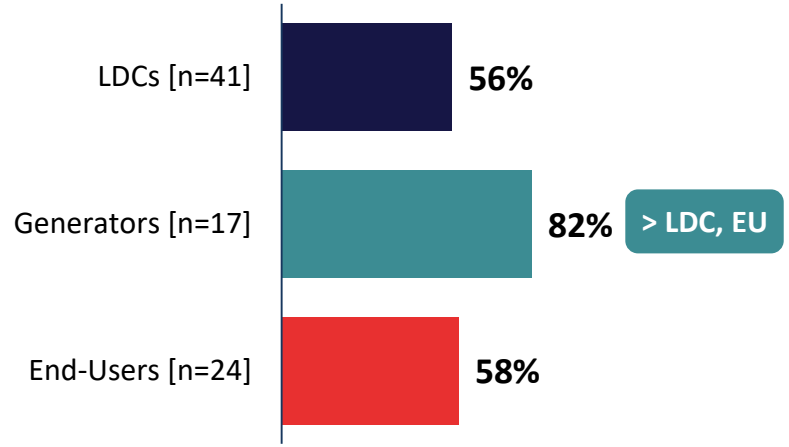
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Communication During Unplanned Outages: Most (62%) of those who have experienced an unplanned outage are satisfied with outage communication

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E23. The communication of information during unplanned outages.
[Asked of those who could recall experiencing an unplanned outage in the past year, n=82]



Total Satisfaction ▶▶ By Customer Type



Caution: *small sample sizes*

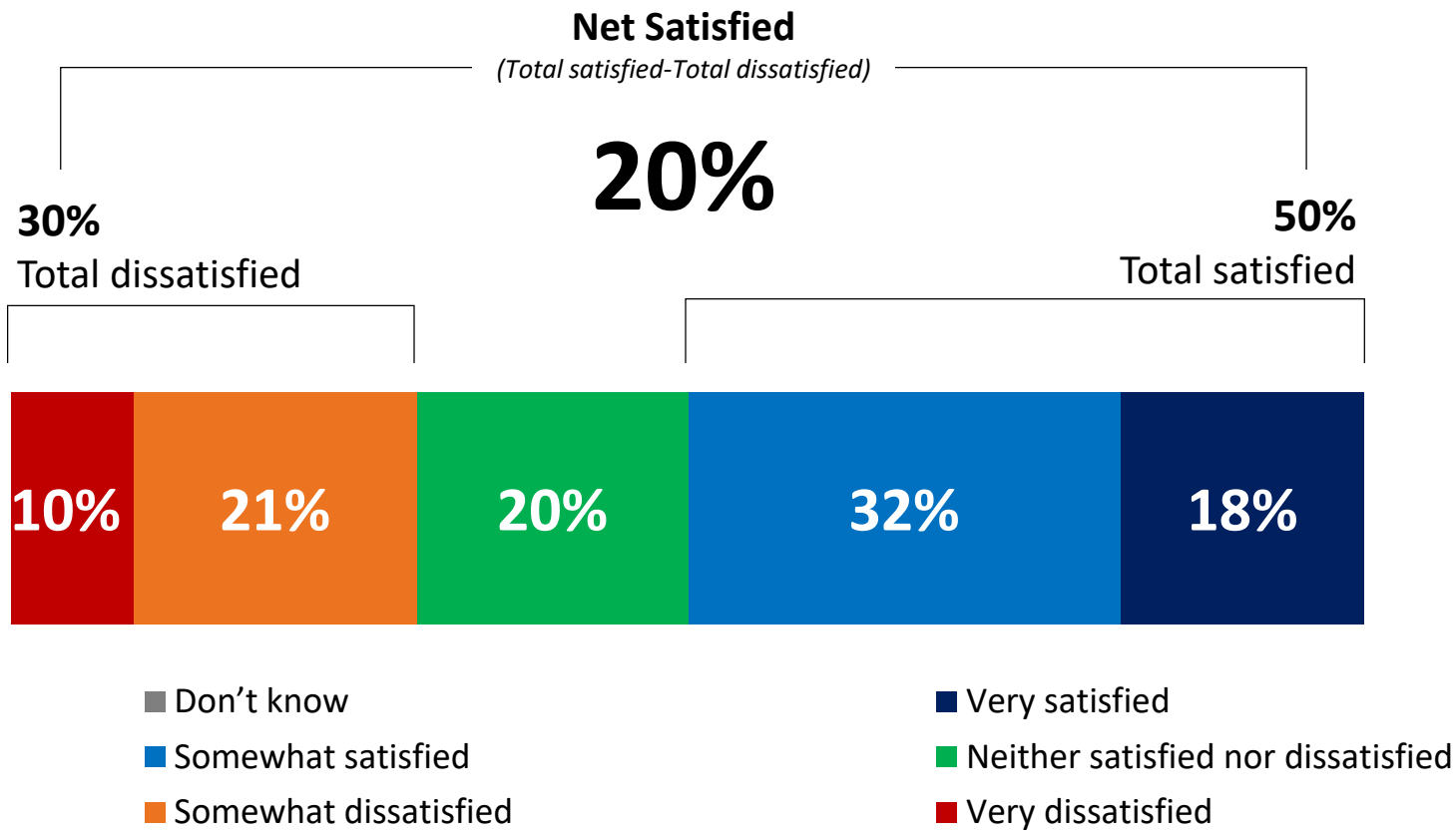
Key Insights

- There is room for improvement on total satisfaction (62%) as well as intensity (currently 23% *very* satisfied), but most LTX customers who can recall an unplanned outages are satisfied with communications during such events.
- Generators (82%) are most satisfied, compared to End-Users (58%) and LDCs (56%).

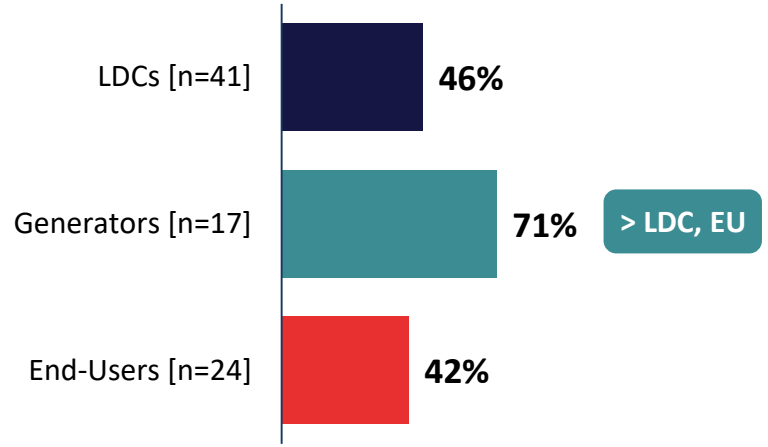
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Number of Unplanned Outages: Half (50%) of those who recall an unplanned outage are satisfied with the number of unplanned outages

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E21. The number of unplanned power outages affecting your business.
[Asked of those who could recall experiencing an unplanned outage in the past year, n=82]



Total Satisfaction ▶▶ By Customer Type



Caution: *small sample sizes*

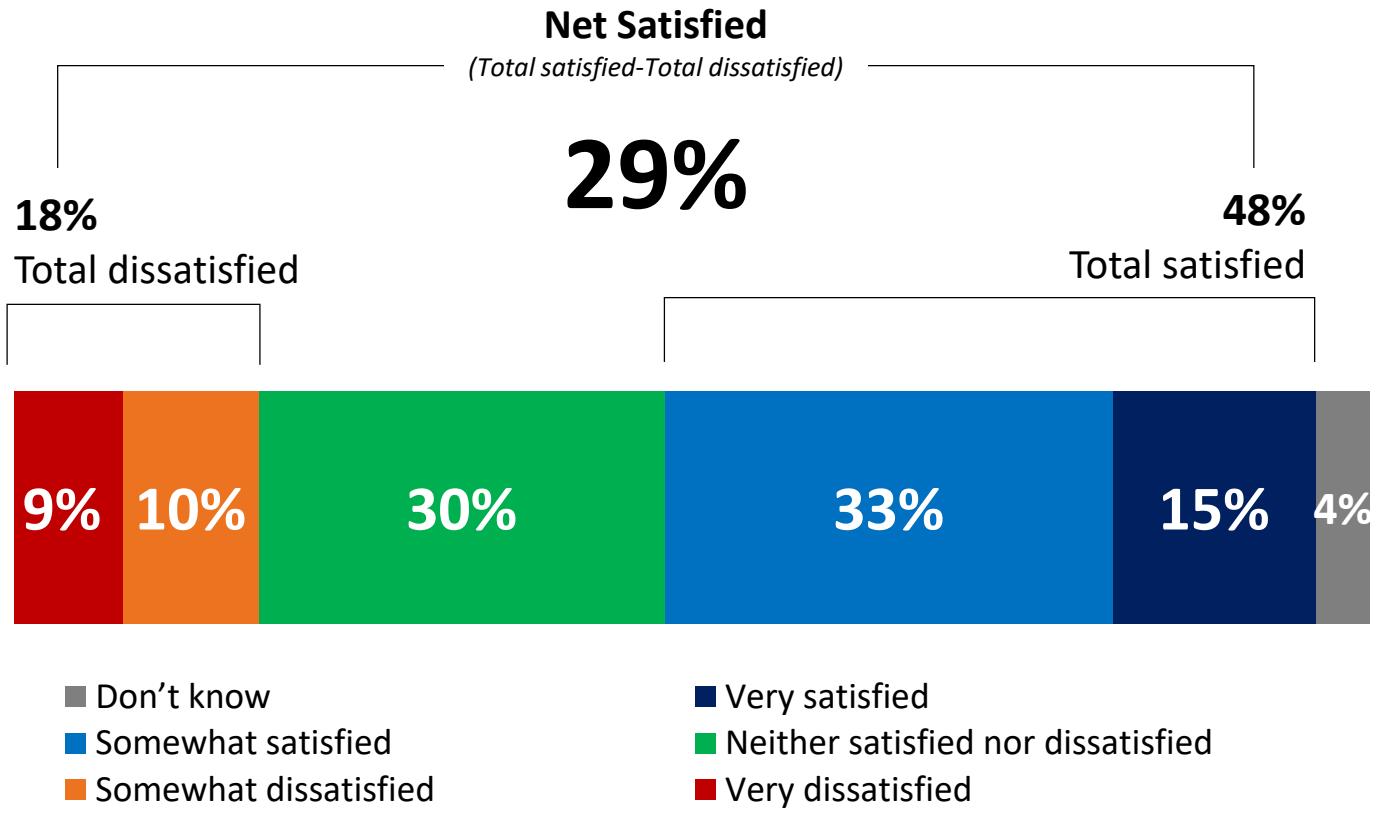
Key Insights

- Half (50%) of LTX customers who recall experiencing an unplanned outage are satisfied with the number of such outages affecting their business. This is relatively low compared to other metrics.
- Satisfaction is highest among Generators (71%), compared to less-than-majority satisfaction among LDCs (46%) and End-Users (42%).

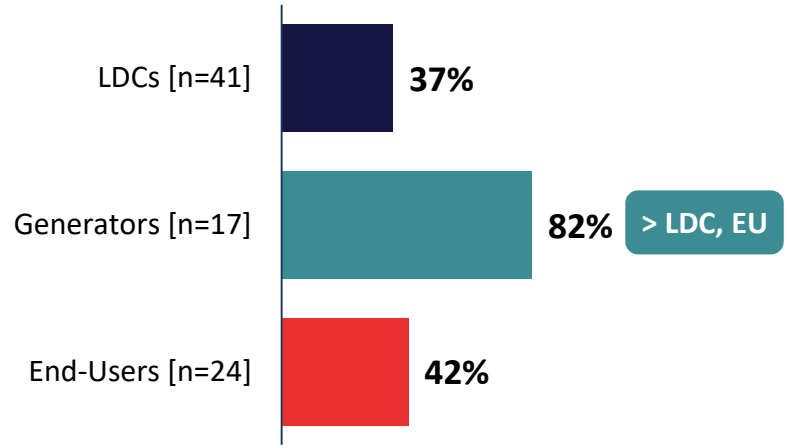
NOTE: Response "Don't know" (0%) was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Duration of Unplanned Outages: Among those who recall an unplanned outage, about half (48%) are satisfied with the duration

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E22. The duration of unplanned power outages.
[Asked of those who could recall experiencing an unplanned outage in the past year, n=82]



Total Satisfaction ▶▶ By Customer Type



Caution: *small sample sizes*

Key Insights

- While net satisfaction is still positive, total satisfaction on duration of unplanned outages (48%) is the lowest across all metrics.
- Hydro One may not be able to control the duration, providing accurate estimates on time to restoration may mitigate customer dissatisfaction.
- LDCs (37%) and End-Users (42%) are about half as likely to be satisfied with unplanned outage duration than Generators (82%).

NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Dimension of Satisfaction

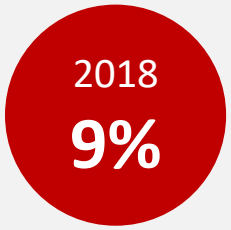
Brand

Metrics Included:

- Accessibility: 87%
- Understanding of business needs: 85%
- Quality advice and guidance: 82%
- Responds to needs: 81%
- Ease of doing business: 78%
- Ability to keep commitments: 78%
- Trusted business partner: 71%
- Good value for money: 58%

Average Brand Satisfaction Score

Average Brand Dissatisfaction Score



Summary Findings

- Most LTX customers are satisfied with all metrics that make up the brand dimension. Accessibility and understanding business needs are strengths, and there are similar levels of satisfaction across all customer types.
- On the other hand, trusted business partner and value-for-money are relative weaknesses and it is on these metrics that we find the largest gaps between the highly satisfied Generators and the not-as-satisfied LDCs and End-Users.
- In fact, Generators are significantly more satisfied than LDCs and End-Users on a handful of metrics. In some instances, satisfaction among Generators are at least 20 percentage points higher than LDCs and/or End-Users.

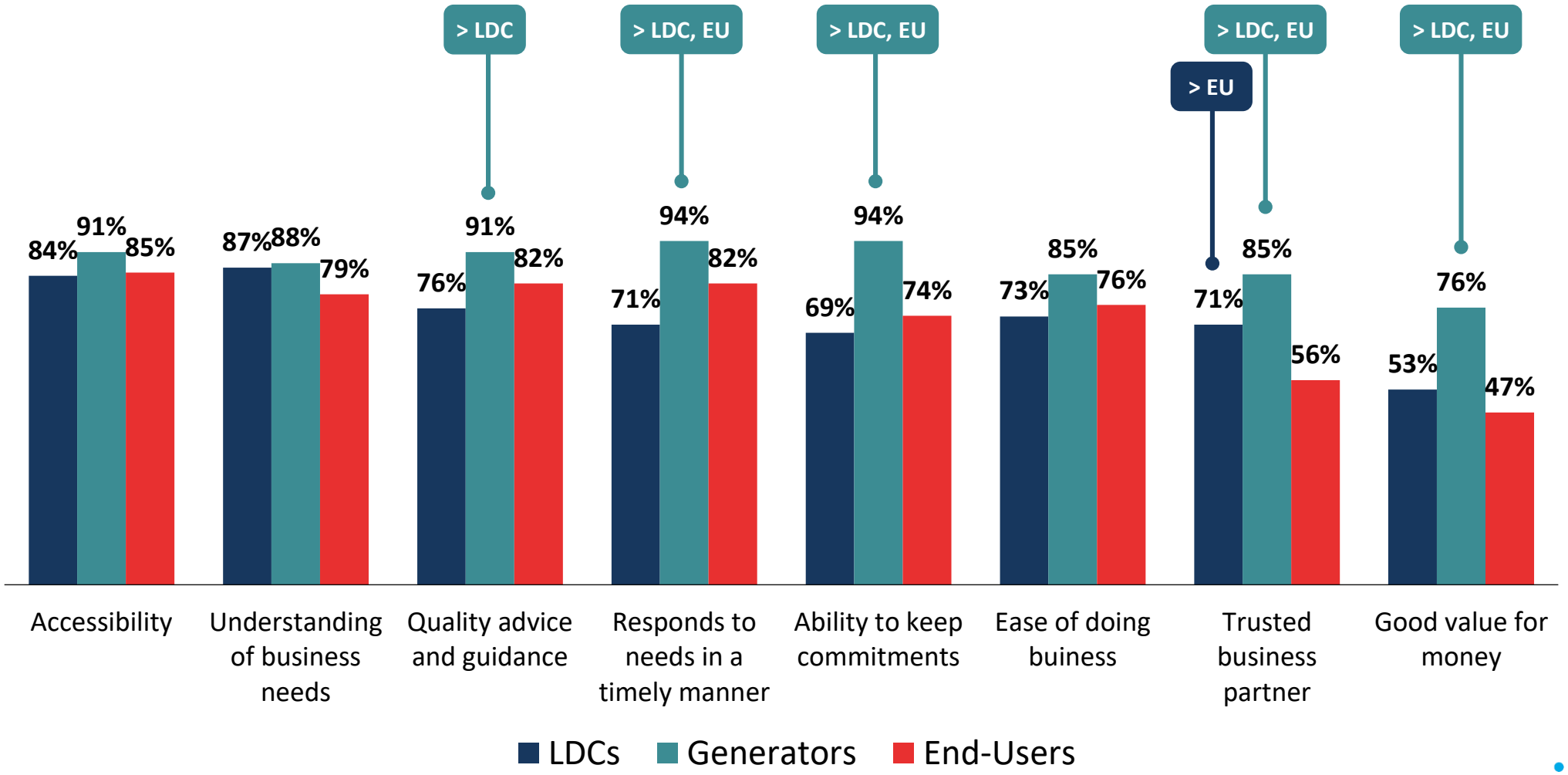
Insights

Brand: Generators have a stronger emotional connection with Hydro One than LDCs and End-Users. To Generators, Hydro One is a partner in their business and they feel they are getting good value. There is a level of trust and confidence there that is lacking in the other two customer types.

The results suggest there may be a need for greater effort to be more responsive to LDC customers and to demonstrate that Hydro One can be relied upon to keep commitments. There may be lessons to be learned from the interactions between Generators and Hydro One to help develop strategies to improve on these metrics.

End-Users may be a tougher nut to crack. They are least likely to have an emotional bond with Hydro One that results in trust and confidence that they are getting value for their money. Gains on these metrics are likely to occur over a longer timeframe than the dimensions that are more about the dialogue between the customer and Hydro One. Again, the service provided to Generators might provide somewhat of a blueprint moving forward to close the End-User satisfaction gap.

Dimensions of Satisfaction: Brand by Customer Type



Average Brand Satisfaction Scores

2018 **73%**

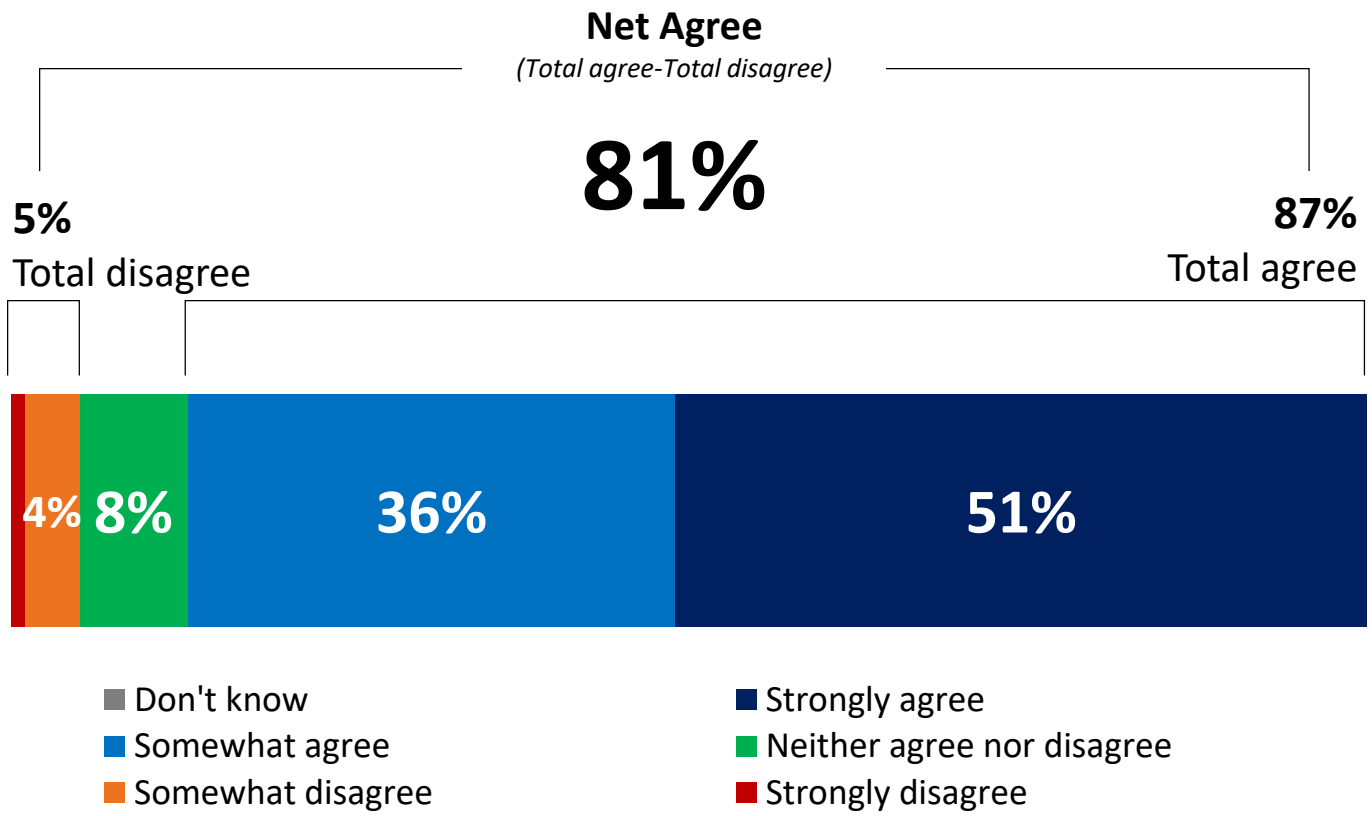
2018 **88%**

2018 **73%**

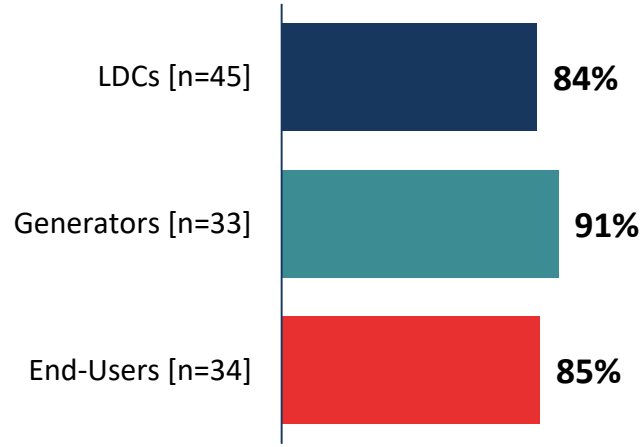
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Accessibility: Almost 9-in-10 LTX customers agree that Hydro One staff are easily accessible; half (51%) *strongly* agree

Q Please indicate if you agree or disagree with the following statements.
D11. Hydro One staff are easily accessible to my organization.
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



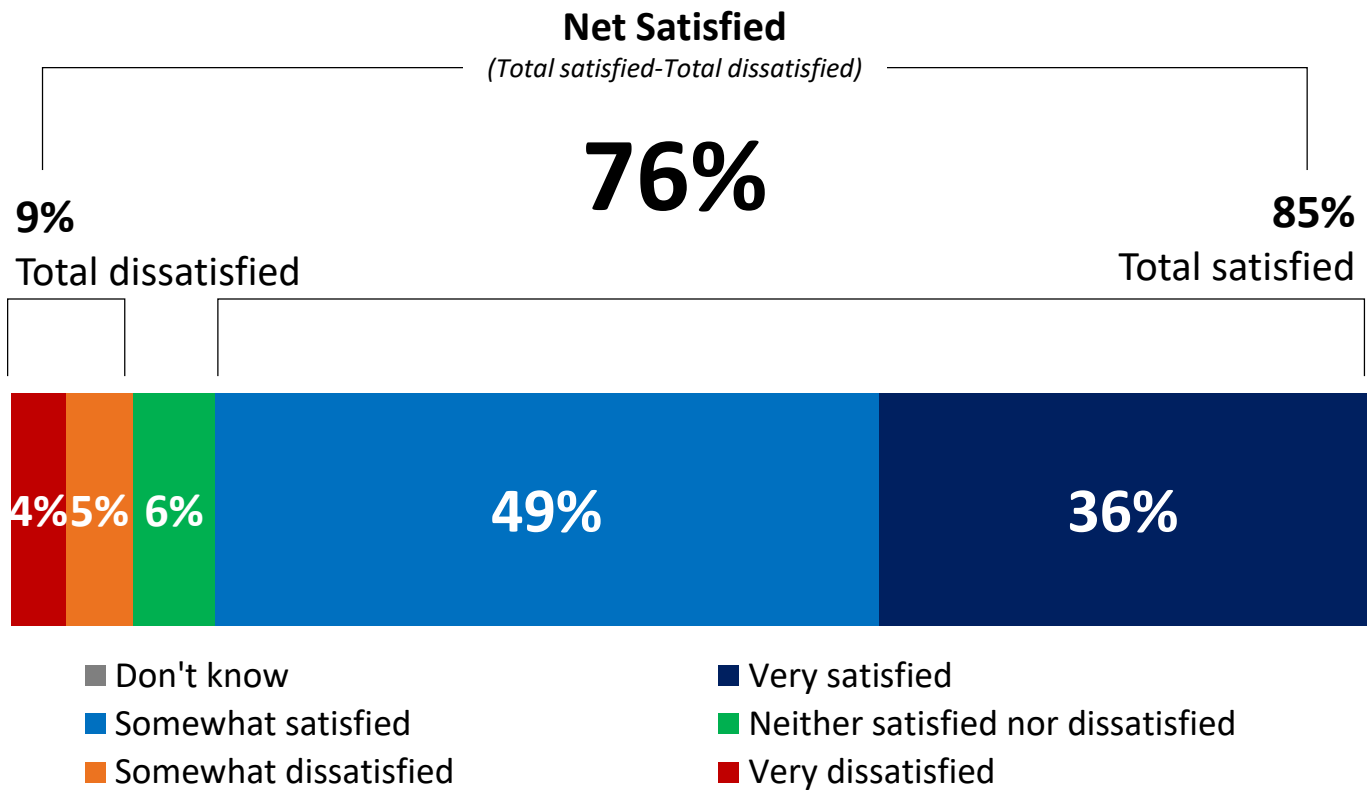
Key Insights

- This is a strong metric for Hydro One. Half (51%) of LTX customers *strongly* agree that staff are easily accessible, and another third (36%) *somewhat* agree.
- Regardless of customer type, total agreement is consistently high, falling within a narrow range from 84% for LDCs to 91% for Generators.

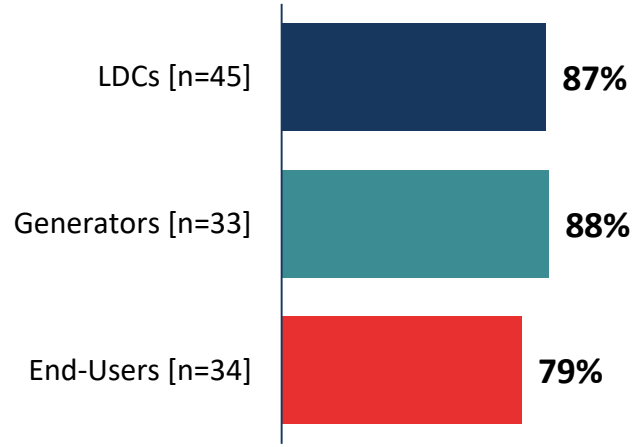
NOTE: Response "Don't know" (0%) was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Understanding Business Needs: A solid majority (85%) of LTX customers are satisfied with Hydro One's understanding of their business needs

Q How satisfied or dissatisfied are you with the following aspects of Hydro One?
D9. Hydro One's understanding of your business needs
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



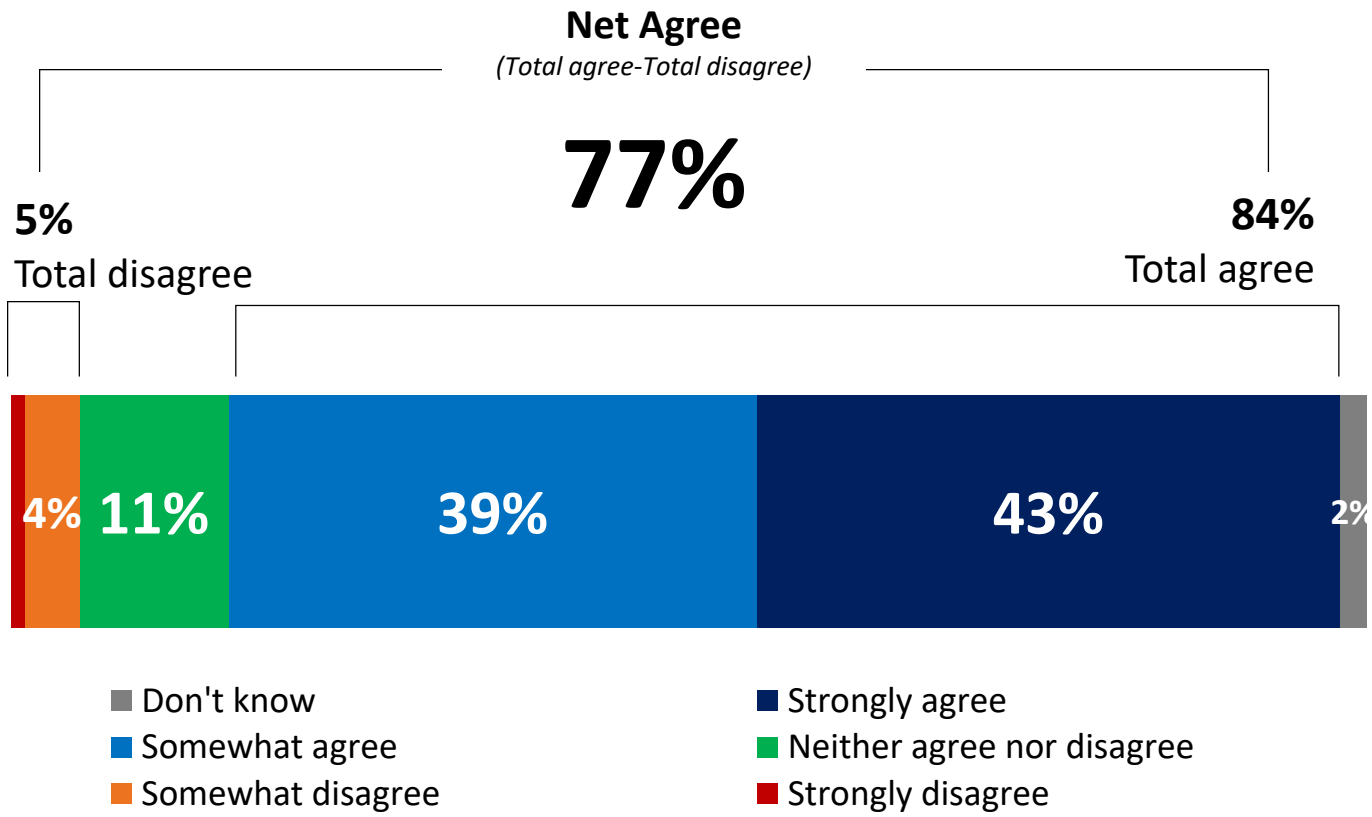
Key Insights

- Half (49%) are *somewhat* satisfied that Hydro One understands their business needs, and another 36% are *very* satisfied.
- Satisfaction is highest among Generators (88%) and LDCs (87%), and marginally lower among End-Users (79%).

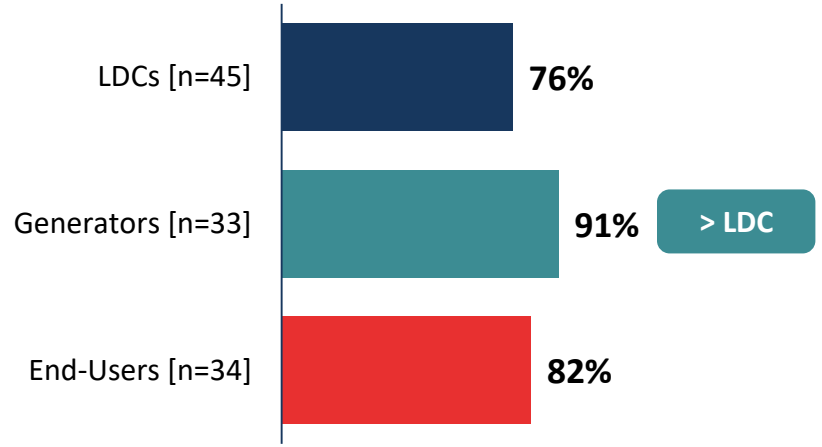
NOTE: Response "Don't know" (0%) was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Quality Advice and Guidance: LTX customers are confident (84% agree) that Hydro One staff are providing quality advice and guidance

Q Please indicate if you agree or disagree with the following statements.
D12. Hydro One staff provide my organization with quality advice and guidance when I have questions about my service.
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



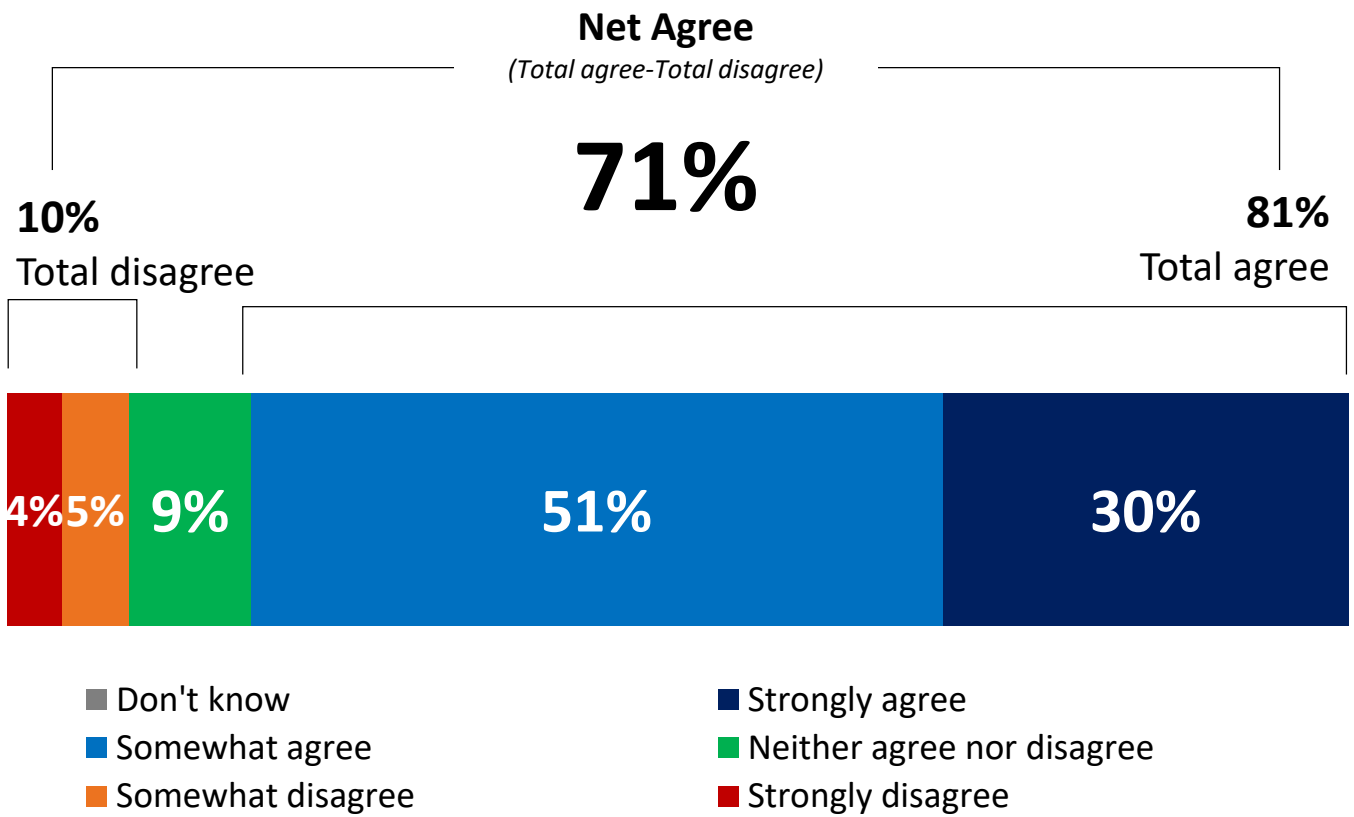
Key Insights

- A strong majority (84%) of LTX customers agree that Hydro One staff provides their organization with quality advice and guidance. They are as likely to *strongly* agree (43%) as they are to only *somewhat* agree (39%).
- Agreement is highest among Generators (91%), and lowest among LDCs (76%).

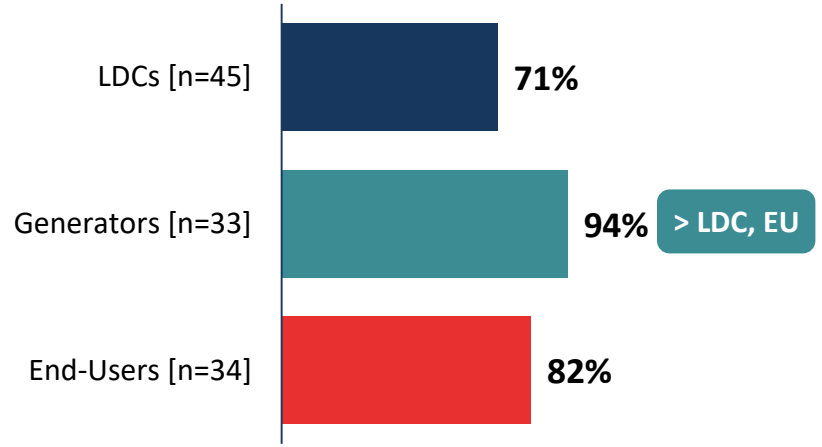
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Prompt Response to Customer Needs: 4-in-5 (81%) LTX customers agree that Hydro One responds to their needs in a timely manner

Q Please indicate if you agree or disagree with the following statements.
D14. Hydro One responds to the needs of my organization in a timely manner.
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



Key Insights

- There is solid total agreement (81%) on this metric, but there is room for improvement on intensity as most who agree only *somewhat* agree.
- Generators (94%) are more likely than End-Users (82%) and LDCs (71%) to feel Hydro One is responding in a timely manner.

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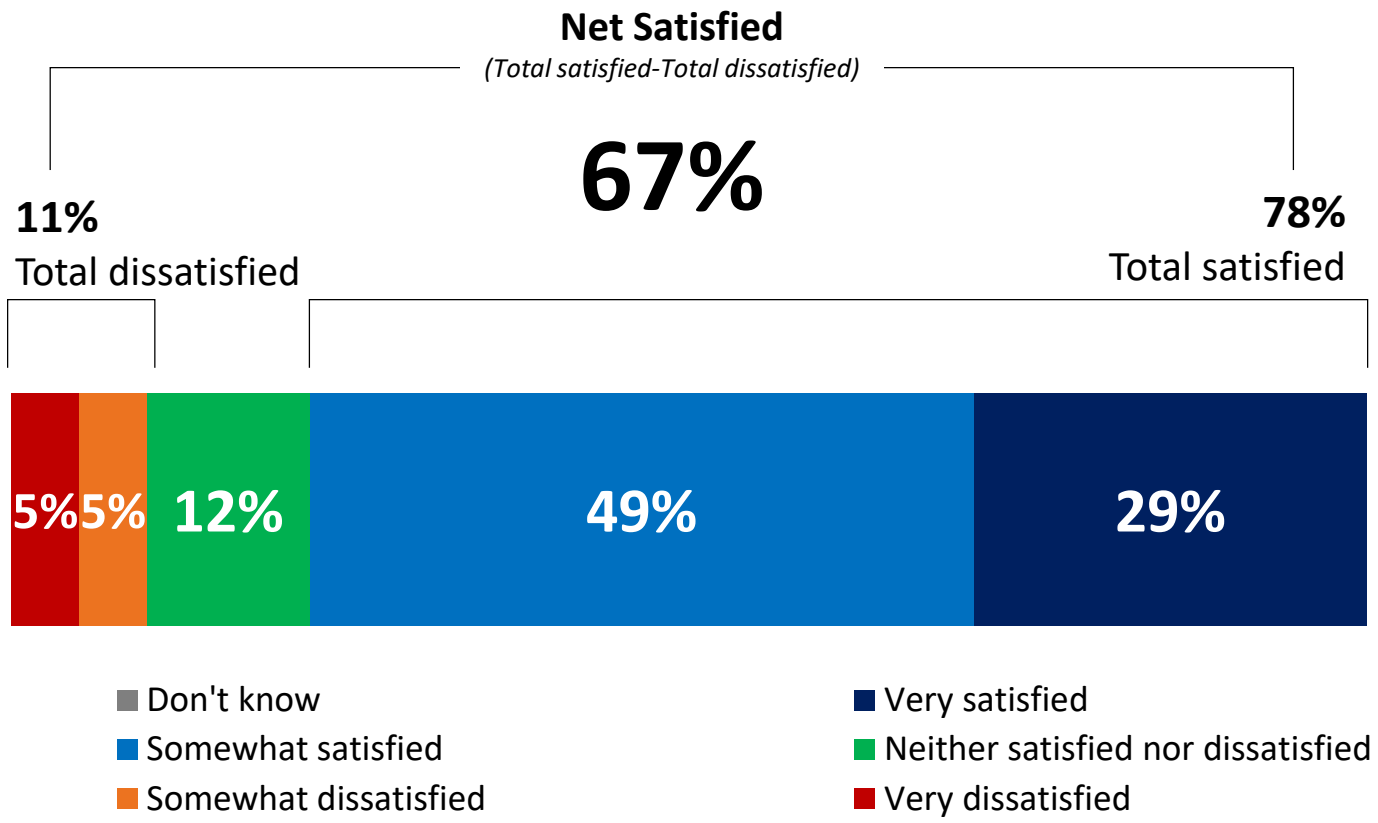
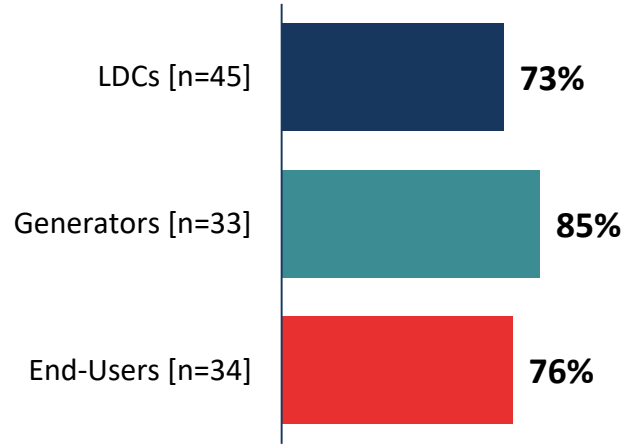
NOTE: Response "Don't know" (0%) was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Ease of Doing Business: More than three-quarters (78%) of LTX customers are satisfied with the ease of doing business with Hydro One

Q How satisfied or dissatisfied are you with the following aspects of Hydro One?
D7. Ease of doing business with Hydro One
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



Key Insights

- Most (78%) LTX customers are satisfied with the ease of doing business with Hydro One, but there is an opportunity to gain some intensity here if customers can be shifted from *somewhat* (49%) to *very* (29%) satisfied.
- At 85%, Generators are the most satisfied customers on this metric, with End-Users (76%) and LDCs (73%) falling just shy of average.

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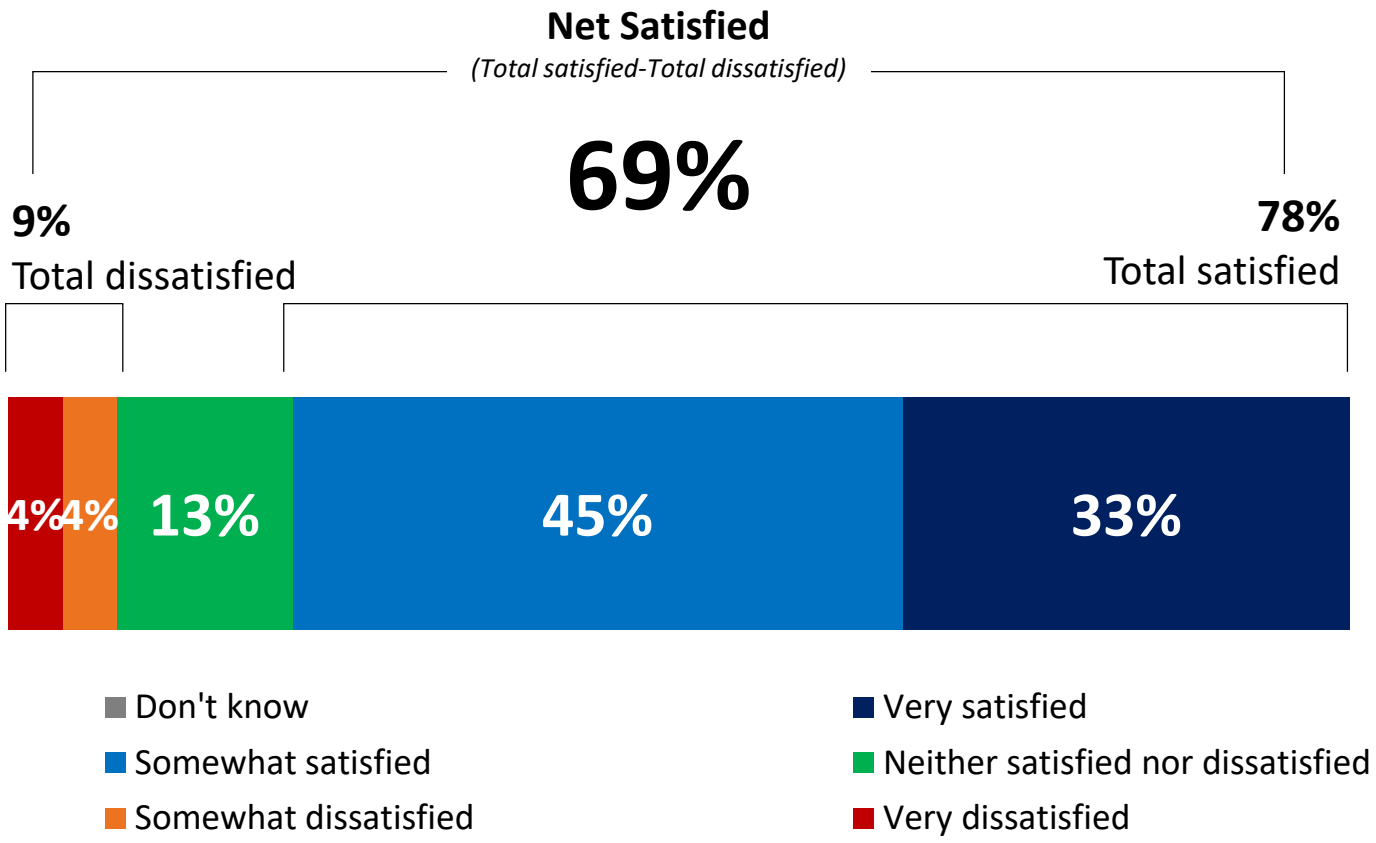
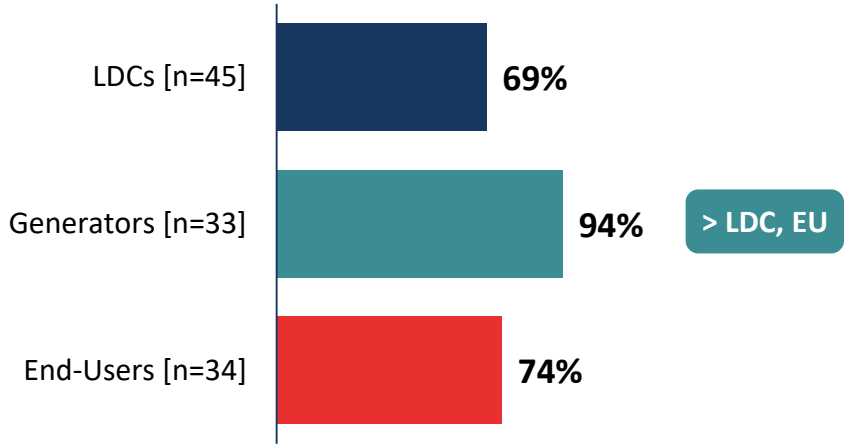
NOTE: Response "Don't know" (0%) was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Keeping Commitments: Most (78%) LTX customers are satisfied with Hydro One's ability to keep commitments

Q How satisfied or dissatisfied are you with the following aspects of Hydro One?
D8. Hydro One's ability to keep commitments
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



Key Insights

- LTX customers are generally satisfied (78%) with Hydro One's ability to keep commitments, but this is room for a gain in intensity on this metric.
- Generators (94%) are much more satisfied than End-Users (74%) or LDCs (69%).

NOTE: Response "Don't know" (0%) was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

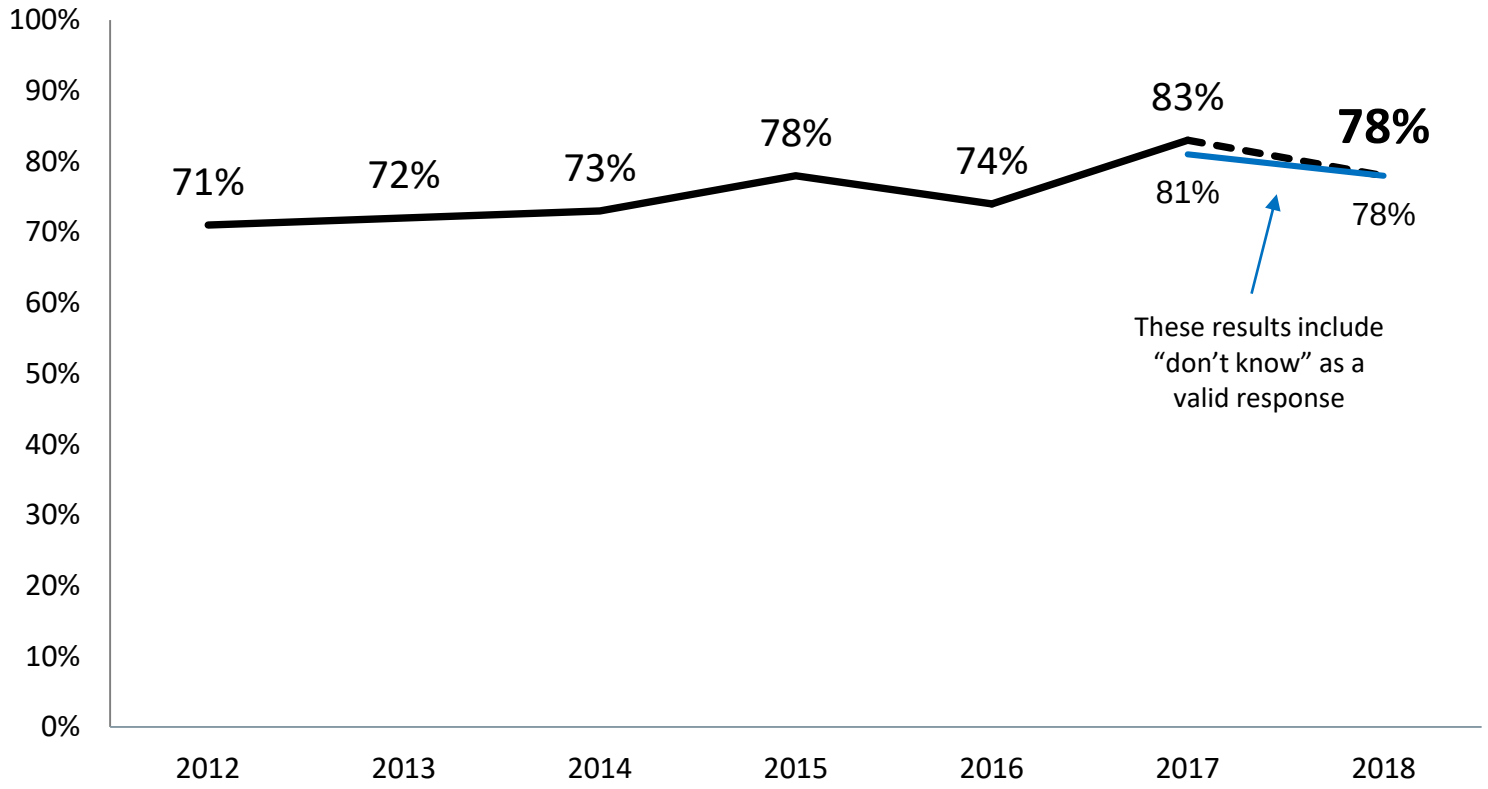
Keeping Commitments: Despite a marginal decline since 2017, about 8-in-10 are satisfied with Hydro One's ability to keep commitments

Q

D8. How satisfied or dissatisfied are you with the following aspects of Hydro One…Hydro One's ability to keep commitments?

PREVIOUSLY: To what extent do you agree with the following statements…Hydro One keeps commitments.

[Asked of all respondents, n=112; valid responses n=112]



Key Insights

- Hydro One had made some gains on satisfaction with keeping commitments in 2017, going from 74% to 83%.
- In 2018, there has been a marginal decline and at 78%, overall satisfaction has returned to the 2015 level.

***NOTE**: whether or not the difference between 2017 and 2018 is statistically significant cannot be determined due to the change in the way the question was asked in 2018.*

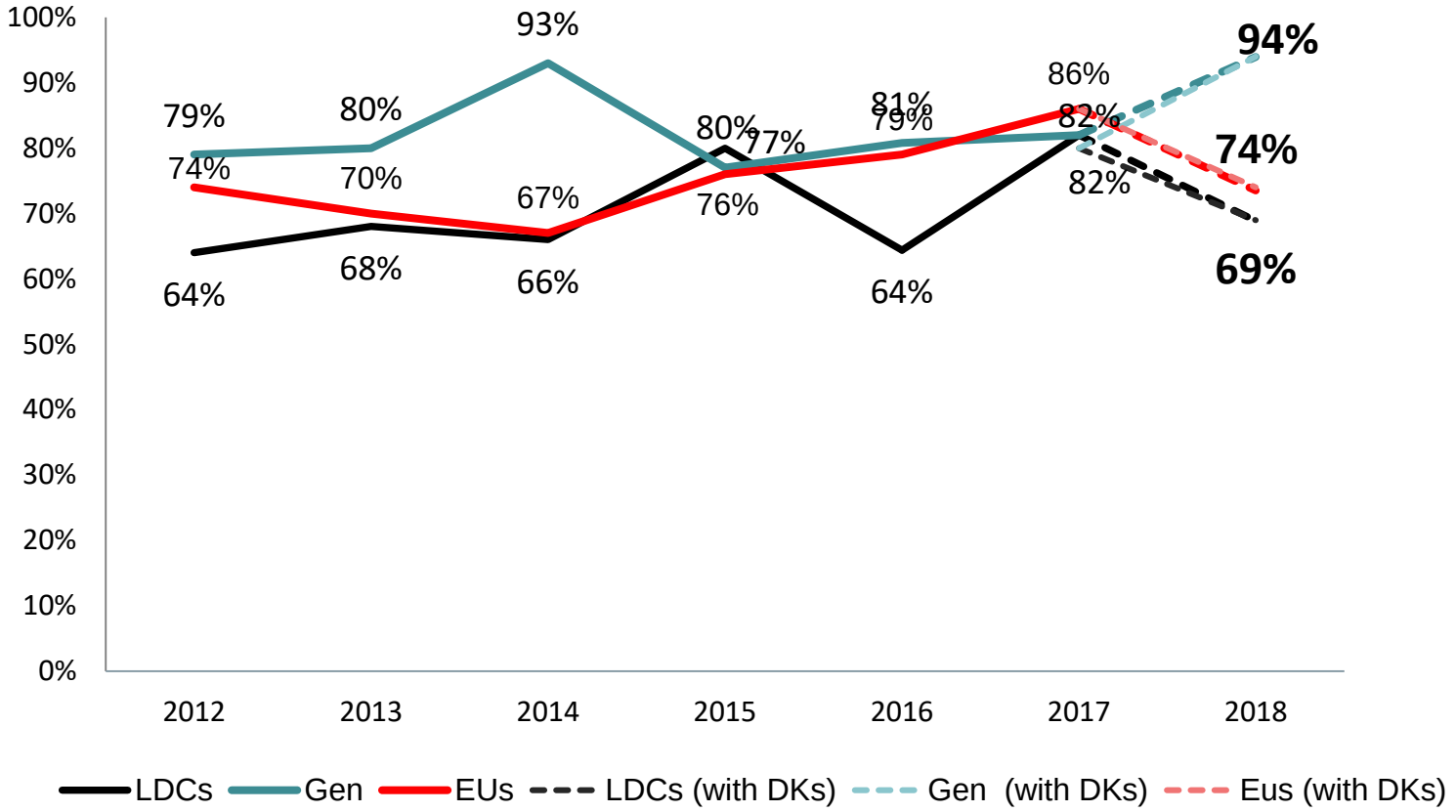
NOTE: Response "Don't know" (0% in 2018) was excluded from this analysis. Statistically significant changes compared to the combined results from 2017 are indicated by ↑↓.

Keeping Commitments (By Segment): Satisfaction is highest among Generators (94%); End-Users (74%) and LDCs (69%) are below average

D8. How satisfied or dissatisfied are you with the following aspects of Hydro One…Hydro One's ability to keep commitments?

PREVIOUSLY: To what extent do you agree with the following statements…Hydro One keeps commitments.

[Asked of all respondents, LDCs n=45, Generators n=33, End-Users n=34; all valid responses]



Key Insights

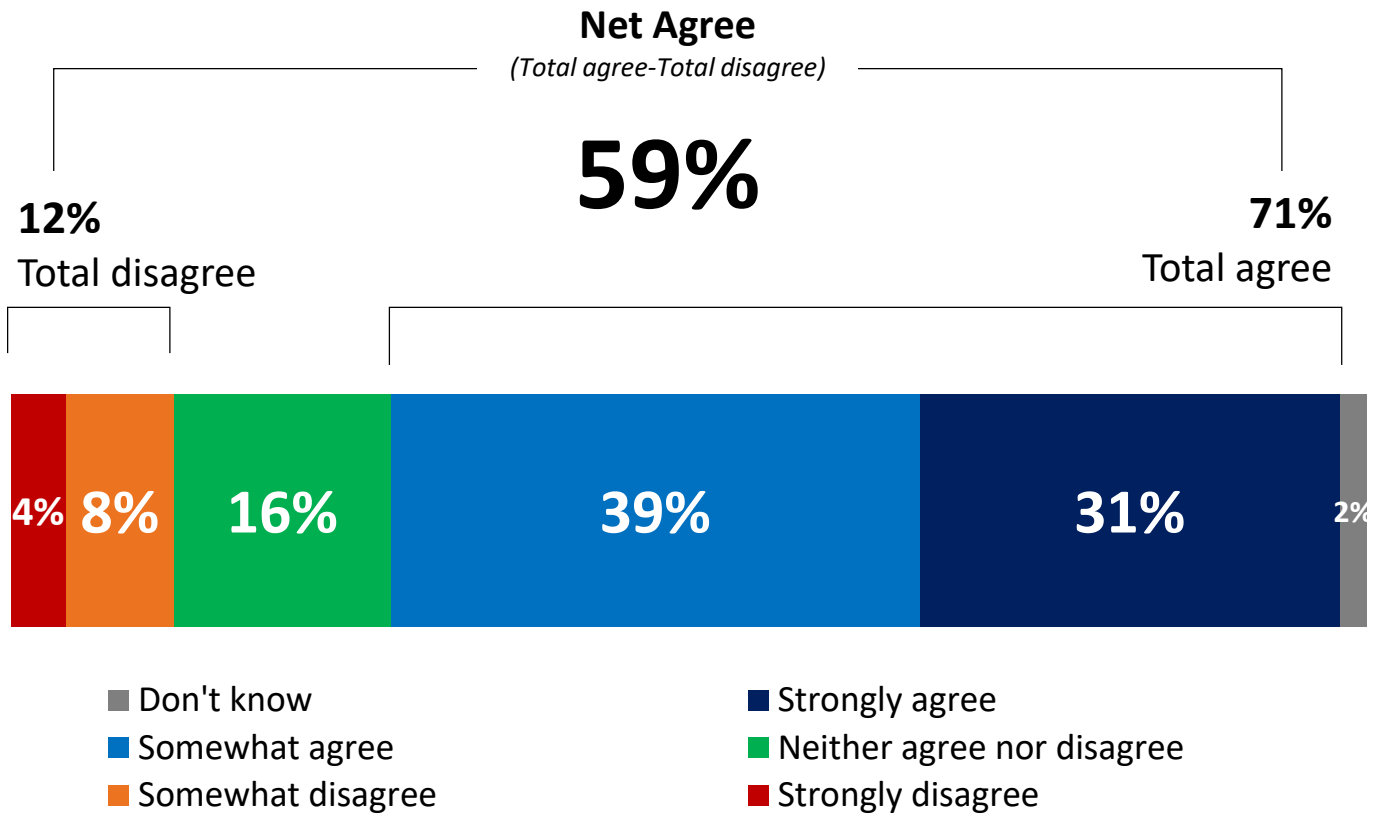
- Arriving at an all-time high of 94% in 2018, satisfaction on this metric has been on an upward trend among Generators since 2015.
- End-Users had also been on an upward trend since 2015, but this year they decrease from 86% in 2017 to 74% in 2018.
- Satisfaction among LDCs has been rising and falling every year since tracking began in 2012. The annual gains and losses grew larger starting in 2014. This year, they have dipped from 80% (including "don't know") in 2017 to 69% in 2018.

***NOTE**: whether or not the differences between 2017 and 2018 are statistically significant cannot be determined due to the change in the way the question was asked in 2018.*

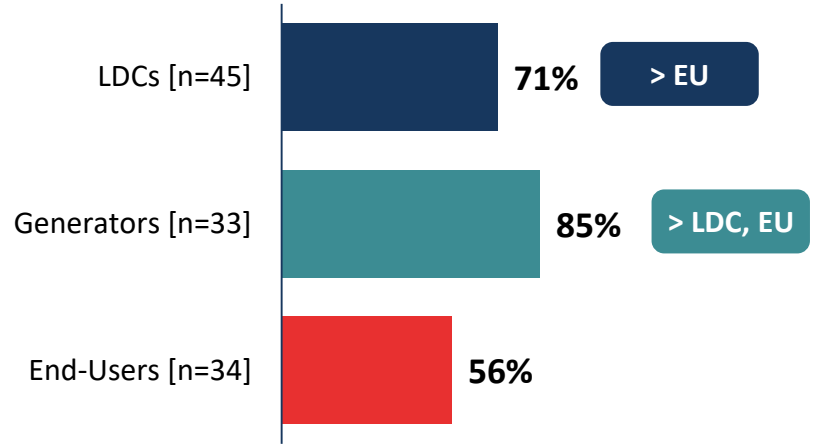
NOTE: Response "Don't know" (0% in 2018) was excluded from this analysis. Statistically significant changes compared to the combined results from 2017 are indicated by ↑↓. Differences between customer type that are statistically significant at a 95% confidence interval are indicated.

Trusted Business Partner: 7-in-10 (71%) LTX customers consider Hydro One a trusted business partner; highest among Generators

Q Please indicate if you agree or disagree with the following statements.
D10. Hydro One is more than an electricity utility, it is a trusted business partner to my organization.
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



Key Insights

- 7-in-10 (71%) LTX customers consider Hydro One a trusted business partner. There is an opportunity to increase intensity on this metric by shifting customers from *somewhat* (39%) to *strongly* (31%) agree.
- Generators (85%) are most likely to consider Hydro One a trusted business partner, while End-Users (56%) are least likely.

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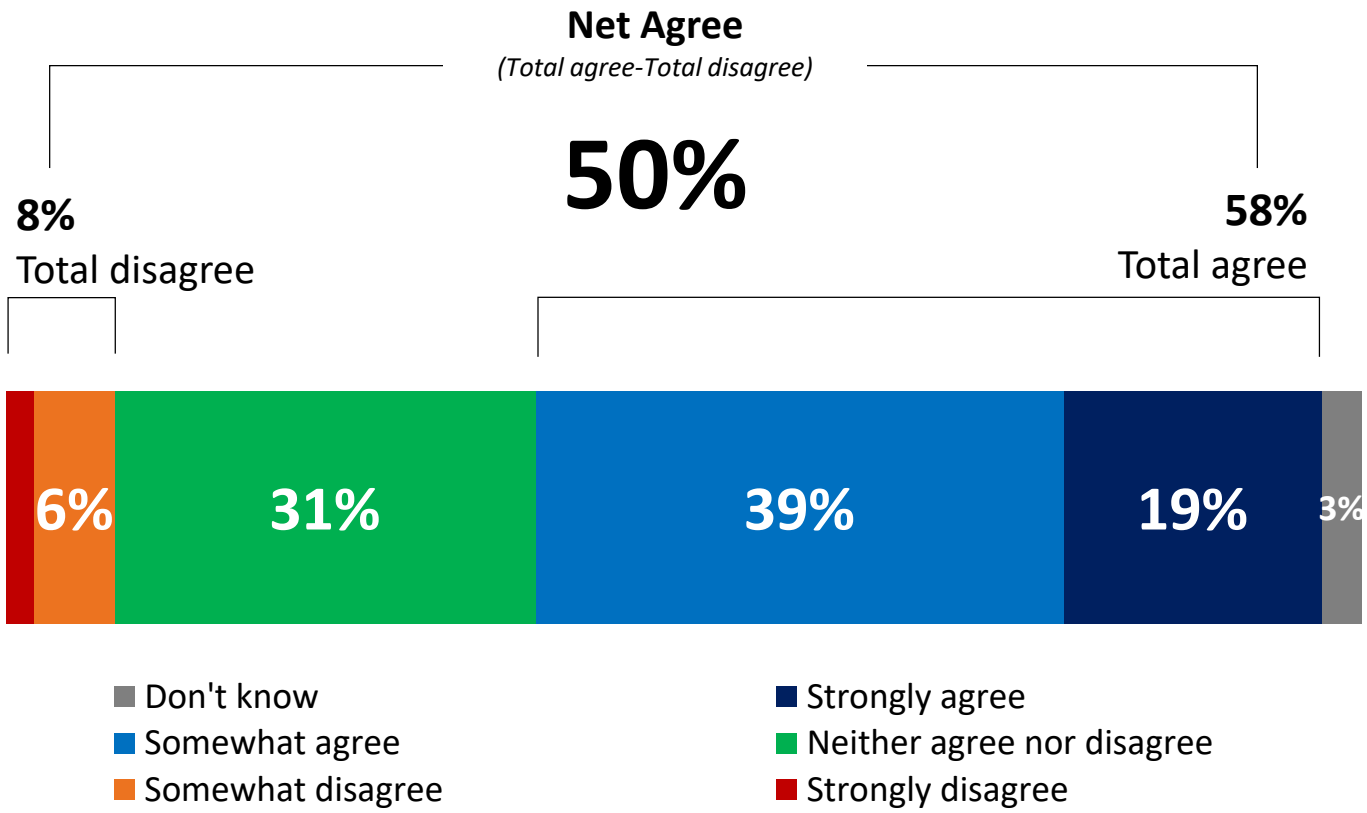
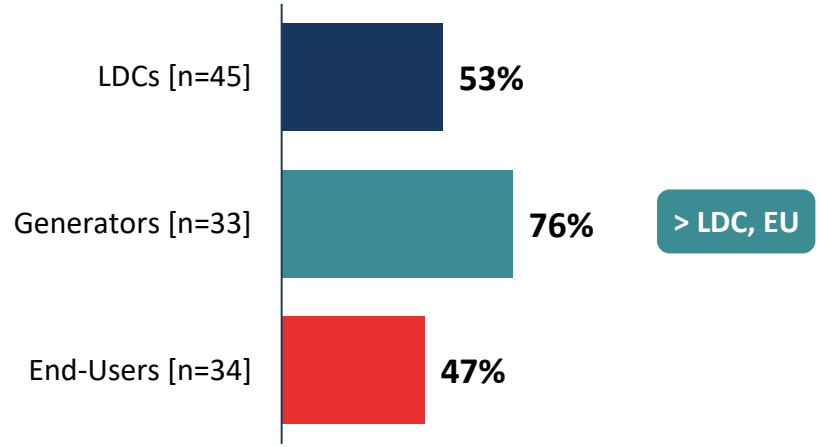
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Value for Money: Almost 3-in-5 (58%) LTX customers agree that Hydro One provides good value for money

Q Please indicate if you agree or disagree with the following statements.
D13. Hydro One provides my organization with good value for money.
[Asked of all respondents, n=112]



Total Satisfaction ▶▶ By Customer Type



Key Insights

- While most (58%) feel they are getting good value for money, almost one-third (31%) of LTX customers neither agree nor disagree. There is an opportunity for gains here by shifting customers from ambivalent to agreement.
- Generators (76%) are most likely to feel they are getting good value for money, while fewer than half (47%) of End-Users share this opinion.

NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Additional Measures

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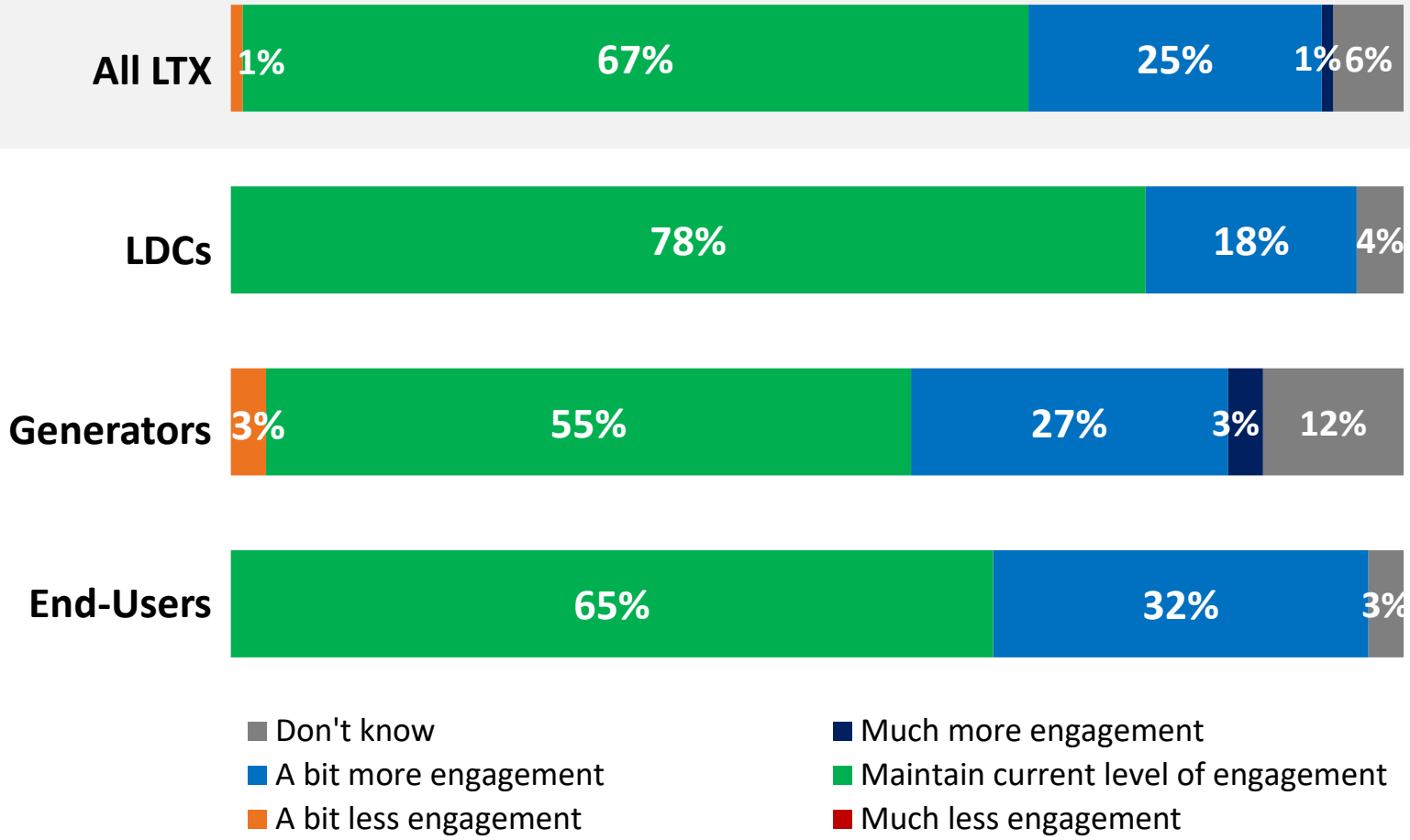
Level of Engagement: Most (67%) LTX customers are happy with the current level of engagement with their Key Account Exec, but 1-in-4 (26%) want more

F40. Would you like more or less engagement with your Hydro One **Key Account Executive**?
[Asked of all respondents, n=112]



	Total More	Total Less	Net More
All LTX	26%	1%	+25%
LDCs	18%	-	+18%
Generators	30%	3%	+27%
End-Users	32% > LDC	-	+32%

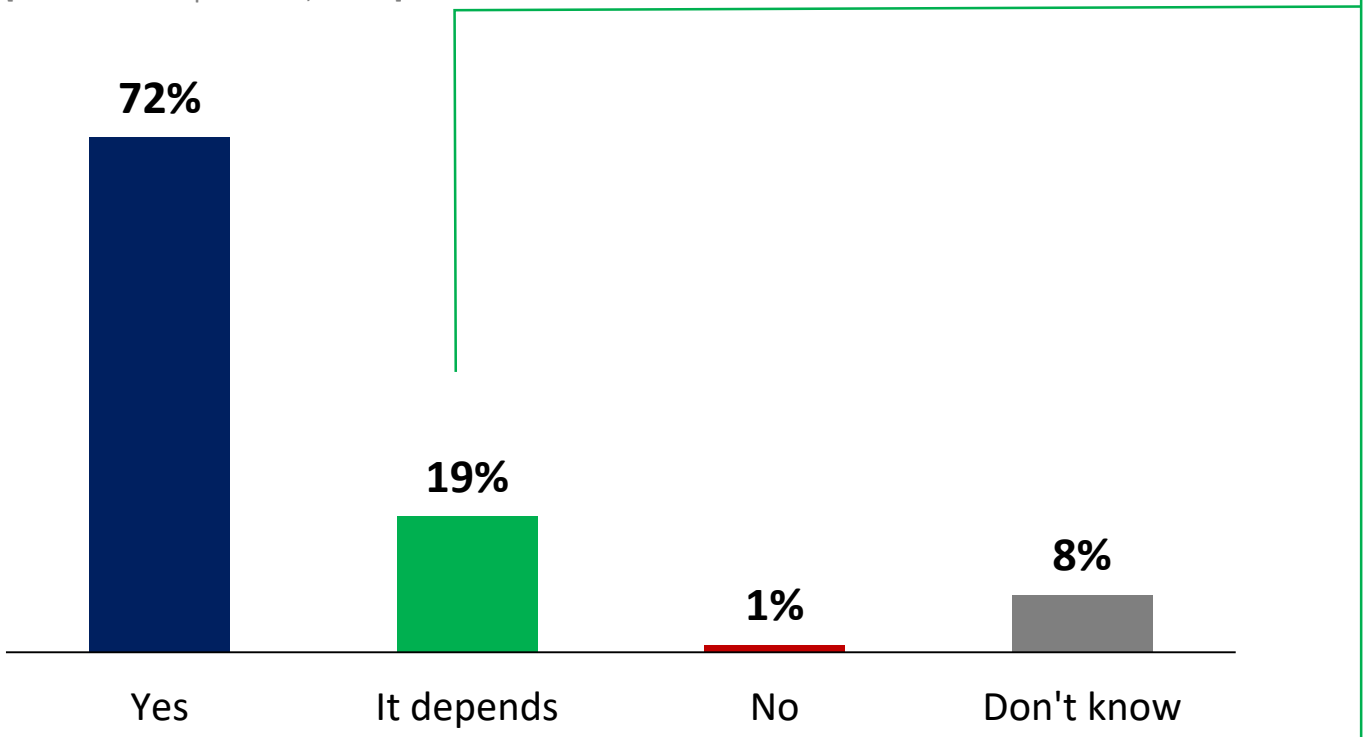
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Single Point of Contact: Most (72%) feel a single point of contact would make things easier, but some say it depends on the circumstances

Q **F41.** Hydro One recently reorganized its Key Account Management team in order to strengthen the role of your Account Executive as a single point of contact within Hydro One.

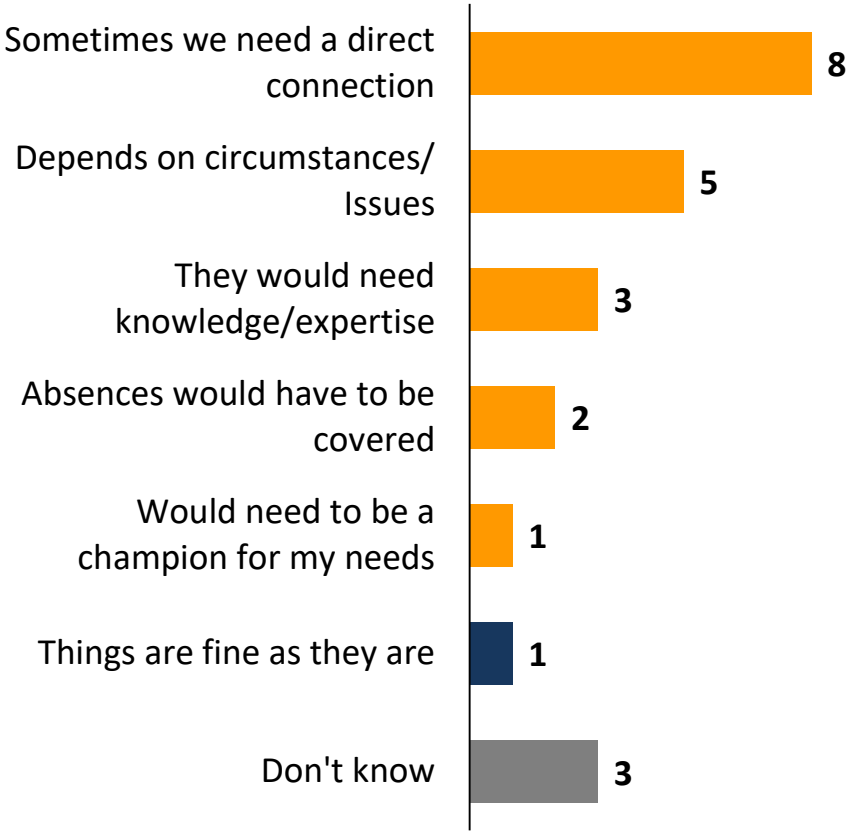
Do you think having a single point of contact through your Account Executive will make working with Hydro One easier for your organization?

[Asked of all respondents, n=112]



Q **F42.** What does the appeal of this approach for your organization depend on?

[Asked of all those who say "It depends", n=21]

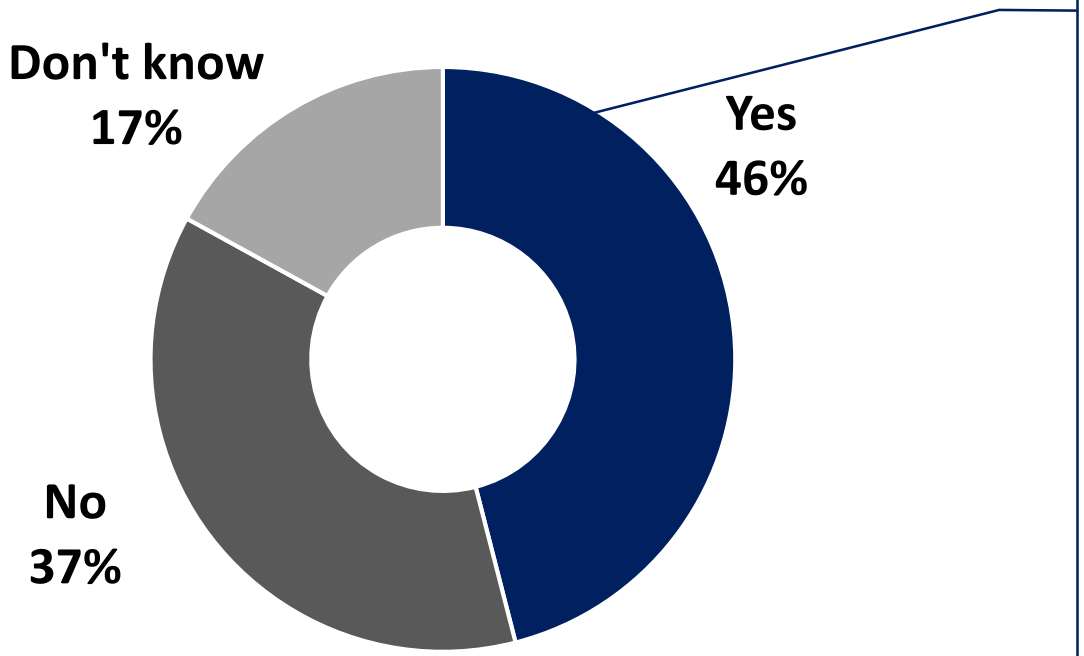


NOTE: Multiple mentions were recorded in this open-ended question. As such, numbers may add up to more than 21.

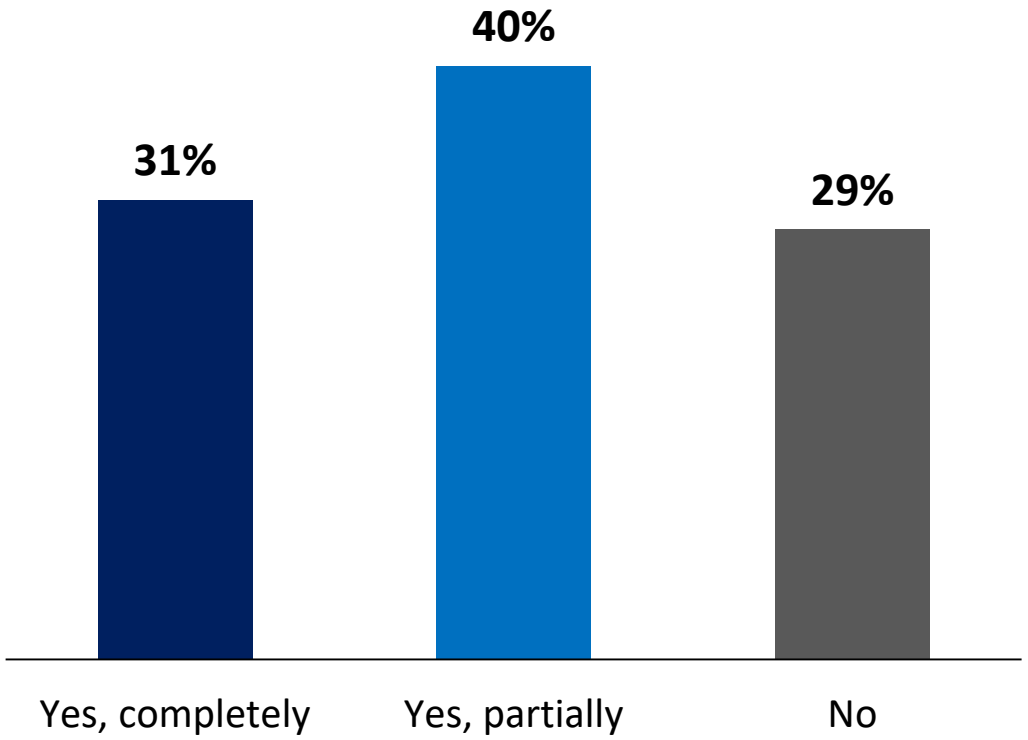
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

CDM Programs: Just under half (46%) recall participating in a CDM program; 71% of respondents who participate are involved with implementation

Q **F43.** Has your organization ever participated in a conservation and demand management (CDM) program provided by either Hydro One or IESO?
[Asked of all respondents, n=112]



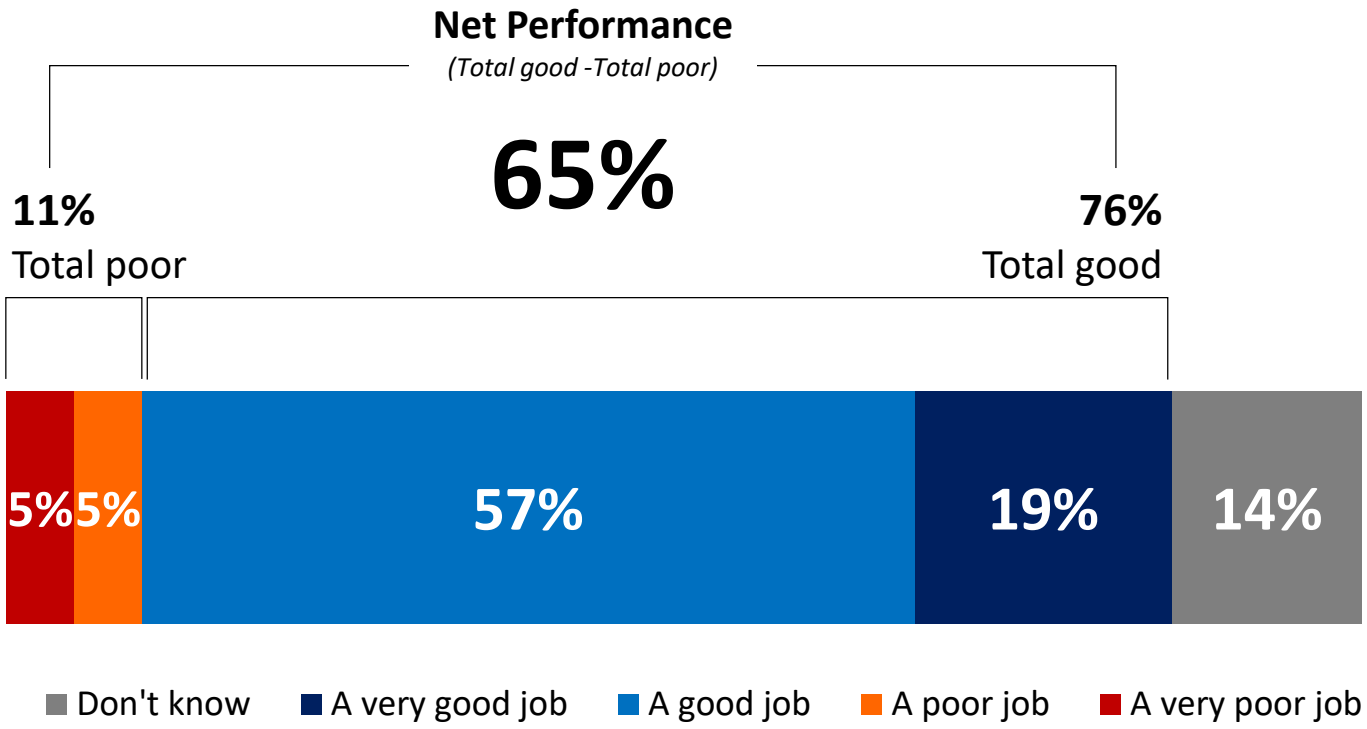
Q **F44.** Are you directly involved in the implementation of the CDM programs in place at your organization?
[Asked of those who could recall CDM participation, n=52]



NOTE: Response "Don't know" was included in this analysis

CDM Tools and Programs: Three-quarters (76%) of those involved say the IESO does a good job at providing information on available CDM programs and tools

F45. In general, how good or poor a job does the IESO do at providing your organization with information on available CDM tools and programs?
[Asked of those who are directly involved in CDM program implementation, n=37]



Total Good ▶▶ By Customer Type

Sample sizes are too small to provide a breakdown by customer type.

Key Insights

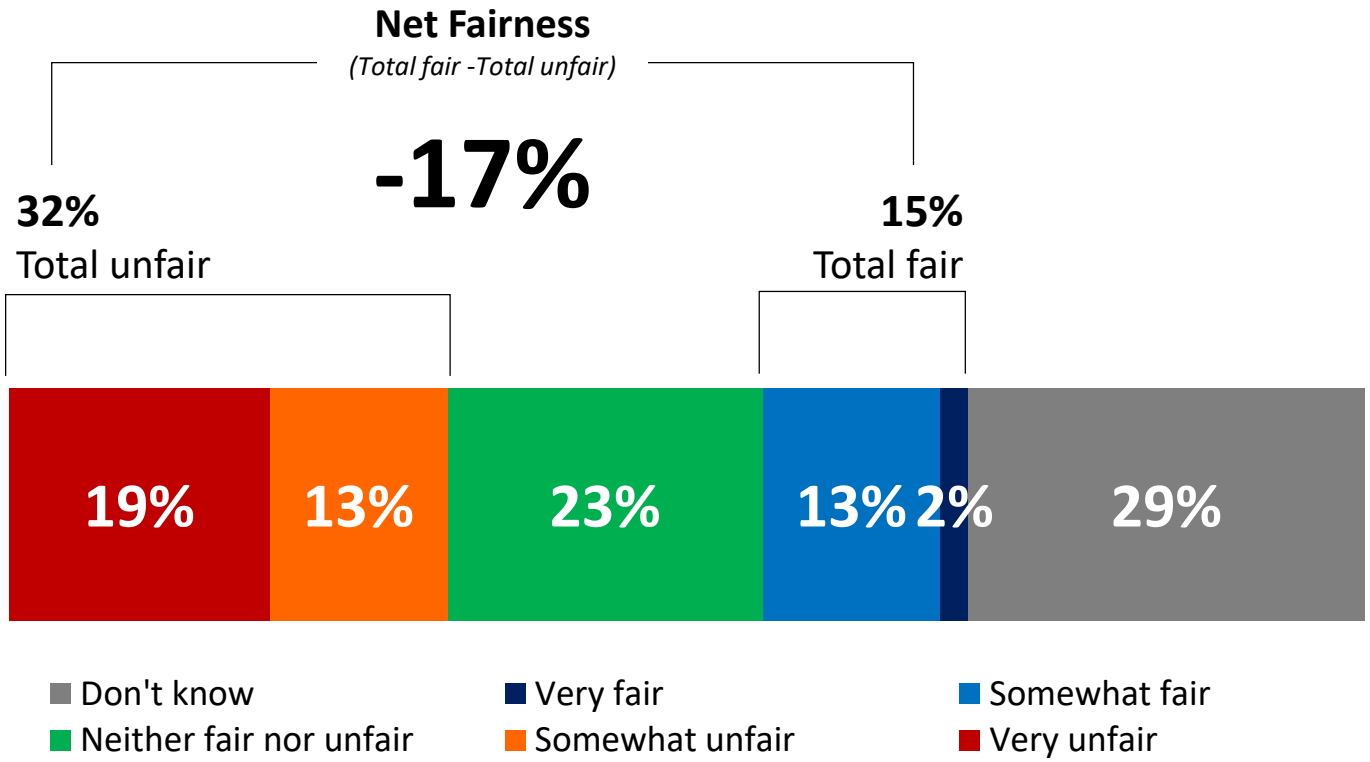
- Three-quarters (76%) of those who are involved in CDM program implementation say the IESO does a good job at providing information on CDM tools and programs, but most (57%) say they do a *good* job as opposed to a *very good* job (19%).

***NOTE**: results should be interpreted with caution due to small sample size*

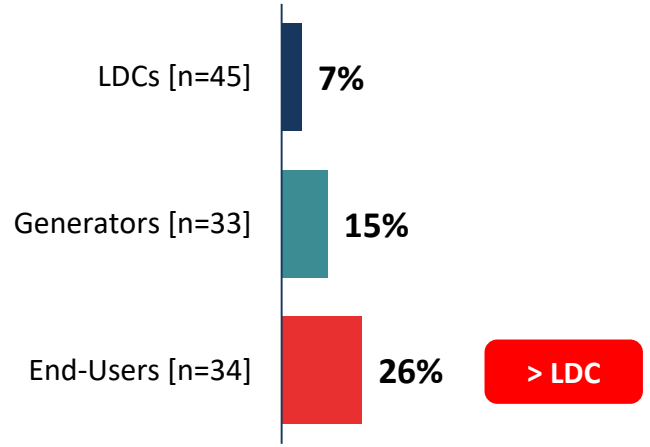
NOTE: Response "Don't know" was included in this analysis

Fairness of the Global Adjustment: One-third (32%) of LTX customers feel the GA is unfair, but most either don't know (29%) or are neutral (23%)

G50. How fair do you think the following charges on your bill are?
The Global Adjustment (GA)
[Asked of all respondents, n=112]



Total Fairness ▶▶ By Customer Type



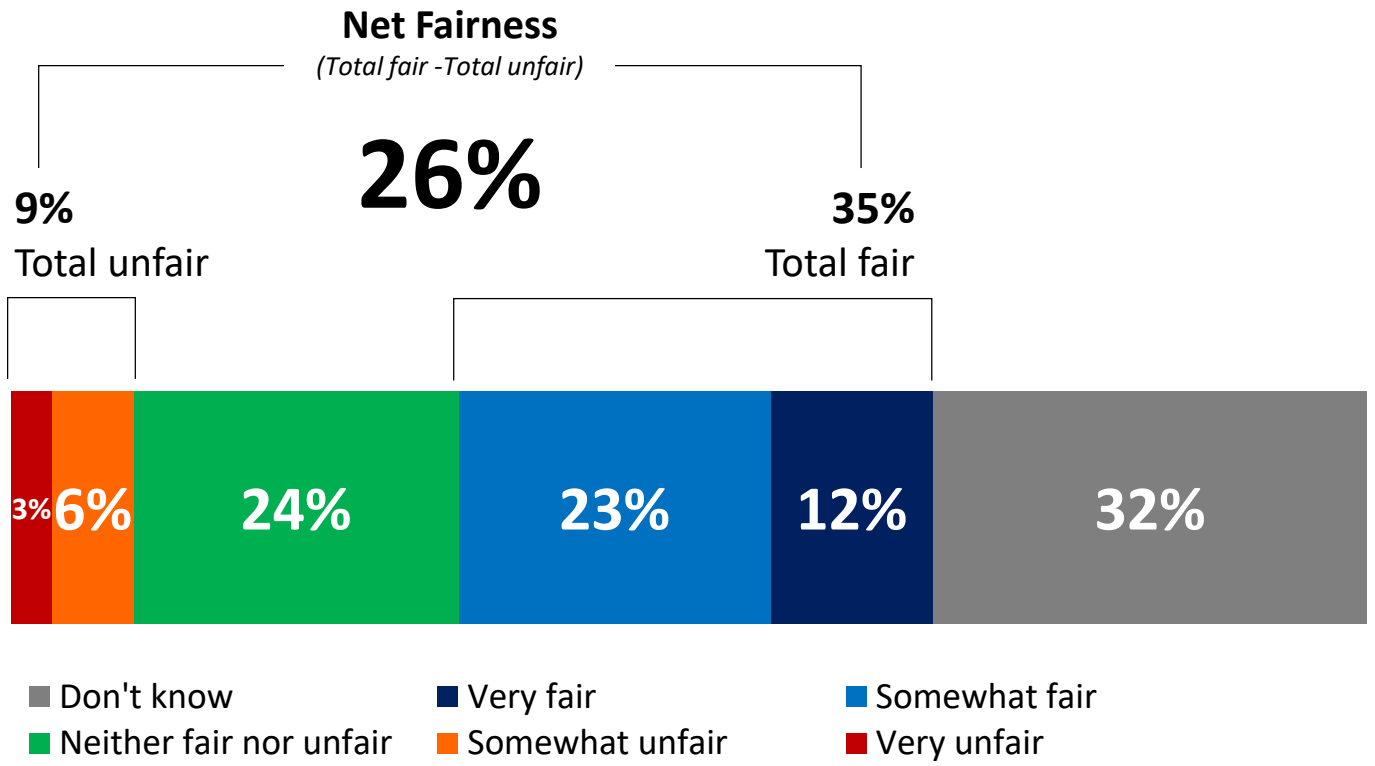
Key Insights

- They tend to find the GA unfair, but most LTX customers do not have an opinion one way or the other about the Global Adjustment charge.
- End-Users are most likely to find it fair (26%), LDCs are least likely (7%), and Generators are right on the average (15%).

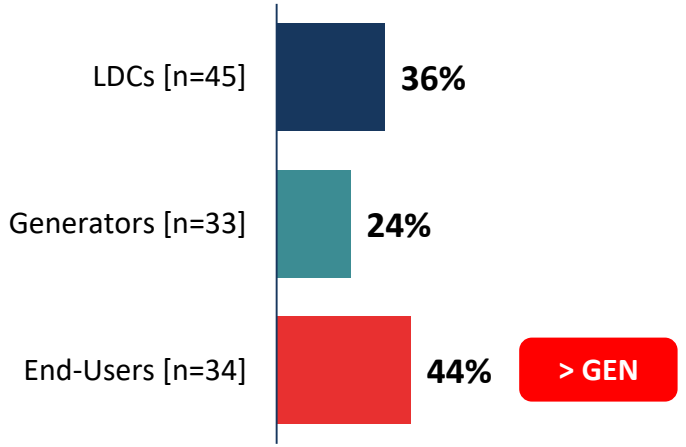
NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Fairness of the Hourly Ontario Energy Price: One-third (35%) of LTX customers say the HOEP is fair; but most don't know (32%) or are neutral (24%)

G51. How fair do you think the following charges on your bill are?
The Hourly Ontario Energy Price (HOEP)
[Asked of all respondents, n=112]



Total Fairness ▶▶ By Customer Type



Key Insights

- Most LTX customers don't have an opinion or are ambivalent about the Hourly Ontario Energy Price, but those who do have an opinion are more likely to deem it fair (35%) than unfair (9%).
- Unlike the Global Adjustment, End-Users (44%) and LDCs (36%) are more likely than Generators (24%) to say the HOEP charge on their bill is fair.

NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Regression Analysis: Identifying Drivers

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Using Regression Analysis: Identifying drivers of customer satisfaction

What is Regression Analysis?

Regressions are another means of determining importance.

- A regression allows us to take all the questions that may explain a key question we are interested in and see which of these is the most important.
- Regressions do this by holding all the likely suspects constant and varying one question at a time to see which questions (explanatory variables) have the greatest impact on the key question (dependent variable).
- In this study, we use regression to understand **why some respondents rate their satisfaction with or likelihood to recommend Hydro One higher than others.**

We use ***Factor Analysis*** to explore underlying dimensions and structure the regression analysis.

- A factor analysis finds the true underlying dimensions of customer satisfaction that explain the pattern of responses to the larger set of attributes.
- Factor analysis allows us to find which attributes mean similar things to customers. The use of factor analysis allows us to determine which attributes should be grouped together in order to conduct meaningful analysis.

Two Measures (DVs): CSAT and NPS

CSAT	NPS
*"Overall, how **satisfied** are you with Hydro One?"*	*"If you had a choice between several possible providers of electricity, how likely would you be to **recommend** Hydro One to your friends, family and others as the preferred electricity distributor?* *Please use a scale from 0 to 10, where 0 means you would not be at all likely to recommend Hydro One to others and 10 means you would be extremely likely to recommend."*
Measures **overall attitude** towards Hydro One.	Measures **attitudinal** aspects of **brand loyalty**.

What drives each of these measures?

The Regression Model: Identifying drivers of customer satisfaction

Price/Billing

Fairness of the Global Adjustment (GA)
Fairness of the Hourly Ontario Energy Price

Customer Service

Communication methods
Customer service (overall)
Service received from Key Account Executive

Participation in CDM programs
Provision of information on CDM tools and programs by the IESO

Product Quality/Reliability

Planned outages (overall)
Quality of power
Unplanned outages (overall)
Reliability of the electricity service
~~Accuracy of duration estimate~~
Time to restore power
~~Communication during outages~~
~~Number of unplanned power outages~~
~~Duration of unplanned outages~~
Recall of planned outage
Recall of unplanned outage

Brand

Accessibility
Understanding of business needs
Quality advice and guidance
Responds to needs
Ability to keep commitments
Ease of doing business
Trusted business partner
Good value for money

NOTE: Bolding denotes questions that were asked in the survey but not included in the summary score for the respective dimension.

Step 1 – Factor Analysis: Price/Billing

Price/Billing

Fairness of the Global Adjustment (GA)

Fairness of the Hourly Ontario Energy Price

Standalones:

- Fairness of the Global Adjustment (GA)
- Fairness of the Hourly Ontario Energy Price

NOTE: Bolding denotes questions that were asked in the survey but not included in the summary score for the respective dimension.

Step 1 – Factor Analysis: Customer Service

Customer Service

Communication methods
Customer service (overall)
Service received from Key Account Executive

Participation in CDM programs
Provision of information on CDM tools and programs by the IESO

Factors

Customer Service

Standalone:

- Participation in CDM programs
- Provision of information on CDM tools and programs by the IESO

NOTE: Bolding denotes questions that were asked in the survey but not included in the summary score for the respective dimension.

Step 1 – Factor Analysis: Product Quality/Reliability

Product Quality/Reliability

Quality of power
Reliability of the electricity service
Time to restore power

~~Accuracy of duration estimate~~
~~Communication during outages~~
~~Number of unplanned power outages~~
~~Duration of unplanned outages~~

Recall of planned outage
Recall of unplanned outage

Factors

Quality & Reliability

Standalones:

- Recall of planned outage
- Recall of unplanned outage
- Planned outages (overall)
- Unplanned outages (overall)

NOTE: Bolding denotes questions that were asked in the survey but not included in the summary score for the respective dimension.

Step 1 – Factor Analysis: Brand

Brand

Ease of doing business
Ability to keep commitments
Understanding of business needs

Quality advice and guidance
Trusted business partner
Good value for money

Accessibility
Responds to needs

Factors

Help & Commitment

Valued Partner

Accessibility & Responsiveness

NOTE: Bolding denotes questions that were asked in the survey but not included in the summary score for the respective dimension.

The Regression Model: Identifying Drivers

Factors

- **Customer Service**
- **Reliability**
- **Help & Commitment**
- **Valued Partner**
- **Accessibility & Responsiveness**

Standalones

- Fairness of GA
- Fairness of HOEP
- Participation in CDM programs
- Provision of information on CDM tools and programs by the IESO
- Recall of planned outage
- Recall of unplanned outage
- Planned outages (overall)
- Unplanned outages (overall)

Controls

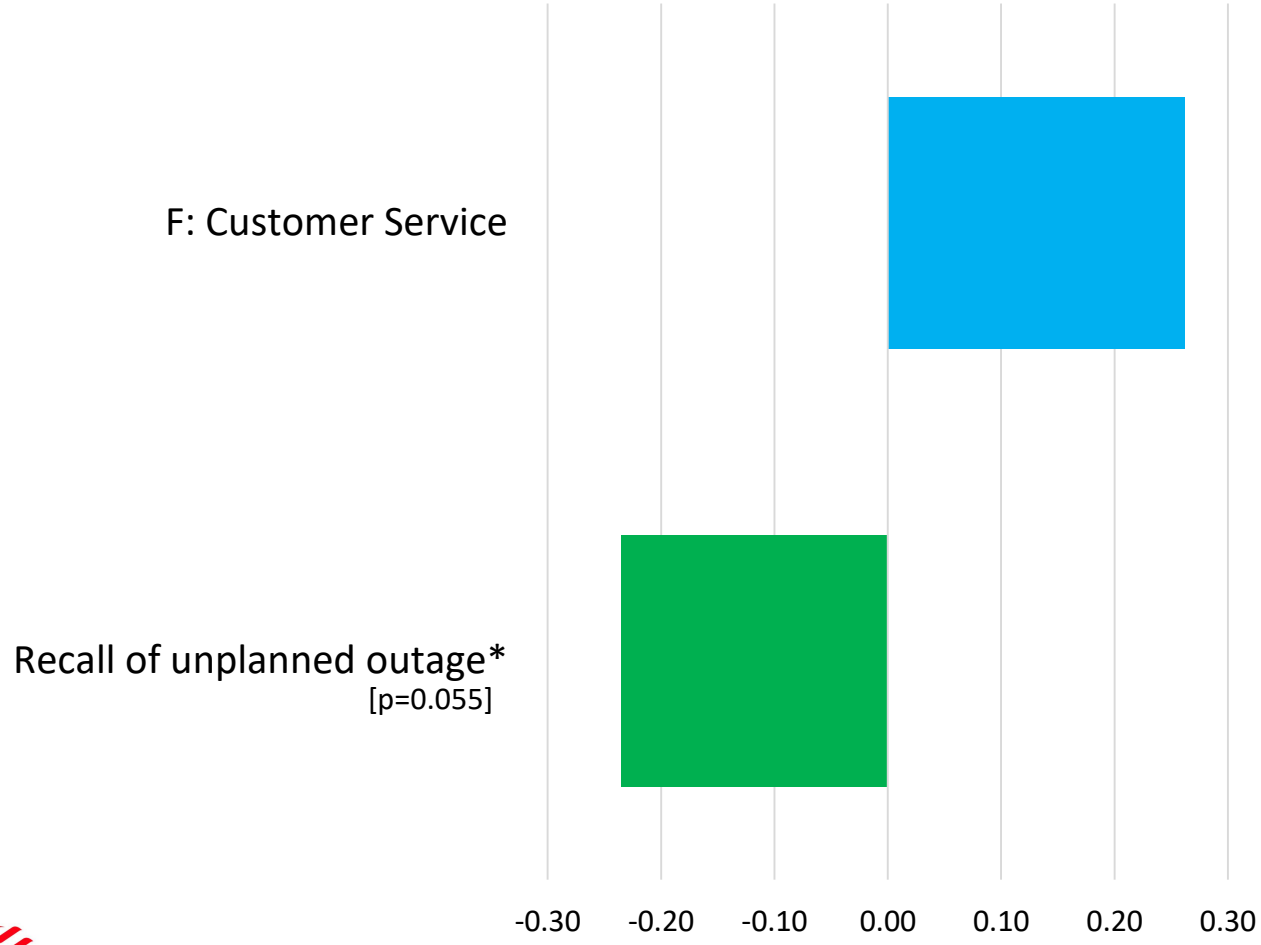
- Customer type
- Environmental controls

Two models:

CSAT | **NPS**

Regression Analysis: Identifying drivers of customer satisfaction

Customer service is the only factor that has a positive and statistically significant impact on customer satisfaction. Recall of an unplanned outage has a negative effect.



Hydro One CSAT

Adjusted R^2 = 0.289

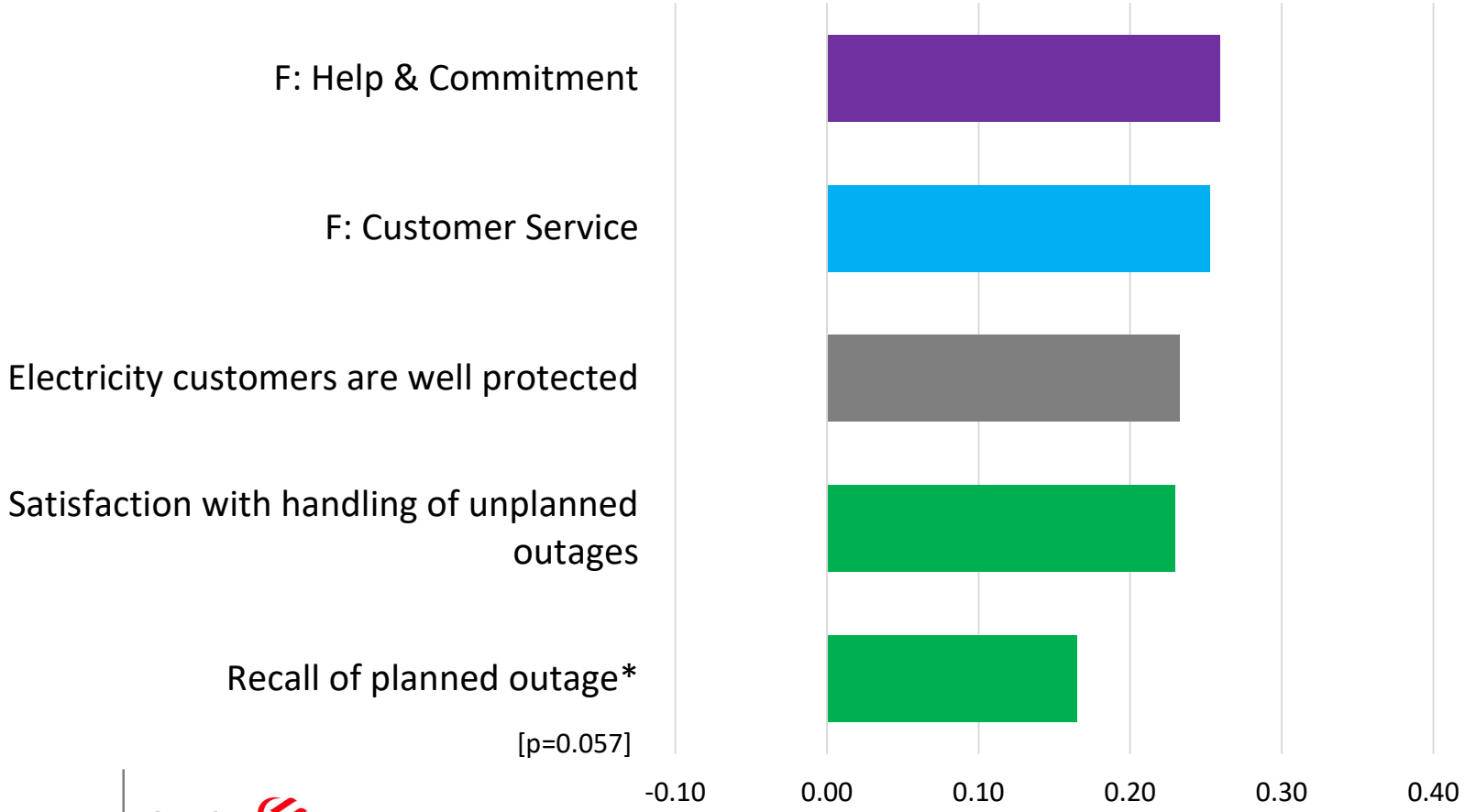
Notes:

- Factor ***Customer Service*** combines "communication methods", "customer service (overall)", "service received from Key Account Executive".

NOTE: Chart shows standardized beta scores. All drivers significant at a 95% confidence interval unless indicated otherwise.

Regression Analysis: Identifying drivers of NPS

Help & commitment, customer service and satisfaction with handling of unplanned outages are the biggest drivers of NPS. Customer type and whether one feels electricity customers are well protected have important positive effects.



NOTE: Chart shows standardized beta scores. All drivers significant at a 95% confidence interval unless indicated otherwise.

Hydro One NPS

Adjusted R^2 = 0.526

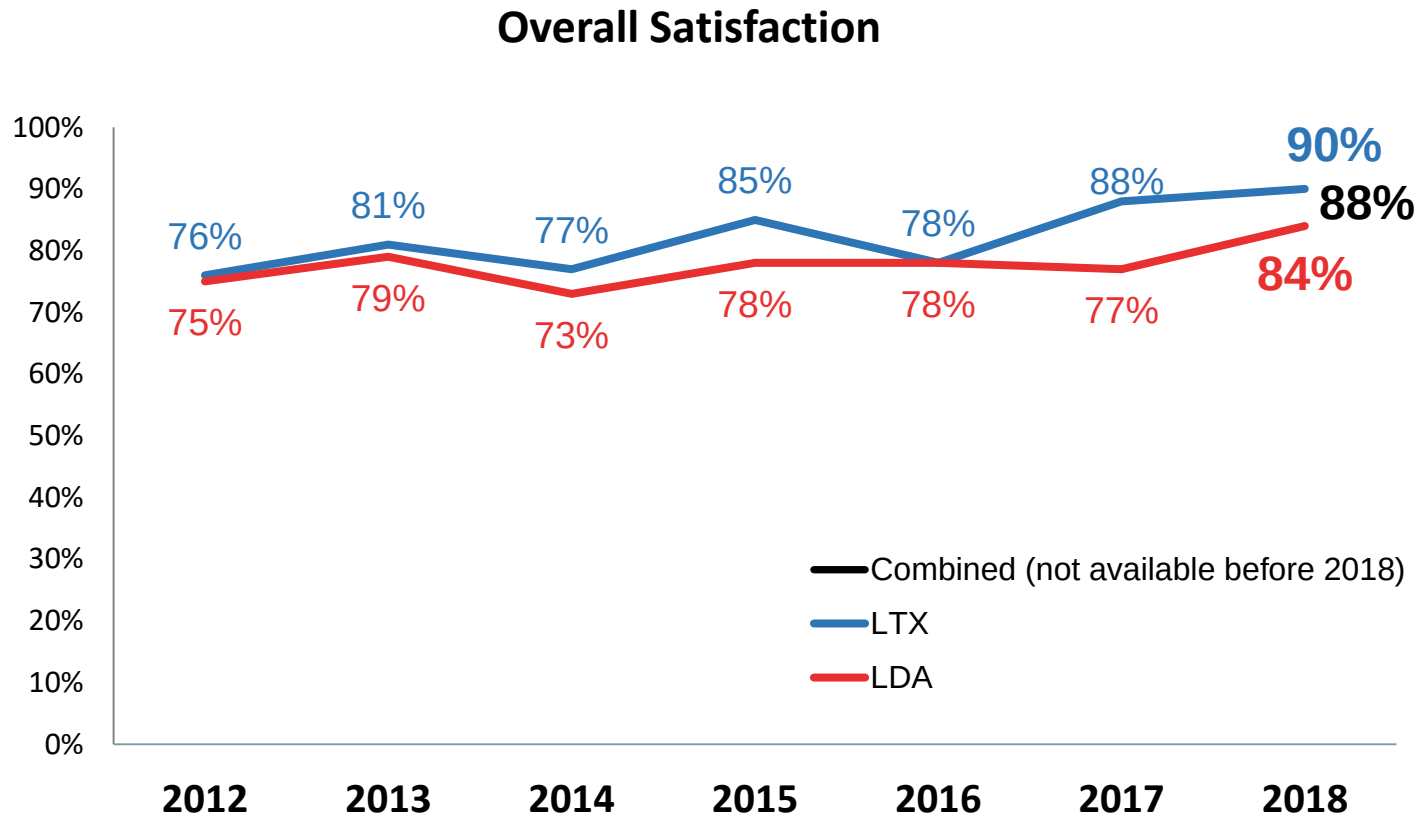
Notes:

- Factor ***Help & Commitment*** combines "ease of doing business", "ability to keep commitments", and "understanding of business needs".
- Factor ***Customer Service*** combines "communication methods", "customer service (overall)", "service received from Key Account Executive".
- This analysis controls for **Customer Type**, which is a strong driver of NPS (results not shown).

Combined LTX and LDA Results

Overall Satisfaction: LTX customers give a marginally higher satisfaction rating than LDA customers

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?

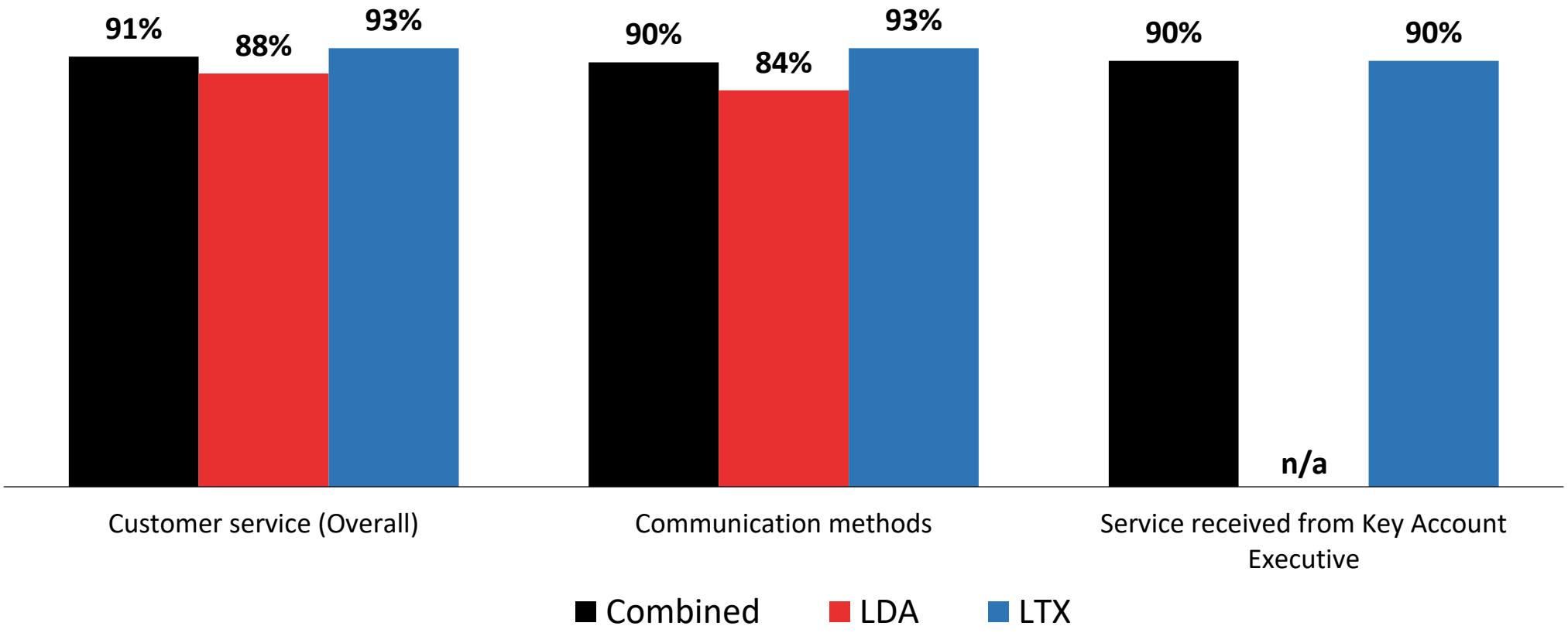


Key Insights

- Combining LTX and LDA customer results does not have a significant impact on overall satisfaction.

NOTE: Response "Don't know" (0% in 2017 & 2018) was excluded from this analysis. Statistically significant changes compared to the results from 2017 are indicated by ↑↓. Differences between customer type that are statistically significant at a 95% confidence interval are indicated.

Dimensions of Satisfaction (Customer Service): LDA customers are marginally lower on the Customer Service dimension



Average Customer Service Satisfaction Scores

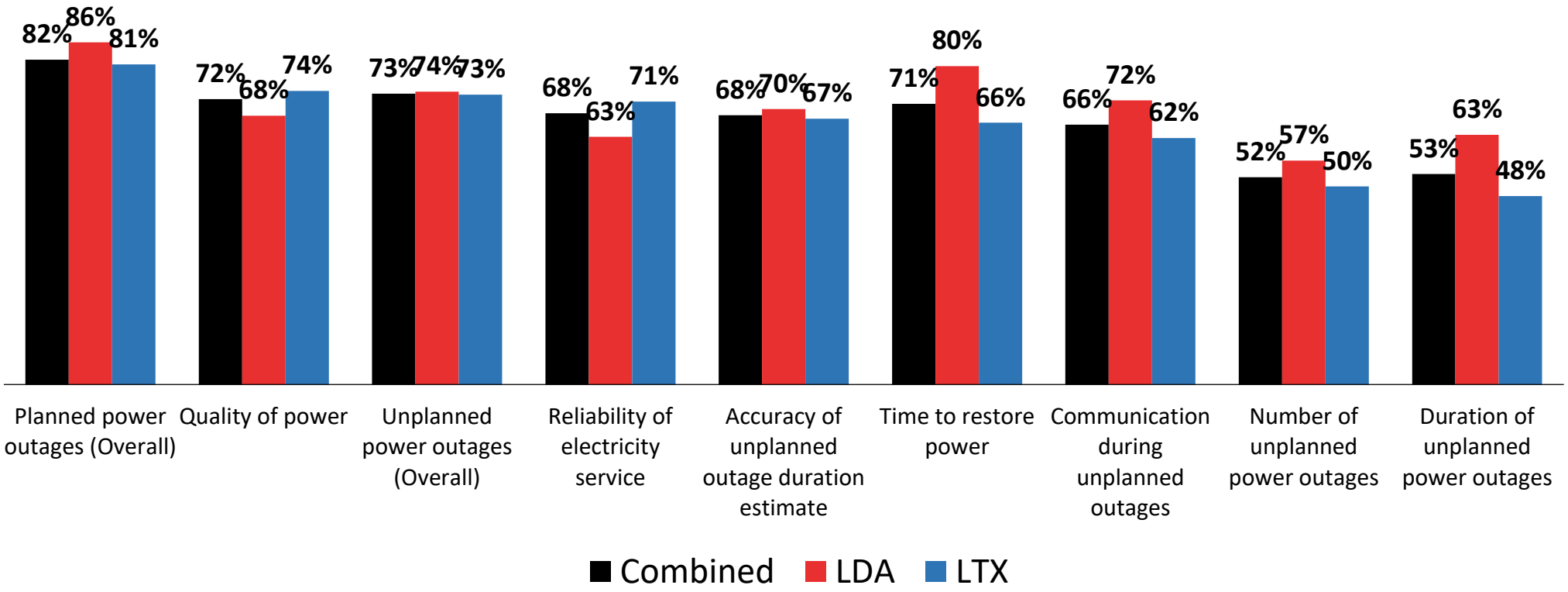
2018 **90%**

2018 **86%**

2018 **92%**

NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Dimensions of Satisfaction (Product): LDA customers are marginally higher on the Product dimension



Average Quality/Reliability Satisfaction Scores

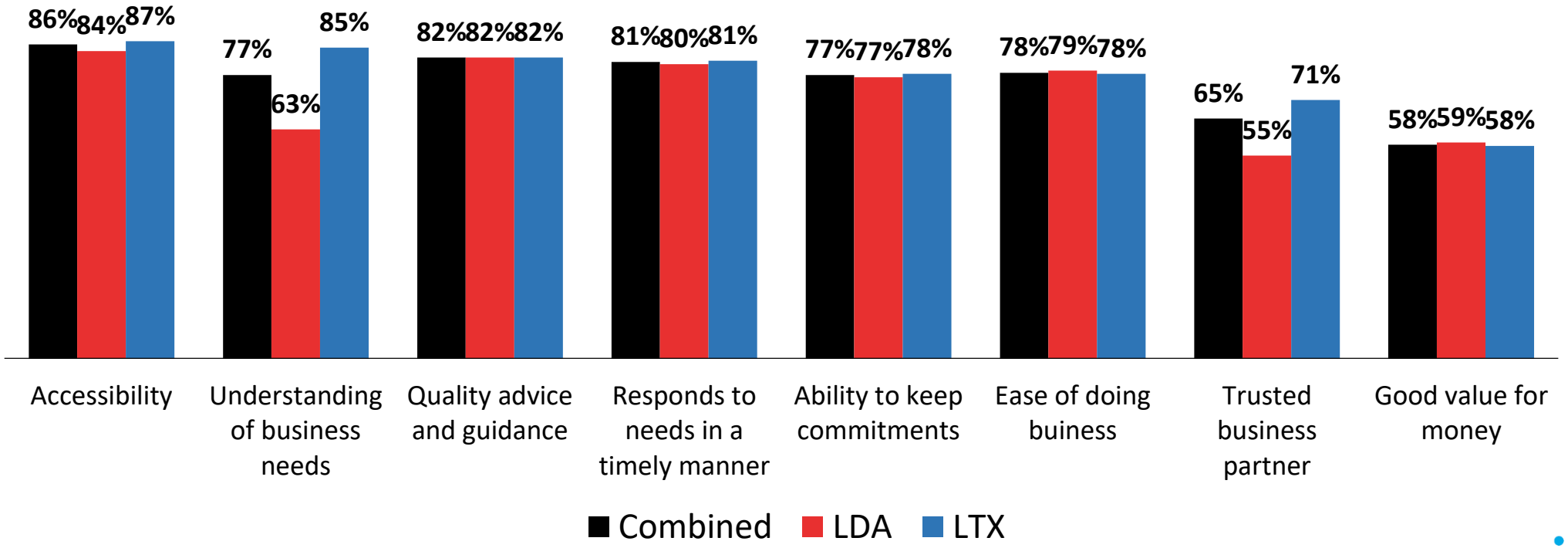
2018 **67%**

2018 **70%**

2018 **66%**

NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Dimensions of Satisfaction (Brand): LDA customers are marginally lower on the Brand dimension



Average Brand Satisfaction Scores

2018 **76%**

2018 **72%**

2018 **77%**

NOTE: Response "Don't know" was included in this analysis
Differences between customer type that are statistically significant at a 95% confidence interval are indicated

Appendix

APPENDIX A: Tracking Changes

Overall:

Metric	Question Text [Response Scale]	2017	2018	Difference
C2 **CSAT**	**Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?** [5 pt. Satisfied/Dissatisfied] *Previously: Q2. How satisfied are you with Hydro One overall? [5 pt. Satisfied/Dissatisfied]*	88%	90%	+2
H54 **NPS**	**If you had a choice between several possible providers of electricity, how likely would you be to recommend Hydro One to your colleagues and peers as the preferred electricity utility?** [11 pt. Not at all likely/Extremely likely] **NEW**	n/a	-14%	n/a

NOTE: In order to provide tracking, the 2018 results in this section *exclude* "Don't know" as a valid response in order to be consistent with the 2017 approach. Tests for statistically significant differences cannot be conducted for any metric aside from overall CSAT due to the changes made to the survey in 2018.

Survey Changes: Brand

BRAND

We continue to track Hydro One's perceived ability to keep commitments in 2018, but have changed the measure to a 5-pt satisfaction scale.

INNOVATIVE did not include '*making decisions promptly'* in the 2018 survey because it was found to be too vague and open to different interpretations among respondents (a source of measurement error).

2017

- Keeps commitments
- Making decisions promptly

Agree/Disagree (10pt)

- NEW: Easy to do business with
- NEW: Understands your business

2018

Satisfied/Dissatisfied (5 pt)

- Ease of doing business with Hydro One
- Hydro One's ability to keep commitments
- Hydro One's understanding of your business needs

Agree/Disagree (5 pt)

- Hydro One is…a trusted business partner
- Hydro One staff are easily accessible to my organization
- Hydro One staff provide…quality advice and guidance when I have questions about my service
- Hydro One provides my organization with good value for money
- Hydro One responds to the needs of my organization in a timely manner

APPENDIX A: Tracking Changes

Brand:

Metric	Question Text [Response Scale]	2017	2018	Difference
D7	**Ease of doing business with Hydro One.** [5 pt. Satisfied/Dissatisfied] *Previously: Q10_O. Easy to do business with. [10 pt. Agree/Disagree]*	76%	78%	+2
D8	**Hydro One's ability to keep commitments.** [5 pt. Satisfied/Dissatisfied] *Previously: Q10_A. Keeps commitments. [10 pt. Agree/Disagree]*	83%	78%	-5
D9	**Hydro One's understanding of your business needs.** [5 pt. Satisfied/Dissatisfied] *Previously: Q10h. Understanding your business needs for electricity. [10 pt. Agree/Disagree]*	86%	85%	-1

Brand results are continued on next page…

NOTE: In order to provide tracking, the 2018 results in this section *exclude* "Don't know" as a valid response in order to be consistent with the 2017 approach. Tests for statistically significant differences cannot be conducted for any metric aside from overall CSAT due to the changes made to the survey in 2018.

APPENDIX A: Tracking Changes

Brand:

Metric	Question Text [Response Scale]	2017	2018	Difference
D10	**Hydro One is more than an electricity utility, it is a trusted business partner to my organization.** [5 pt. Agree/Disagree] *Previously: Q17. Given how you just defined a trusted advisor, do you consider Hydro One to be a trusted advisor to your organization? [Yes/No]*		72%	
D11	**Hydro One staff are easily accessible to my organization.** [5 pt. Agree/Disagree] **NEW**	n/a	87%	n/a
D12	**Hydro One staff provide my organization with quality advice and guidance when I have questions about my service.** [5 pt. Agree/Disagree] **NEW**	n/a	84%	n/a
D13	**Hydro One provides my organization with good value for money.** [5 pt. Agree/Disagree] **NEW**	n/a	60%	n/a
D14	**Hydro One's responds to the needs of my organization in a timely manner.** [5 pt. Agree/Disagree] **NEW**	n/a	81%	n/a

NOTE: In order to provide tracking, the 2018 results in this section *exclude* "Don't know" as a valid response in order to be consistent with the 2017 approach.
Tests for statistically significant differences cannot be conducted for any metric aside from overall CSAT due to the changes made to the survey in 2018.

Survey Changes: Product Reliability/Quality

PRODUCT RELIABILITY/QUALITY

INNOVATIVE increased the number of product reliability/quality questions, adding those that are required by the OEB. These questions are highlighted in blue.

2017

LTX Only

Agree/Disagree (10pt)

- You can easily reach the OGCC during unplanned outages

2018

Satisfied/Dissatisfied (5 pt)

- The quality of power delivered to your organization
- The reliability of your electricity service
- The amount of time it takes to restore power when unplanned power outages occur
- Overall satisfaction with unplanned outages
- The number of unplanned power outages affecting your business
- The duration of unplanned outages
- The communication of information during unplanned outages
- The accuracy of information during unplanned outages
- Overall satisfaction with planned outages

APPENDIX A: Tracking Changes

Product Quality/Reliability:

Metric	Question Text [Response Scale]	2017	2018	Difference
E15	**The quality of power delivered to your organization (as judged by the absence of voltage fluctuations that may affect your organization's facilities and equipment).** [5 pt. Satisfied/Dissatisfied] **NEW**	n/a	80%	n/a
E16	**The reliability of your electricity service (as judged by the number of unplanned outages your organization experiences.** [5 pt. Satisfied/Dissatisfied] **NEW**	n/a	75%	n/a
E17	**The amount of time it takes to restore power when unplanned power outages occur.** [5 pt. Satisfied/Dissatisfied] **NEW**	n/a	71%	n/a
E20	**Generally, how satisfied or dissatisfied are your with the way your unplanned power outages are managed by Hydro One?** [5 pt. Satisfied/Dissatisfied] *Previously: Combined unplanned and planned outages*	n/a	75%	n/a
E28	**Generally, how satisfied or dissatisfied are you with the way your planned power outages are managed by Hydro One?** [5 pt. Satisfied/Dissatisfied] *Previously: Combined unplanned and planned outages*	n/a	83%	n/a

Product quality/reliability results are continued on next page…

NOTE: In order to provide tracking, the 2018 results in this section *exclude* "Don't know" as a valid response in order to be consistent with the 2017 approach.
Tests for statistically significant differences cannot be conducted for any metric aside from overall CSAT due to the changes made to the survey in 2018.

APPENDIX A: Tracking Changes

Product Quality/Reliability:

Metric	Question Text [Response Scale]	2017	2018	Difference
E21	**The number of unplanned outages affecting your business.** [5 pt. Satisfied/Dissatisfied] **NEW**	n/a	50%	n/a
E22	**The duration of unplanned outages.** [5 pt. Satisfied/Dissatisfied] *Previously: Q6_1. Minimizing duration of unplanned outages. [10pt. Agree/Disagree]*		49%	
E23	**The communication of information during unplanned outages.** [5 pt. Satisfied/Dissatisfied] **NEW**	n/a	63%	n/a
E24	**The accuracy of information provided regarding the duration of unplanned outages.** [5 pt. Satisfied/Dissatisfied] **NEW**	n/a	70%	n/a

NOTE: In order to provide tracking, the 2018 results in this section *exclude* "Don't know" as a valid response in order to be consistent with the 2017 approach. Tests for statistically significant differences cannot be conducted for any metric aside from overall CSAT due to the changes made to the survey in 2018.

Survey Changes: Customer Service

CUSTOMER SERVICE

Overall satisfaction ratings were added.

2017

Satisfied/Dissatisfed (5pt)

- Most recent contact experience with your Account Executive

2018

Satisfied/Dissatisfied (5 pt)

- Overall satisfaction of customer service
- The way Hydro One communicates with you and your organization

Satisfied/Dissatisfed (5pt)

- Service received from your Hydro One Key Account Executive

APPENDIX A: Tracking Changes

Customer Service:

Metric	Question Text [Response Scale]	2017	2018	Difference
F30	**Overall, how satisfied or dissatisfied are you with the customer service provided to your organization by Hydro One?** [5 pt. Satisfied/Dissatisfied] **NEW**	n/a	93%	n/a
F34	**Thinking about your organization's interactions with Hydro One over the past year – either via email, over the telephone, at the Large Customer Conference, or with in-person meetings – how satisfied are your with the way Hydro One communicates with your and your organization?** [5 pt. Satisfied/Dissatisfied] *Previously: Q27. Now we would like to the change the focus to written and verbal communications. Overall, how satisfied are your with the way Hydro One communicates with your company? [5 pt. Satisfied/Dissatisfied]*		94%	
F36	**How satisfied or dissatisfied are you with the service you receive from your Hydro One Key Account Executive?** [5 pt. Satisfied/Dissatisfied] *Previously: Q24. How satisfied are you with your most recent contact experience with your Account Executive? [5 pt. Satisfied/Dissatisfied] [ASKED ONLY OF THOSE WHO HAD RECENT CONTACT WITH THEIR AE]*	94%	95%	+1

NOTE: In order to provide tracking, the 2018 results in this section *exclude* "Don't know" as a valid response in order to be consistent with the 2017 approach. Tests for statistically significant differences cannot be conducted for any metric aside from overall CSAT due to the changes made to the survey in 2018.

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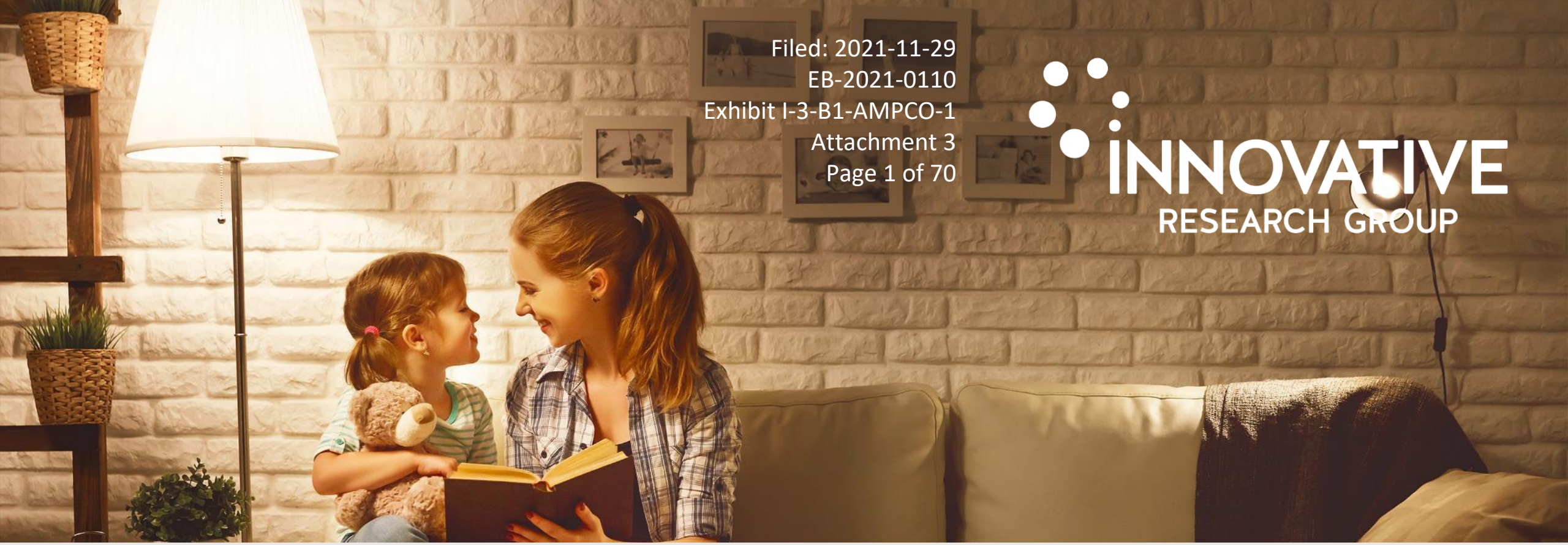
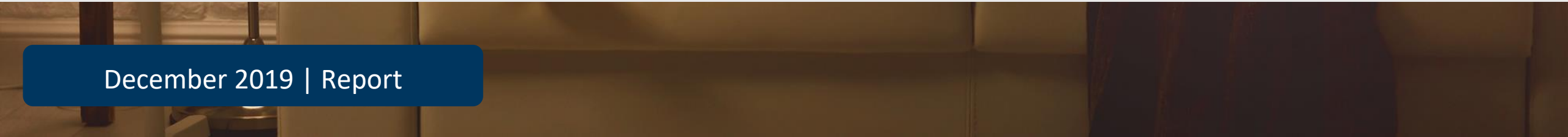


INNOVATIVE RESEARCH GROUP

2019 Large Tx Customer Satisfaction

Understanding Dimensions of Satisfaction and Dissatisfaction

hydro one



December 2019 | Report

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Methodology & Survey Changes

Methodology

The findings presented in this report are based on a customer survey carried out by Innovative Research Group (INNOVATIVE) for Hydro One.

The survey was conducted among large transmission (LTX) customers of Hydro One, from May 9th to Jun 19th and October 23rd to November 15th,2019 (a breakdown of customer segments is included in the tables below). Participants were able to complete the survey online or schedule a phone interview. In total, 109 participants completed the survey.

The below table shows the surveyed customer segments and their sample sizes:

Segment Size	TOTAL LTX	LDCs	Generators	End-Users
Total Population Size	197	61	71	65
Surveyed	109	44	31	34
% Captured	55%	72%	42%	52%

NOTE: *Graphs may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers.*

A Note Regarding Survey Changes

In an effort to create a clear snapshot of performance comparable across all customer groups, INNOVATIVE has worked with Hydro One to reorganize the LTX survey to better reflect and quantify customer experience.

Due to changes in survey questions over recent years, tracking for measures within dimensions of satisfaction, and in general, is inconsistent. ***In this report, we therefore limit tracking to key scorecard measures that were unaffected by changes.***

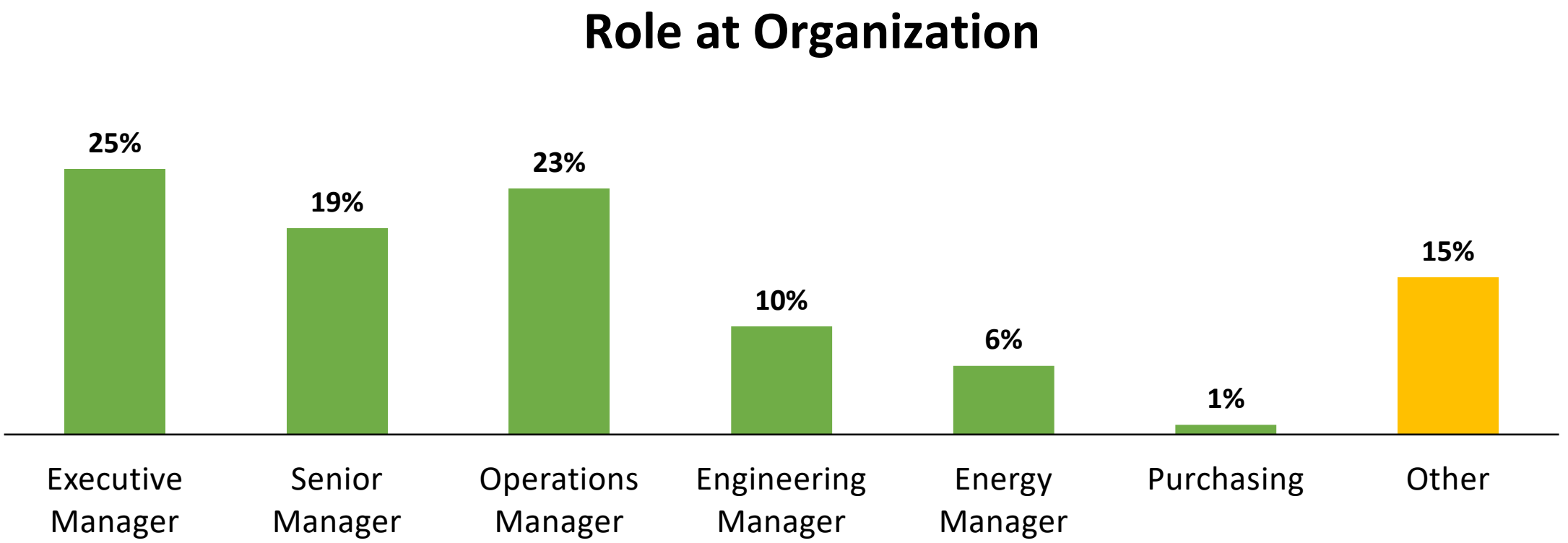
A number of fundamental changes have been made for the 2019 LTX survey:

- Alignment with R&SB, where possible
- Integration with qualitative learnings
- Removal of non-actionable questions

At the beginning of the survey, all respondents were presented with the following preamble:

> *"The following questions are about your experiences with and opinions of Hydro One.*
>
> *Hydro One builds and maintains power lines, towers and poles, delivers electricity, reads meters, answers customer calls, responds during outages, and clears trees and brush from power lines. Hydro One does not generate electricity or set electricity prices."*

Firmographics: *LTX Customer Profile*



NOTE: Response "Don't know" (1%) not shown.

Executive Summary

Key Findings | Executive Summary

1 **Overall satisfaction remains high, despite three point decline**
LDCs and Generators are marginally less satisfied than they were a year ago, while End-Users are marginally more satisfied.

2 **Generators and End-Users have a more favourable impression of Hydro One than LDCs**
Favourable impression among LDCs is ten or more points lower than among the other customer segments.

3 **KAEs score top marks in satisfaction**
Satisfaction is highest for service from KAEs (94%) and communication (88%). The lowest levels of satisfaction are for impact on local community (60%) and value for money (57%).

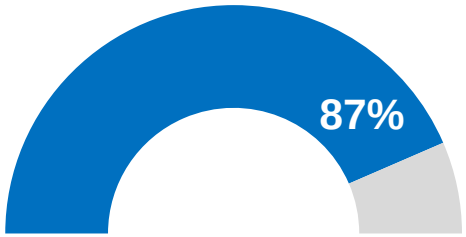
4 **Decline in Detractors paired with an increase in Promoters leads to improved NPS**
Identical proportions of Detractors and Promoters result in a neutral NPS. A plurality are Passive, presenting an opportunity to convert these customers into Promoters.

5 **Bills are having less of an impact, and customers feel more protected this year**
Fewer customers say their hydro bill is impacting their bottom line, and a larger proportion say they feel well-protected with respect to prices and reliability this year.

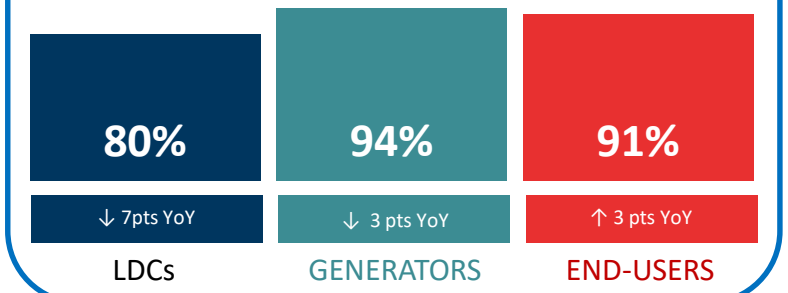
Key Metrics | LTX Customer Satisfaction

OVERALL SATISFACTION

Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?

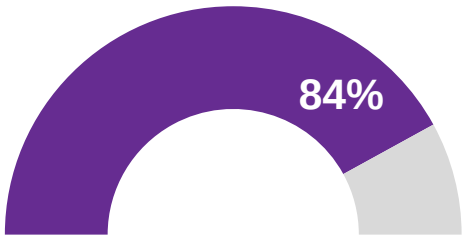


87% of respondents are either **very** or **somewhat satisfied** with service from Hydro One.

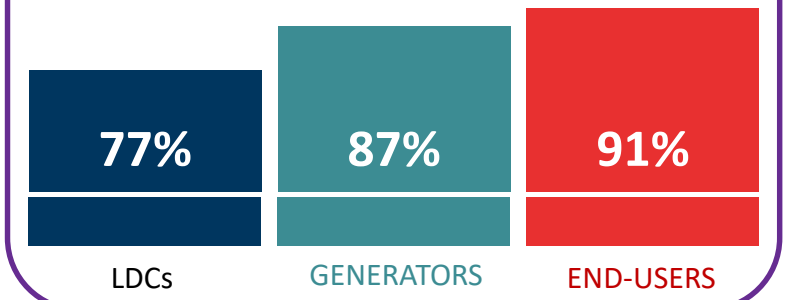


OVERALL IMPRESSION

Now, thinking about your impression of Hydro One more broadly, how would you describe your view of the company?

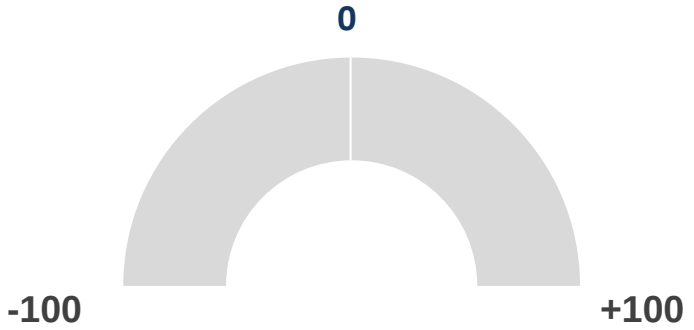


84% of respondents have either a **very** or **somewhat favourable impression** of Hydro One.

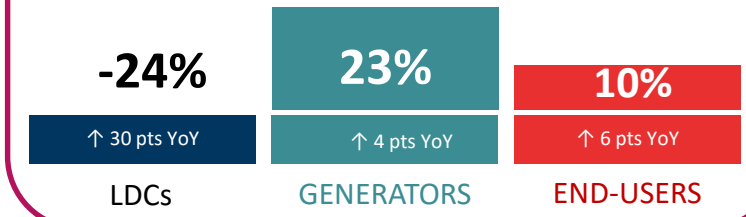


NET PROMOTER SCORE

If you had a choice between several possible providers of electricity, how likely would you be to recommend Hydro One to your colleagues and peers as the preferred electricity utility?



An NPS* of **0** means that respondents are **no more likely to be a promoter than detractor** of Hydro One. Passive respondents are not used in the calculation of NPS, but represent 42% of the sample.

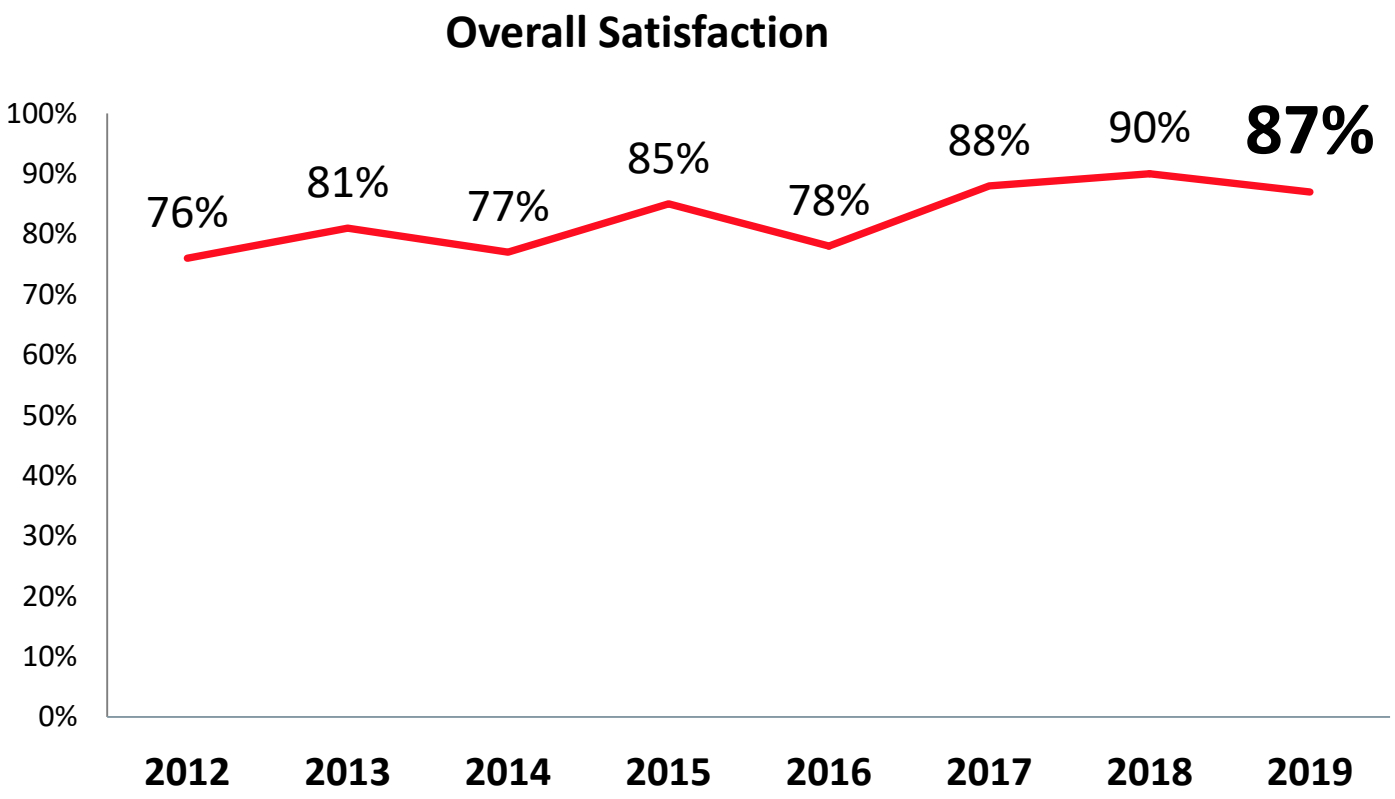


Overall Satisfaction (All LTX): Overall satisfaction remains high, despite a marginal decline from last year

Q

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?

[Asked of all respondents, n=109]



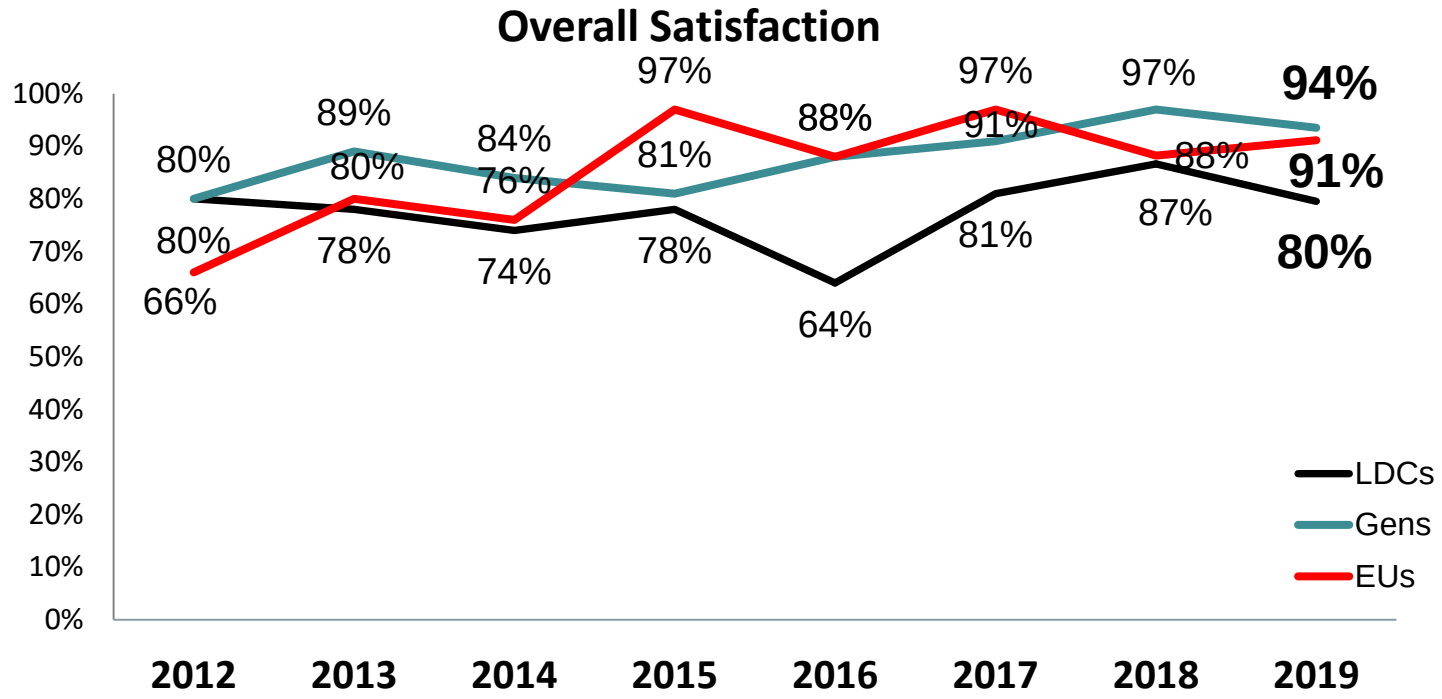
Key Insights

- Overall satisfaction is down three points from 2018.
- Since there were no respondents who said “don’t know” to this question in 2017 and 2018, the results are reliably trackable. Therefore, we know that there has not been a significant change since 2017.
- One respondent said “don’t know” in 2019, included in 2019 results.

NOTE: Response “don't know" was excluded from this analysis until 2017 (Don’t know 0% for 2017,2018). “Don’t know” (1%) included in 2019.
Statistically significant changes compared to the results from 2018 are indicated by ↑↓.

Overall Satisfaction (By Customer Type): Gap between Generator and LDC satisfaction grows to 14pt difference; End-Users up 3pts

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?



	2012	2013	2014	2015	2016	2017	2018	2019
LDCs	80%	78%	74%	78%	64%	81%	87%	80%
Gens	80%	89%	84%	81%	88%	91%	97%	94%
EUs	66%	80%	76%	97%	88%	97%	88%	91%

NOTE: Response "Don't know" (0% in 2017 & 2018) was excluded from this analysis. "Don't know" (1%) included in 2019.

Key Insights

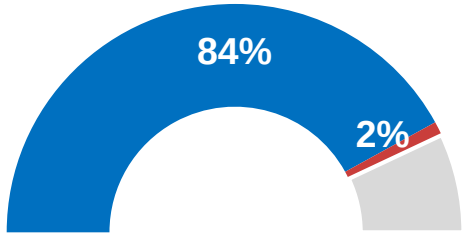
- Generator satisfaction drops 3 points compared to 2018, but still at a higher level of satisfaction than other customer segments.
- LDCs drop 7 points and remain the least satisfied of the three groups.
- End-Users up 3 points from 2018. Due to the small sample size (n=34), this is not a statistically significant change.

LTX Customer Type	Total Population	Sample Size
LDCs	61	44
Generators	71	31
End-Users	65	34

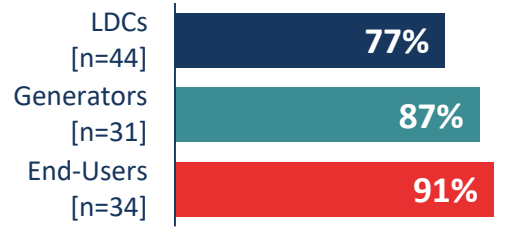
Dimensions of Satisfaction | LTX

Overall Impression*

D6. Now, thinking about your impression of Hydro One more broadly, how would you describe your view of the company?

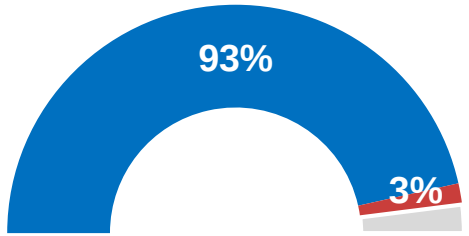


Total Satisfaction ▶▶ By Customer Type



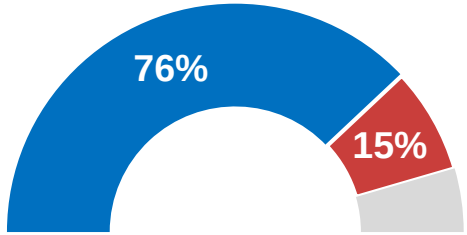
Overall Satisfaction with Customer Service

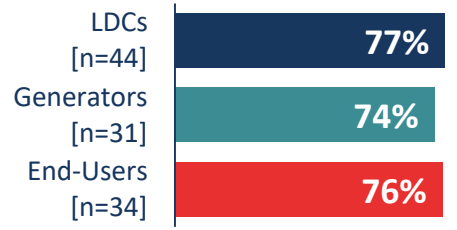
F30. Overall, how satisfied or dissatisfied are you with the customer service provided to your organization by Hydro One?



Overall Satisfaction with Reliability

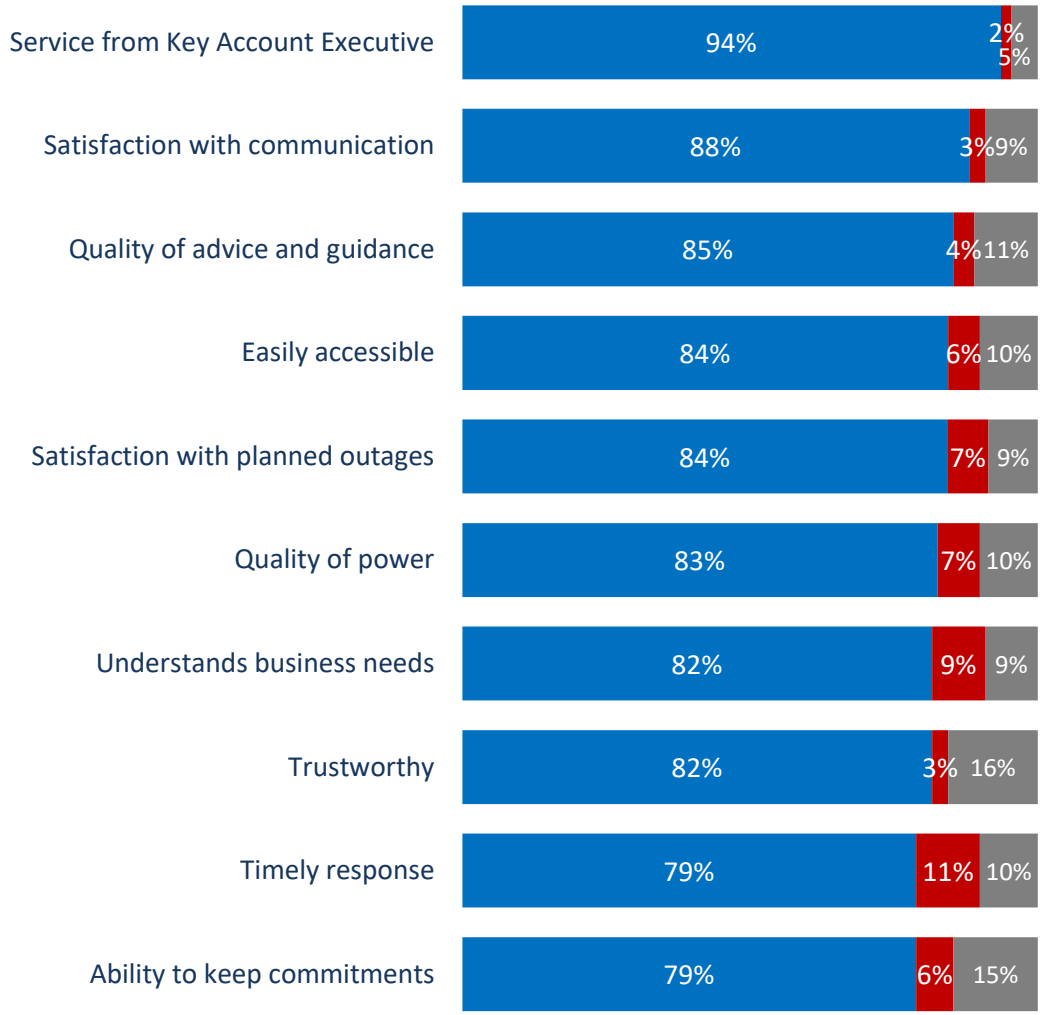
E20. For each statement, please indicate your level of satisfaction or dissatisfaction: The reliability of your electricity service (as judged by the number of unplanned power outages your organization experiences).

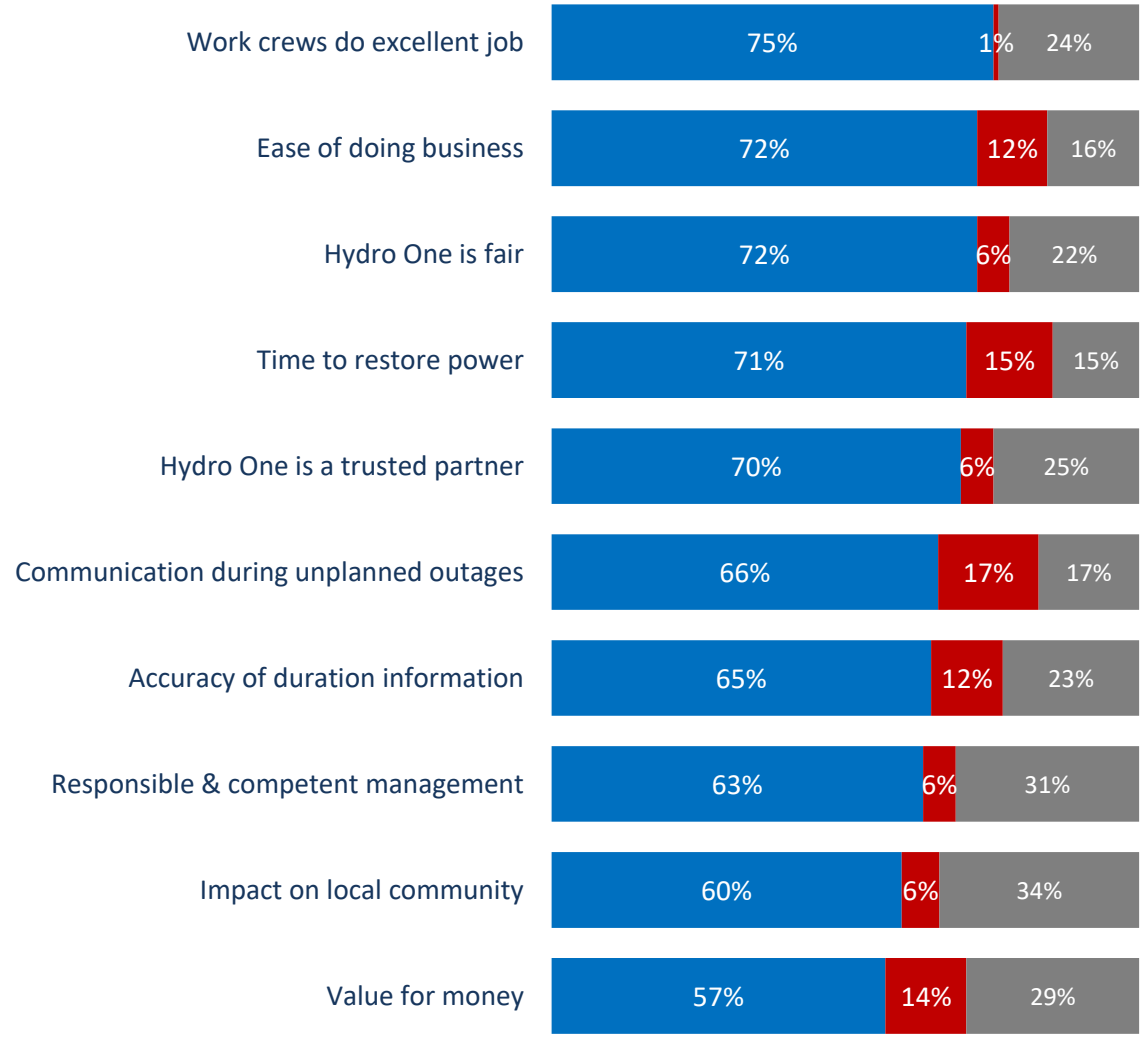




Note: Percentages represent total satisfied/dissatisfied (very and somewhat), or top and bottom two collapses for 5-point scales. *Overall impression represents total favourable/unfavourable.

Dimensions of Satisfaction | Details



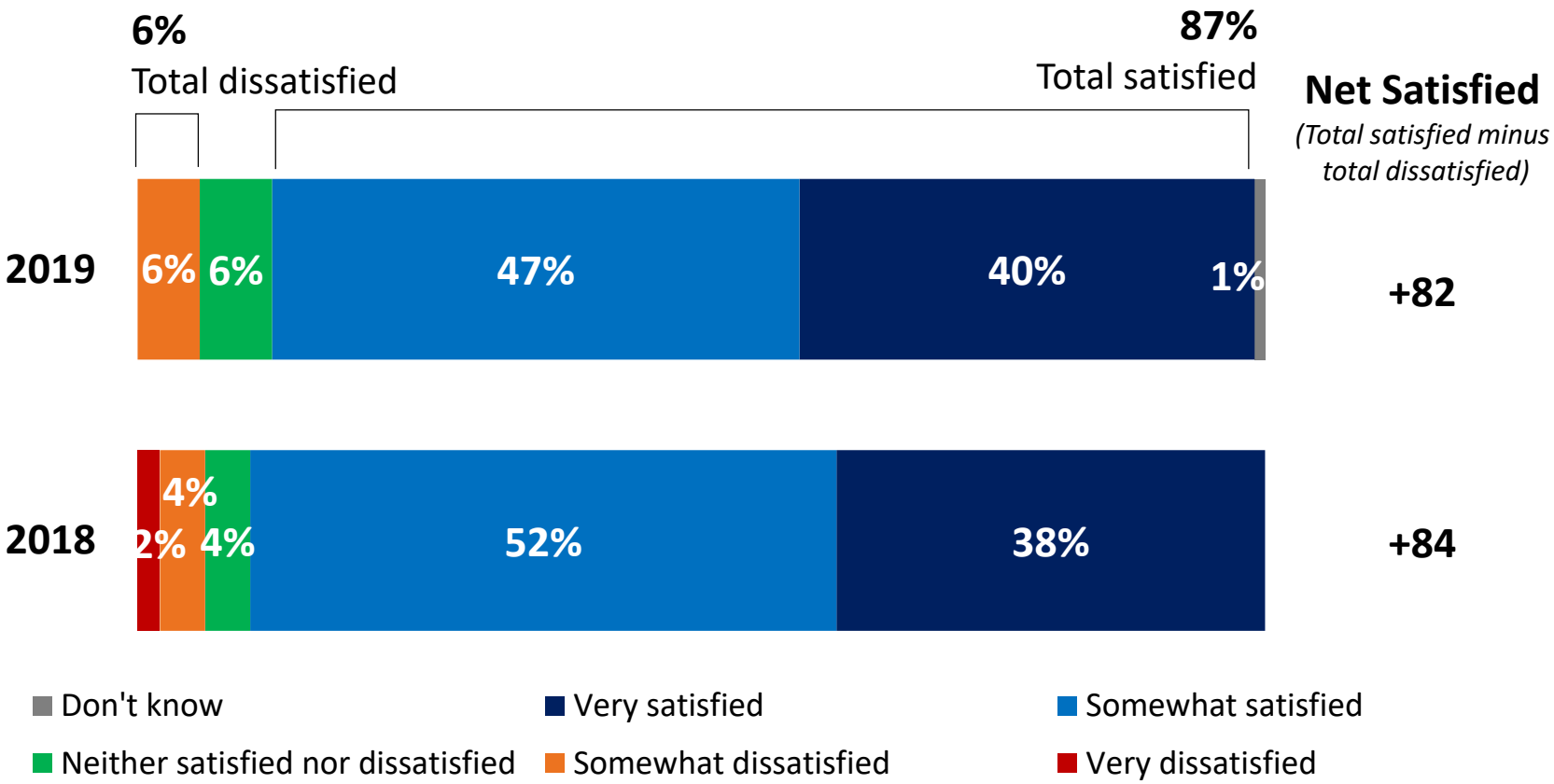


Satisfied | Dissatisfied | Don't know/neither/refused

Customer Satisfaction

Overall Satisfaction: Almost 9-in-10 (87%) LTX customers are satisfied with the service they receive from Hydro One

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?
[Asked of all respondents, n=109]

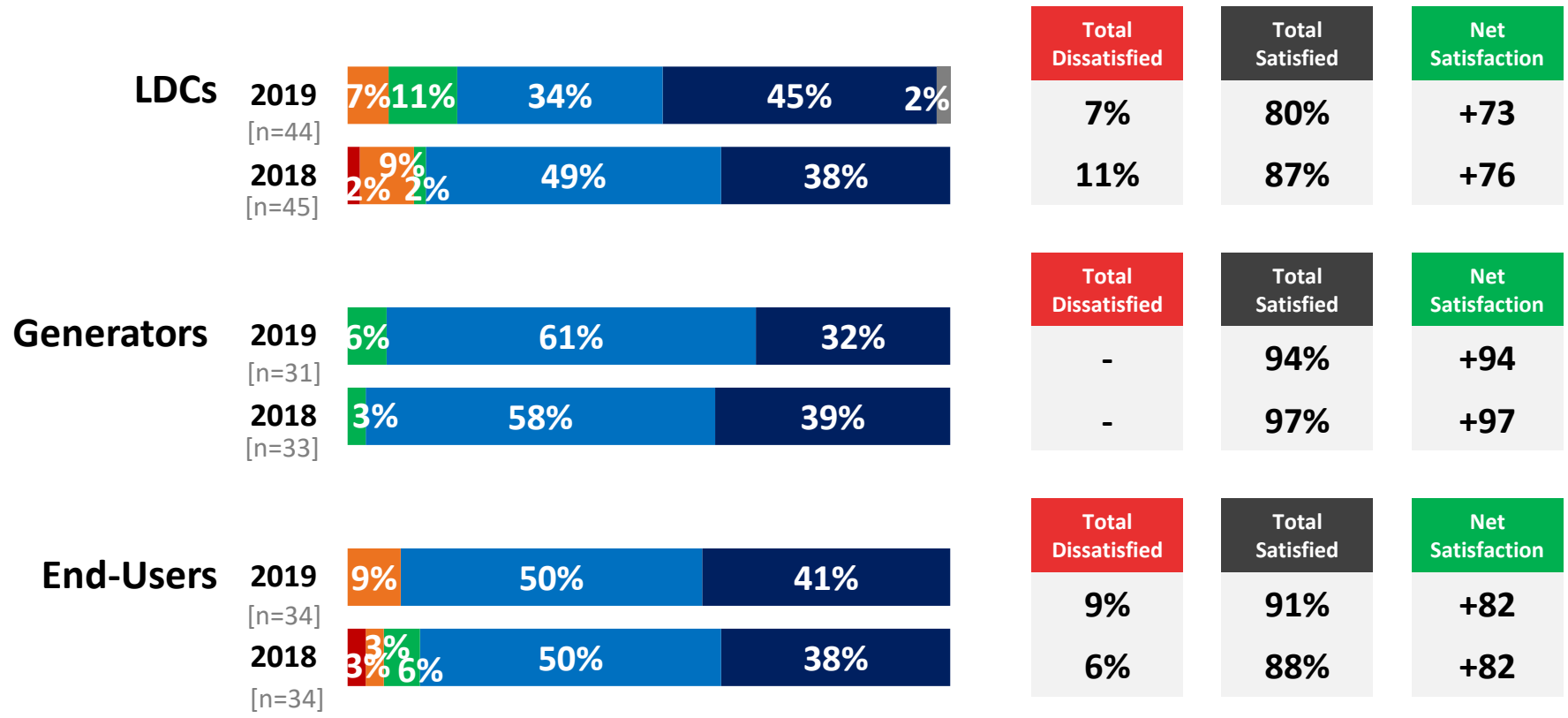


Key Insights

- Majority (87%) are satisfied with Hydro One, but there is room for improvement on intensity. Currently, almost half (47%) are *somewhat* satisfied, while 40% are *very* satisfied.
- Net satisfaction is down 2 points from 2018

Overall Satisfaction by Type: At least 8-in-10 customers are satisfied across all customer groups; satisfaction highest among Generators

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?
[Asked of all respondents; 2019 LDC n=44, Gen n=31, EU n=34]



	Total Dissatisfied	Total Satisfied	Net Satisfaction
2019 [n=44]	7%	80%	+73
2018 [n=45]	11%	87%	+76

	Total Dissatisfied	Total Satisfied	Net Satisfaction
2019 [n=31]	-	94%	+94
2018 [n=33]	-	97%	+97

	Total Dissatisfied	Total Satisfied	Net Satisfaction
2019 [n=34]	9%	91%	+82
2018 [n=34]	6%	88%	+82

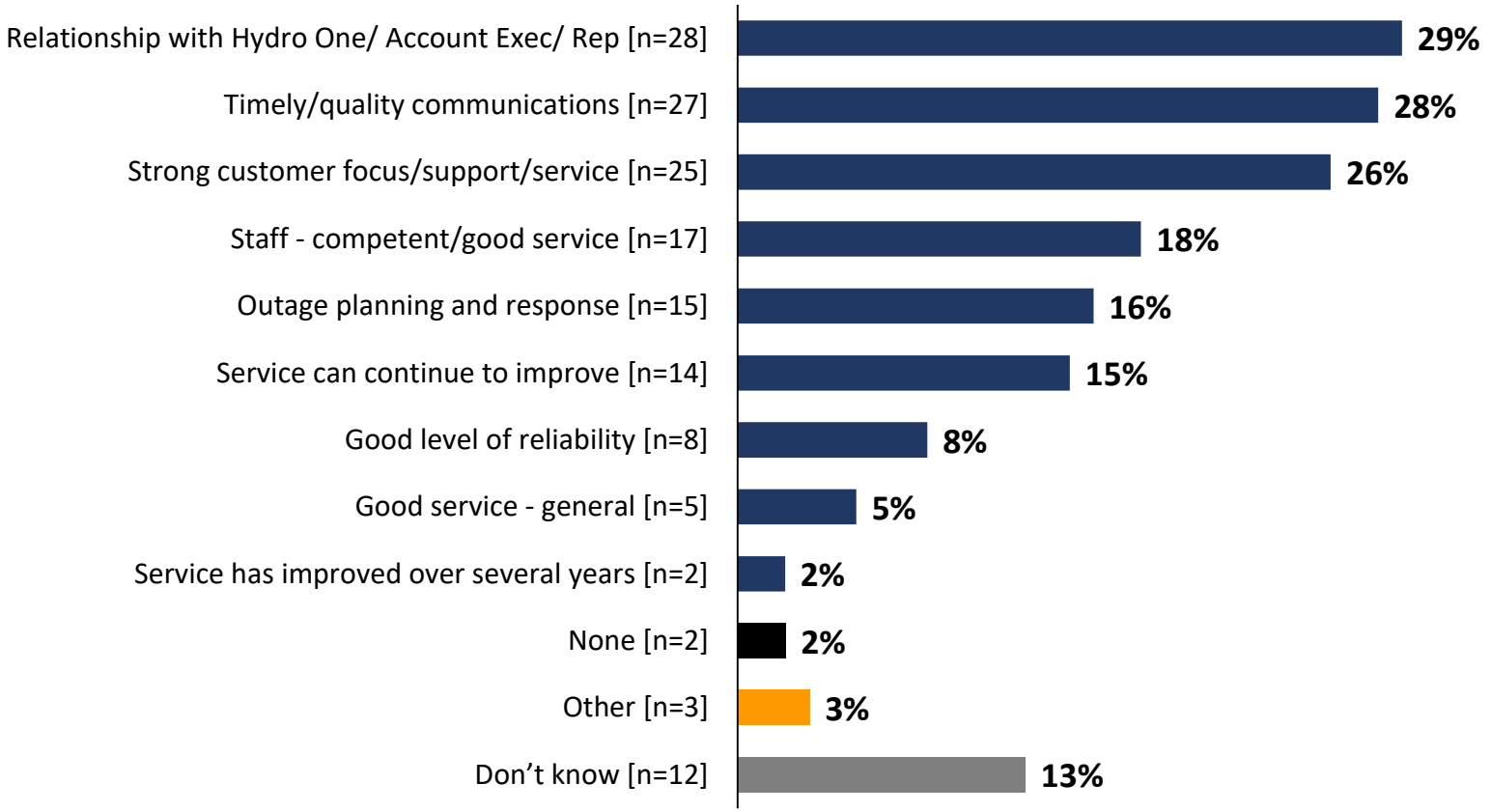
Key Insights

- The higher proportion of *somewhat satisfied* and complete absence of dissatisfied Generators results in highest satisfaction among that customer group.
- However, the level of *intense* satisfaction is lowest among Generators.
- The proportions are small, but there are some dissatisfied LDC (7%) and End-Use (9%) customers.
- Compared to 2018, net satisfaction dipped 3 points for LDCs and Generators, while remaining the same for End-Users

Reasons for Satisfaction: Top attributes include the relationship with their Account Executive and quality communications

C3. Is there any particular reason why you're satisfied with the service your organization receives from Hydro One?

[Asked of those that are somewhat or very satisfied, open-ended, n=95]



Key Insights

- About 3-in-10 (29%) satisfied LTX customers attribute their satisfaction to "relationship with Account Executive".
- Second on the list (28%) is "timely/quality communications", followed by "strong customer focus/support/service" (26%).

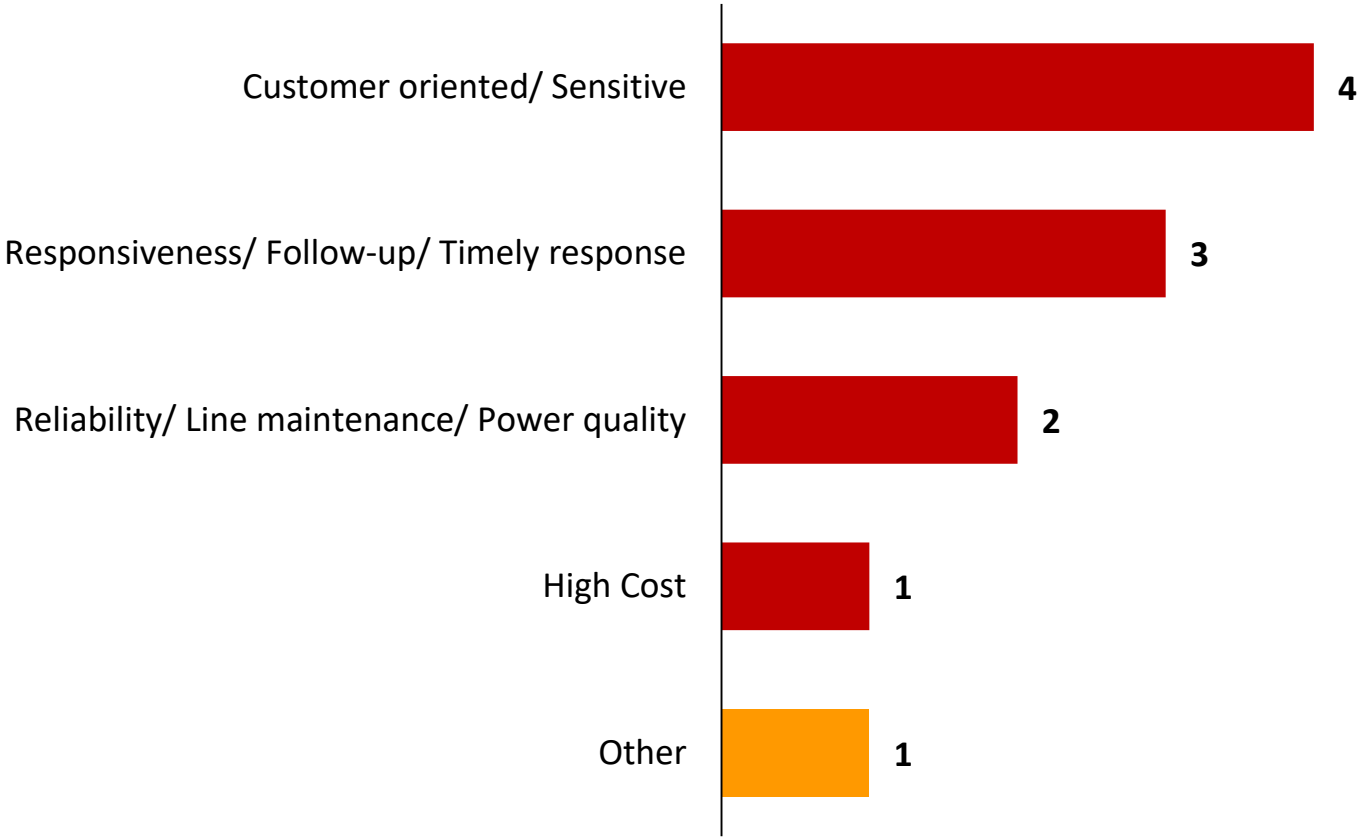
NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Reasons for Dissatisfaction: Very few are dissatisfied. Those who are, attribute it to customer sensitivity, responsiveness, or reliability

Q

C4. Is there any particular reason why you're dissatisfied with the service your organization receives from Hydro One?

[Asked of those who were somewhat or very dissatisfied, open-ended, n=6]



Key Insights

- Due to the very small sample size, any insights on reasons for dissatisfaction are entirely qualitative in nature.

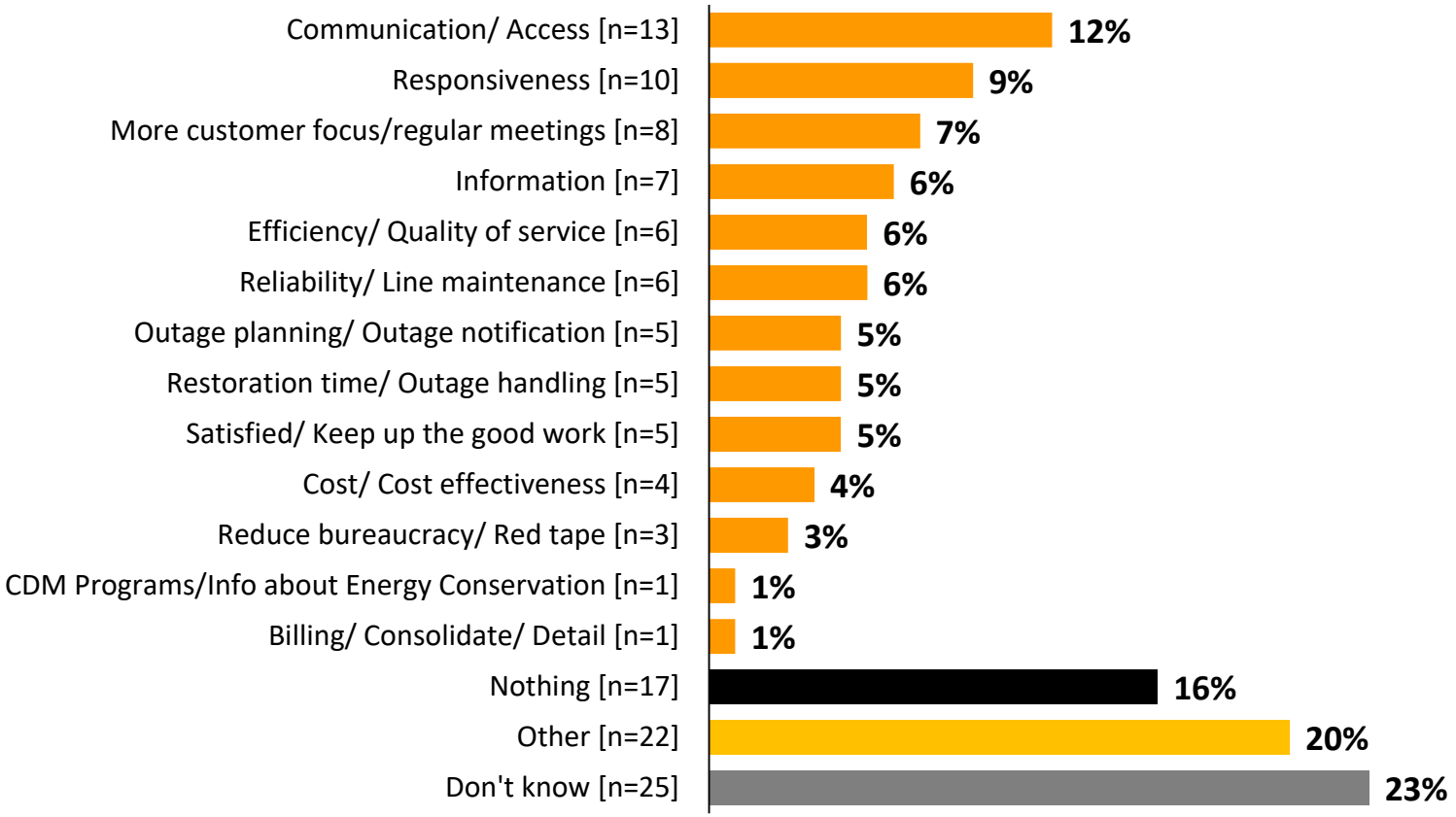
NOTE: Multiple mentions were recorded in this open-ended question. As such, numbers may add up to more than n=7 .

Overall Areas of Improvement: 2-in-5 (39%) have nothing or don't know what to suggest; top mention is communication/access

Q

C5. Is there anything in particular that Hydro One can do to improve its services to your organization?

[Asked of all respondents, open-ended, n=109]



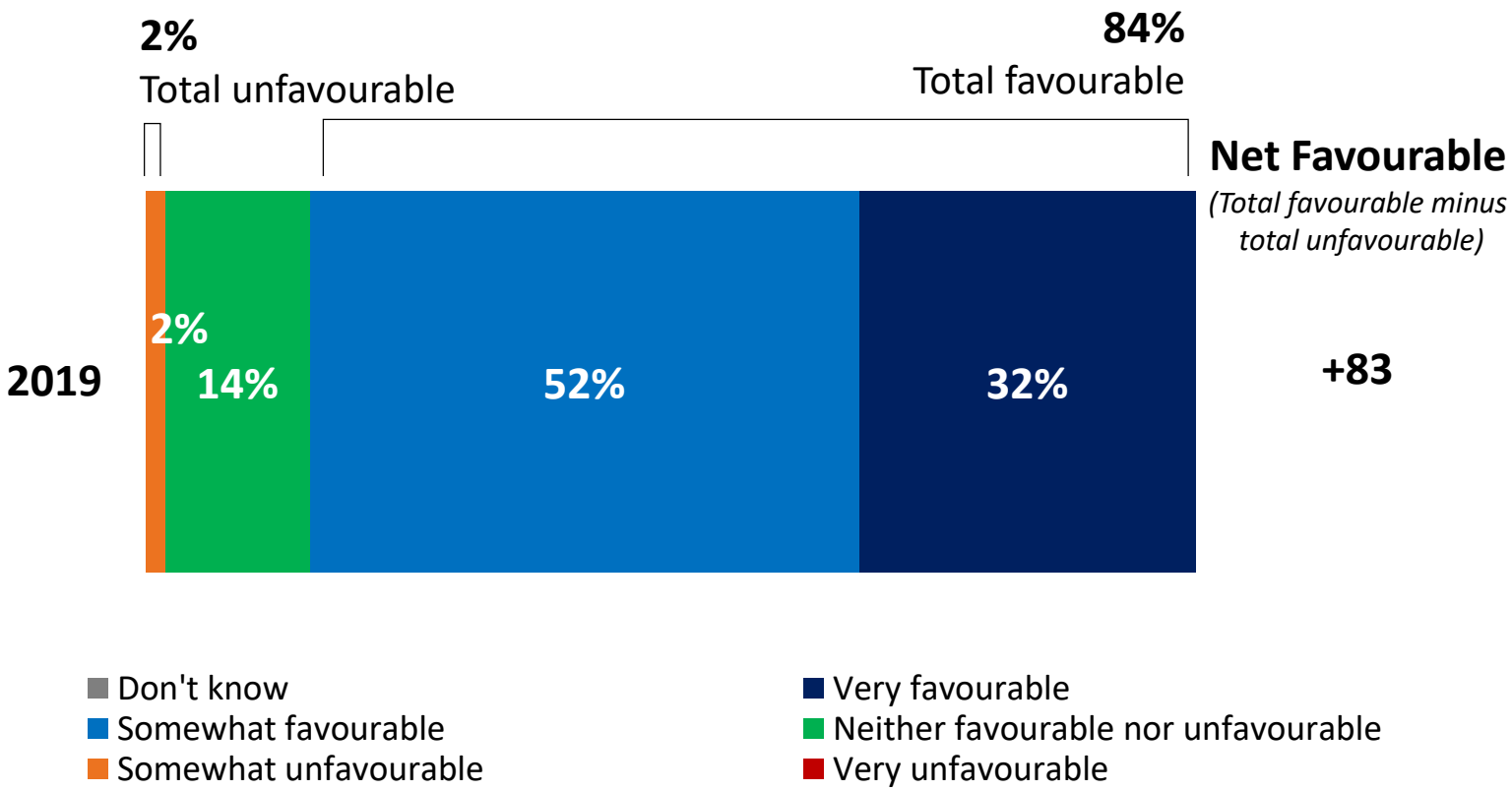
Key Insights

- Over 2-in-5 (44%) of LTX customers have nothing to suggest (16%), or they are satisfied (5%), or they just don't know (23%) how Hydro One could improve their service.
- "Communication/access" tops the list of suggestions at 12%, followed by "responsiveness" (9%), and "more customer focus" (7%).

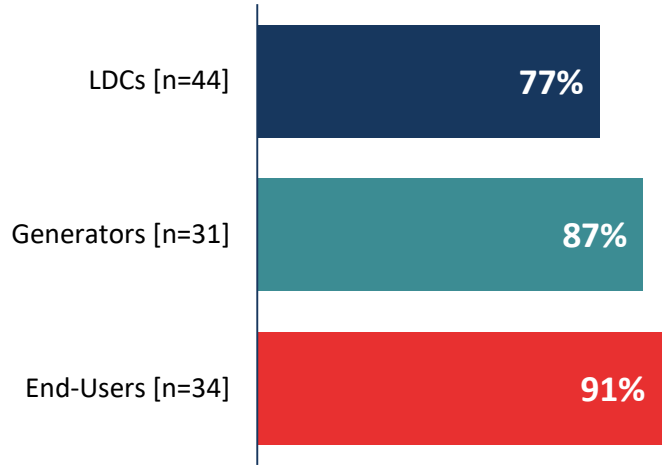
NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Overall Impression: More than 8-in-10 (84%) say they have a favourable impression; almost 1-in-3 (32%) say *very favourable*

[NEW] D6. Now, thinking about your impression of Hydro One more broadly, how would you describe your view of the company?
[Asked of all respondents, n=109]



Total Favourable ▶▶ By Customer Type



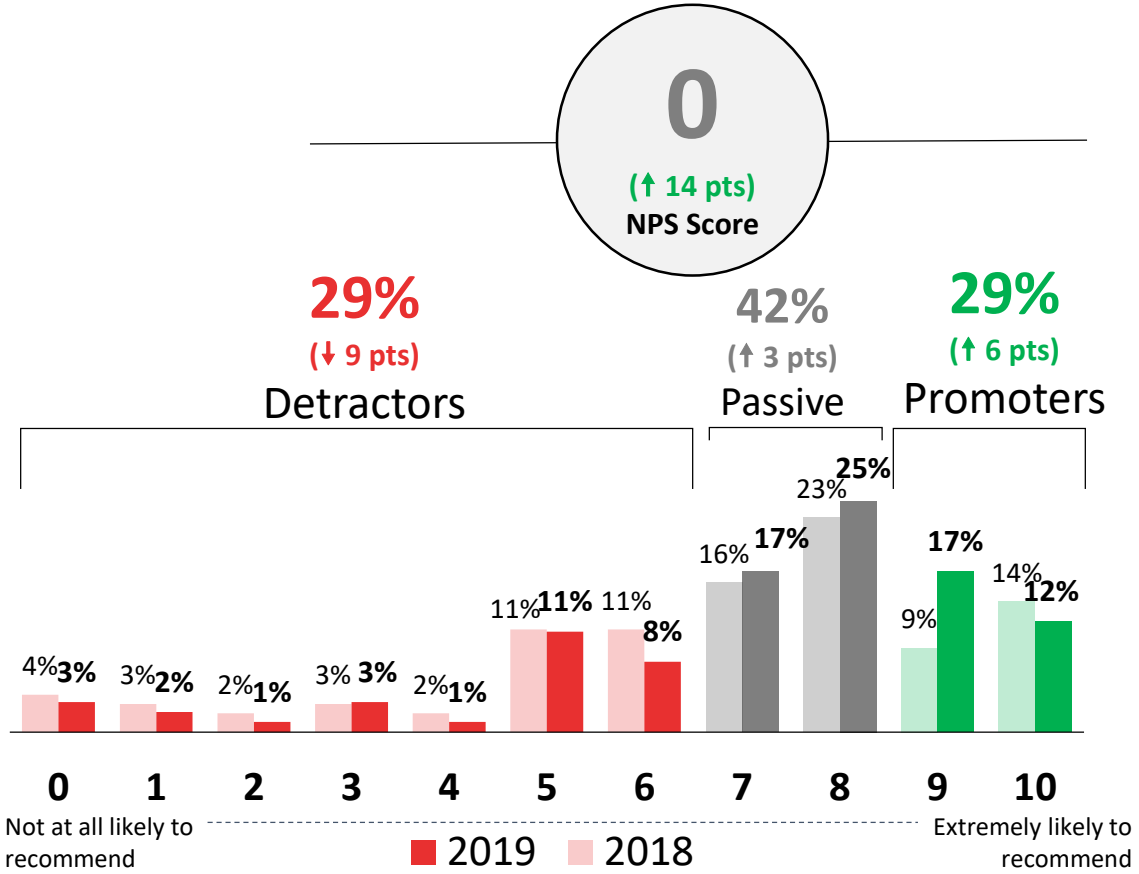
Key Insights

- A strong majority (84%) of LTX customers have a favourable impression of Hydro One. They are more likely to have a *somewhat* favourable (52%) impression than they are to have a very favourable (32%) impression, leaving room for improvement on intensity.
- Favourability is highest among Generators (91%), and lowest among LDCs (77%).

Net Promoter Score: Overall NPS is neutral, one-quarter (25%) land shy of being promoters; Generators and End-Users have positive NPS

Q **H62.** If you had a choice between several possible providers of electricity, how likely would you be to recommend Hydro One to your colleagues and peers as the preferred electricity utility? Please use a scale from 0 to 10, where 0 means you would not be at all likely to recommend Hydro One to others and 10 means you would be extremely likely to recommend.

[Asked of all respondents, n=109]



	NPS	=	Promoters	-	Detractors		Passive
LDCs < Generators	-24	=	19%	-	43%		38%
Generators > LDC	+23	=	42%	-	19%		38%
End-Users	+10	=	30%	-	20%		50%

Key Insights

- NPS is perfectly neutral (0%) among LTX customers, the proportion of strong promoters (12% who gave a response of 10), more than neutralizes the strong detractors (10% who gave a response of 0-4).
- Generators are most likely to recommend Hydro One; LDCs least likely. No Generators gave a rating less than 5

NOTE: New question in 2018. NPS scores run on a scale from -100 to +100. Response "Don't know" (15%) is excluded from the calculation of the NPS.

Drivers of CSAT outside of Hydro One's control

It is important to distinguish between what is within, and what is outside of Hydro One's influence or control when it comes to drivers of customer satisfaction.

Perceptions of electric companies often tend to move with general perceptions of ***provincial government management in the sector*** rather than in response to the local utility.

In addition, perceptions of utilities are also strongly correlated with **financial circumstances**. In tough times perception and preference can change because customers are struggling with their bills, not because of anything the company has, or has not, done.

Control questions help distributors distinguish between:

a) utility driven programs that impact CSAT; and

b) uncontrollable external drivers that impact CSAT.

When conducting **brand research** in the energy sector, INNOVATIVE often tests multiple environmental control to assess what role predispositions (customer values and beliefs – which can be difficult and costly to change) play in the formation of a utility's brand health and reputation.

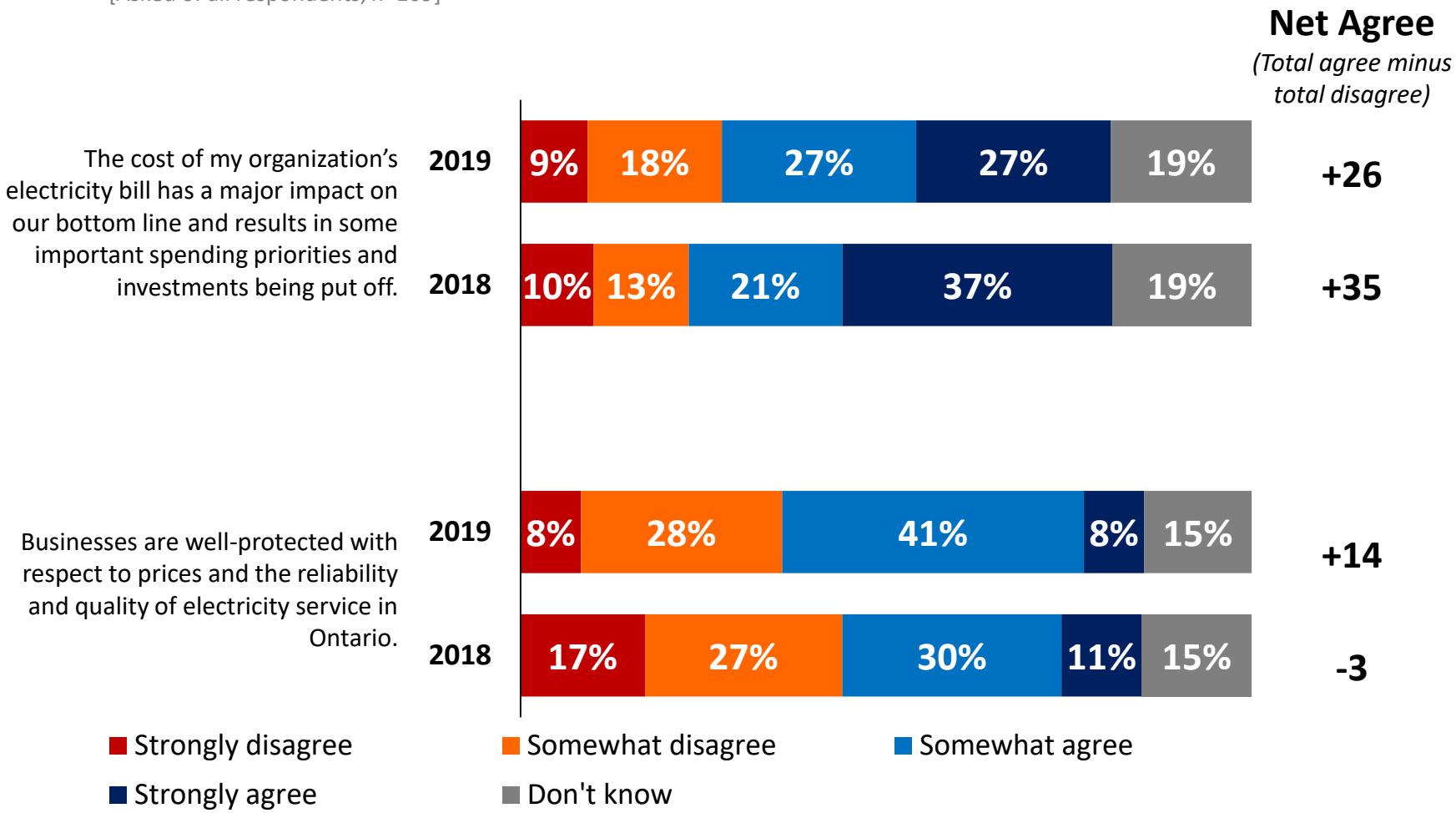
However, in **CSAT research**, we usually limit our environmental controls to two key questions to help capture external phenomena:

Government Management of the Electricity System:
Businesses are well-protected with respect to prices and the reliability and quality of electricity service in Ontario.

Financial Circumstances:
The cost of my organization's electricity bill has a major impact on our bottom line and results in some important spending priorities and investments being put off.

Environmental Controls: Majority (53%) agree their electricity bill is impacting their bottom line; half (50%) agree they are well-protected

H63 & H64. For each statement please tell me if you would strongly agree, somewhat agree, somewhat disagree or strongly disagree.
[Asked of all respondents, n=109]



Key Insights

- Consistent with 2018, a majority (53%) of LTX customers say their bottom line is being impacted by their electricity bill.
  - LDCs: 41% agree
  - Generators: 32% agree
  - End-Users: 88% agree
- Compared to 2018, marginally more customers agree that businesses are protected in terms of prices, reliability and quality of electricity service in Ontario. Half (50%) agree, and over one third (36%) disagree, the level of *strong* agreement (8%) matches the level of *strong* disagreement (8%).
  - LDCs: 50% agree
  - Generators: 61% agree
  - End-Users: 38% agree

Drivers of Customer Satisfaction

Using Regression Analysis | Identifying drivers of customer satisfaction

What is Regression Analysis?

Regressions are another means of determining importance.

- A regression allows us to take all the questions that may explain a key question we are interested in and see which of these is the most important.
- Regressions do this by holding all the likely suspects constant and varying one question at a time to see which questions (explanatory variables) have the greatest impact on the key question (dependent variable).
- In this study, we use regression to understand **why some respondents rate their satisfaction with, impression of, or likelihood to recommend Hydro One higher than others.**

We use ***Factor Analysis*** to explore underlying dimensions and structure the regression analysis.

- A factor analysis finds the true underlying dimensions of customer satisfaction.
- Factor analysis allows us to find which attributes mean similar things to customers. The use of factor analysis allows us to determine which attributes should be grouped together in order to conduct meaningful analysis.

Three Measures (DVs) | CSAT, Overall Impression, NPS

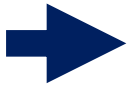
CSAT	Overall impression	NPS
"Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?"	*"Now, thinking about your impression of Hydro One more broadly, how would you describe your view of the company?*	*"We understand that, in reality, your electricity provider is determined by where you are located. But, if you had a choice between several possible providers of electricity, how likely would you be to **recommend** Hydro One to your colleagues and peers as the preferred electricity utility? Please use a scale from 0 to 10, where 0 means you would not be at all likely to recommend Hydro One to others and 10 means you would be extremely likely to recommend."*
Measures **overall attitude** towards Hydro One.	Is a proxy for an **overall brand measure**.	Measures **attitudinal** aspects of **brand loyalty**.

What drives each of these measures?

Factor Analysis | Finding underlying dimensions

Variables

Hydro One is fair
Hydro One is a trusted partner
Hydro One is trustworthy
Value for money



Factors

Fairness, Trust, & Value for Money

Quality of power
Reliable electricity service
Time to restore power

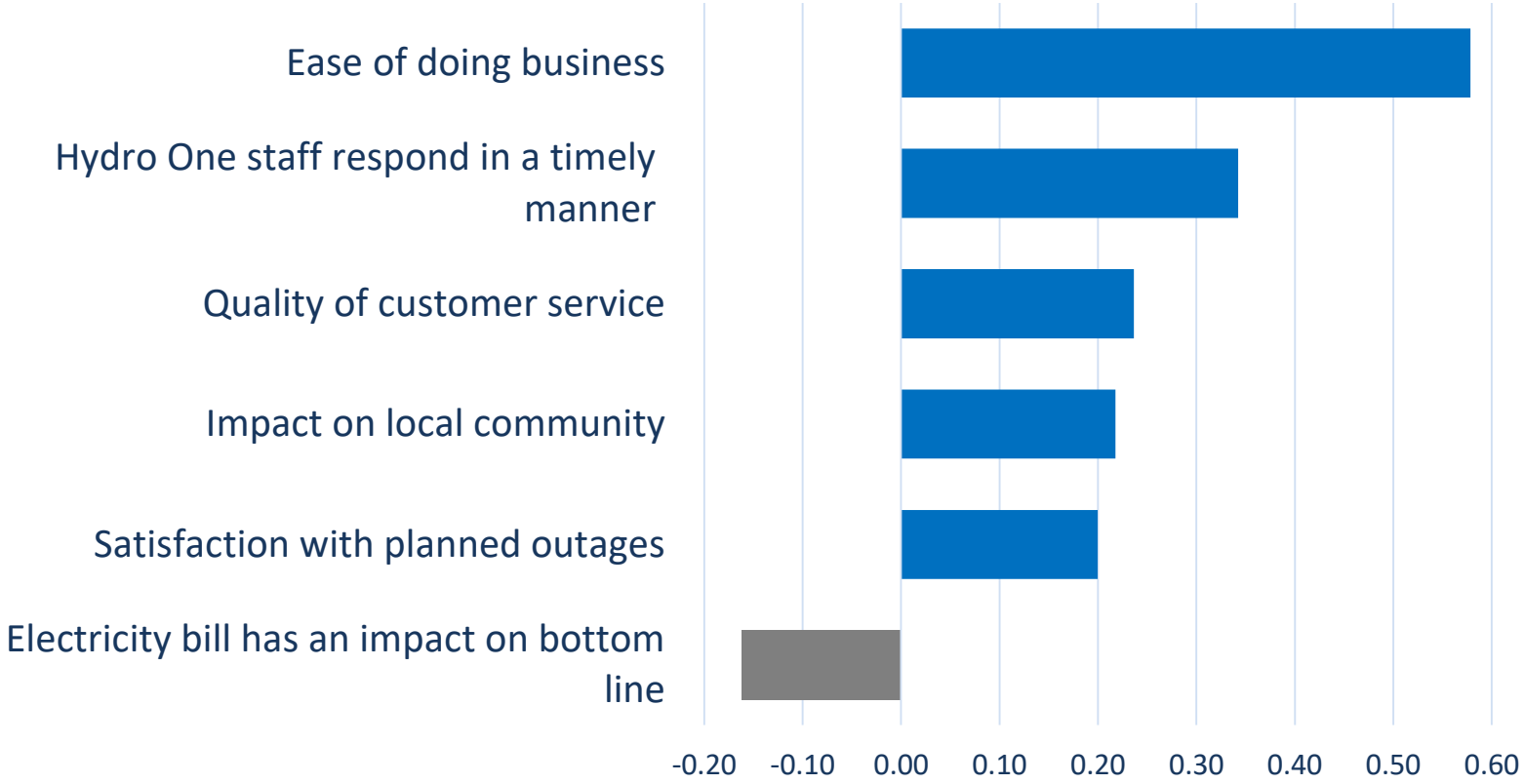
Quality & Reliability

Standalones

LDC vs. Generator vs. End-user
Environmental: financial burden
Environmental: businesses well-protected
Responsible, competent management
Ability to keep commitments
Ease of doing business
Understands business needs
Work crews do an excellent job
Impact on local community
Experience of unplanned outage(s)
Experience of planned outage(s)
Satisfaction with planned outages
Satisfaction with communications
Quality of customer service
Service from Account Executive
Fairness of GA
Fairness of HOEP
Quality advice and guidance
Responds in a timely manner
Staff easily accessible
Accuracy of info during outages
Communication during outages

Regression Analysis | Identifying drivers of customer satisfaction

Satisfaction with ease of doing business is, by far, the strongest driver of overall customer satisfaction among LTx customers. Satisfaction with customer service quality, community engagement and outage handling also contribute to higher overall satisfaction.



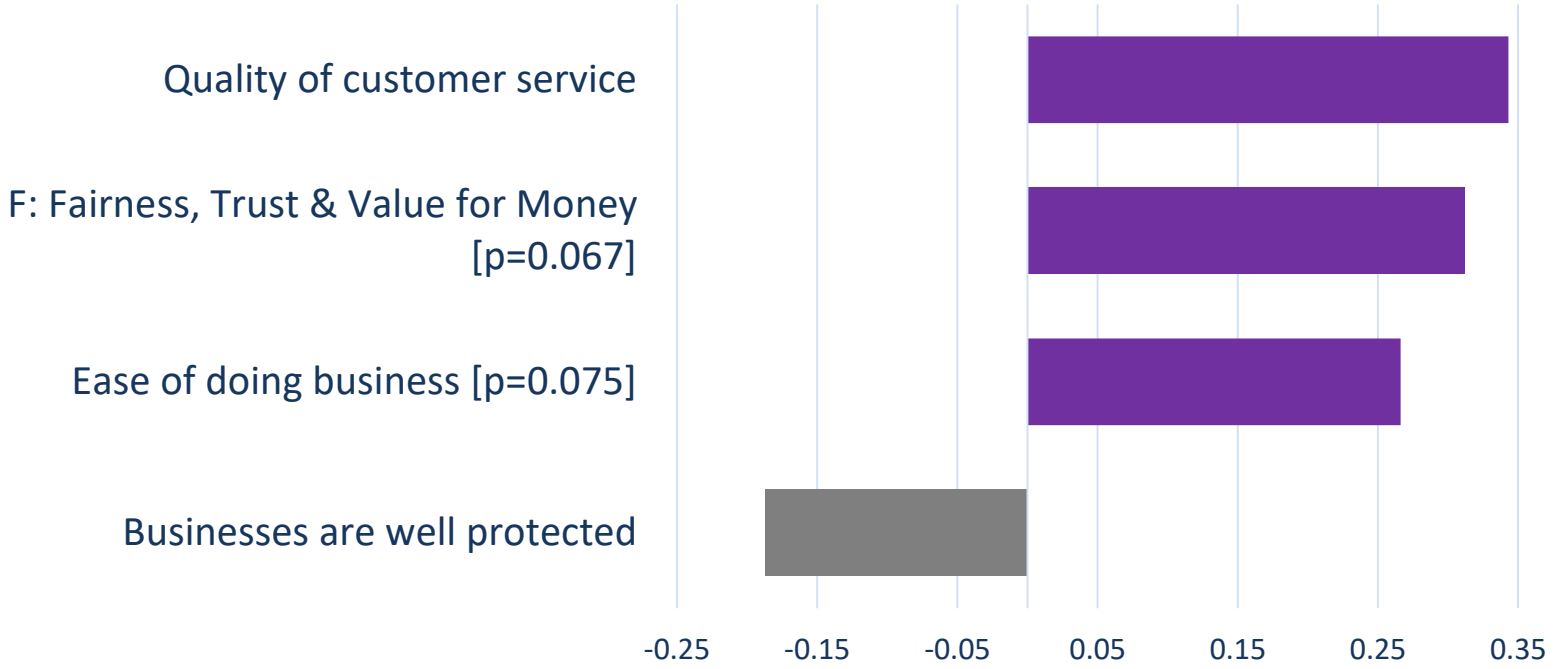
Hydro One CSAT

Adjusted R^2 = 0.581

Note: Chart shows standardized beta scores. All drivers significant at a 95% confidence interval unless indicated otherwise.

Regression Analysis | Identifying drivers of overall impression

Satisfaction with customer service, the perception that Hydro One is fair, trustworthy and provides good value for money, as well as satisfaction with ease of doing business and are positive drivers of overall impression. Holding everything else constant, those who think businesses are well protected with respect to the price, reliability and quality of electricity tend to have a more negative impression of Hydro One.



Hydro One Impression

Adjusted R^2 = 0.524

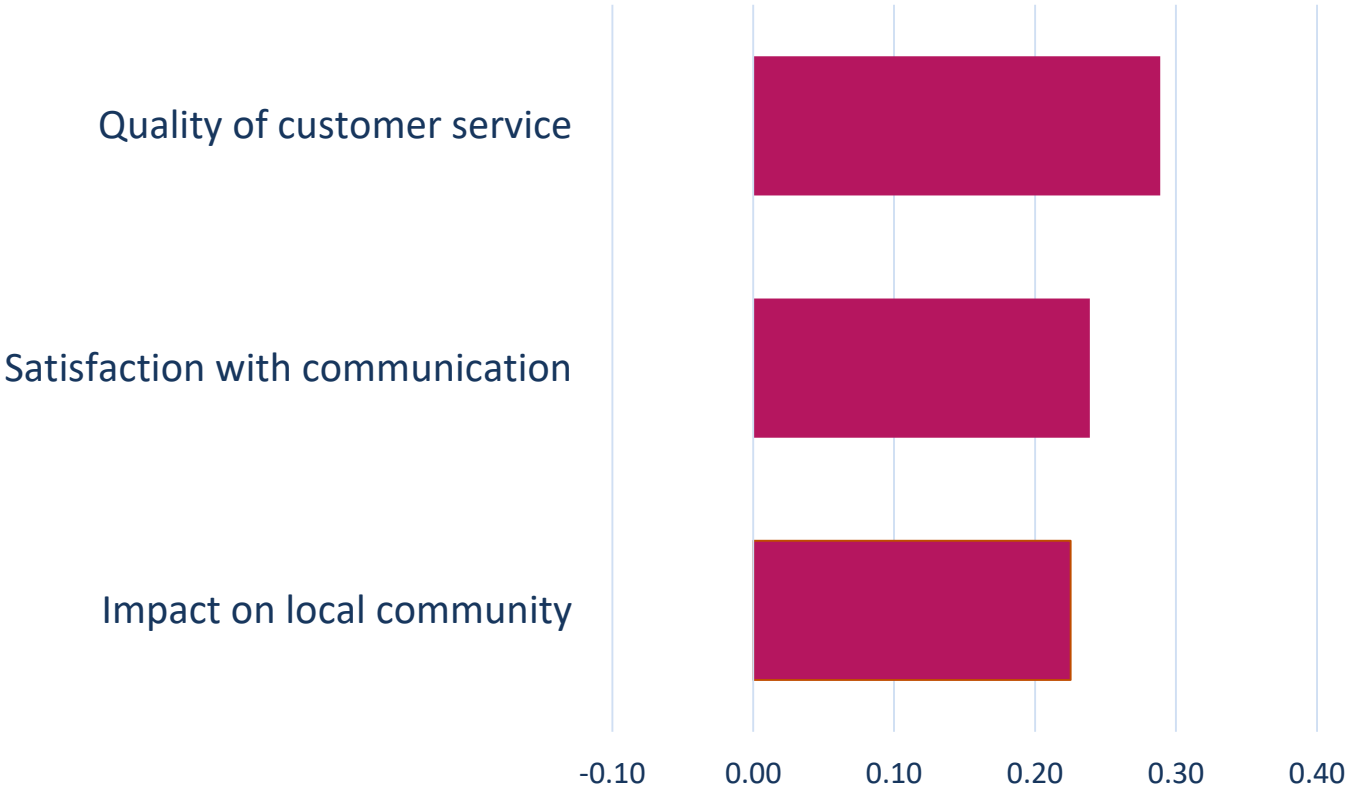
Notes:

- Factor ***Fairness, Trust & Value for Money*** combines "Hydro One is fair", "Hydro One is trustworthy", "Hydro One is a trusted partner" and "Hydro One provides good value for money".

Note: Chart shows standardized beta scores. All drivers significant at a 95% confidence interval unless indicated otherwise.

Regression Analysis | Identifying drivers of NPS

Customer service, satisfaction with communication from Hydro One, and community engagement are positive drivers of NPS.

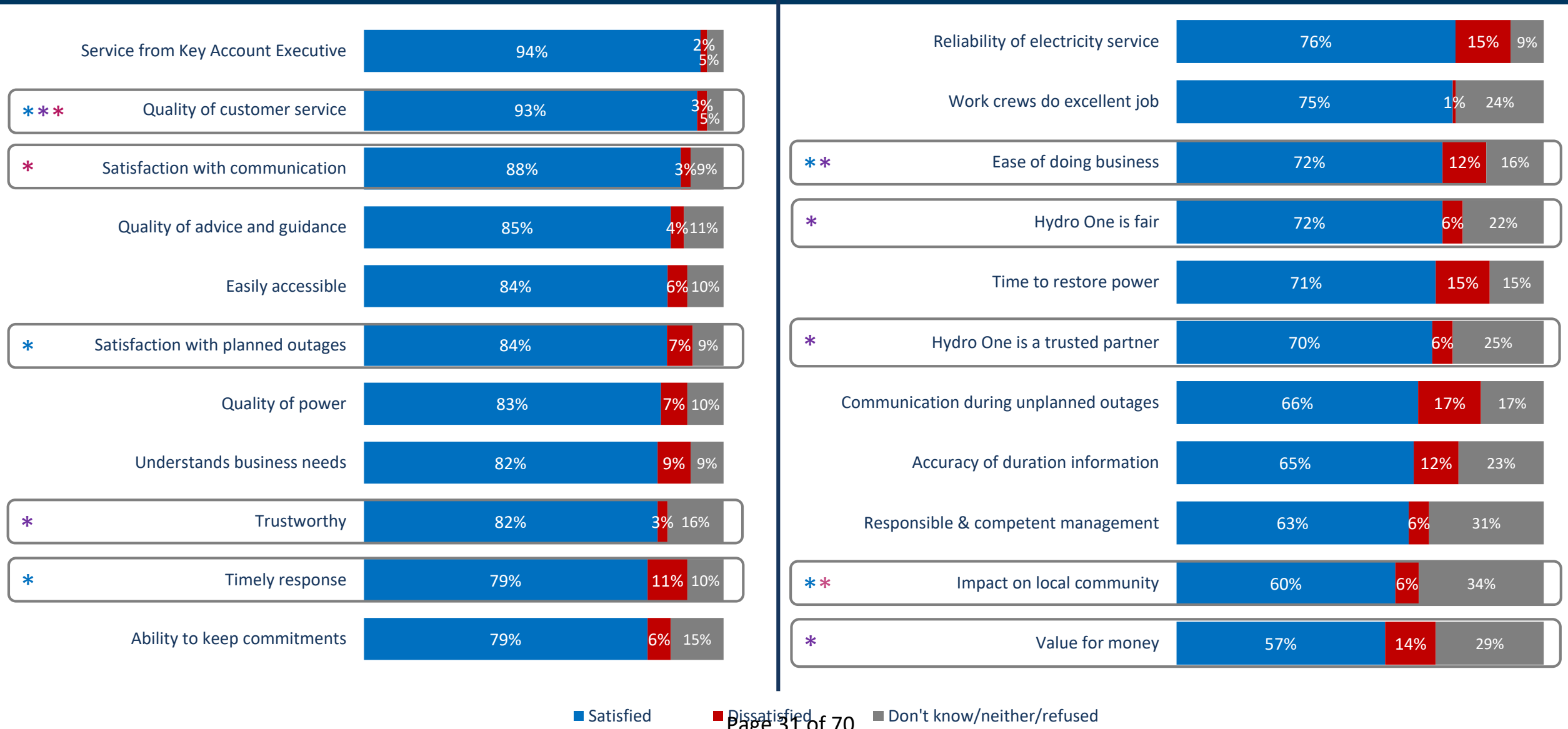


Hydro One NPS

Adjusted R^2 = 0.368

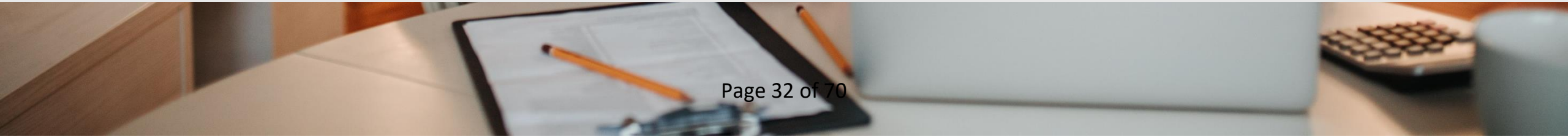
Note: Chart shows standardized beta scores. All drivers significant at a 95% confidence interval unless indicated otherwise.

Summary | Drivers and Satisfaction Levels



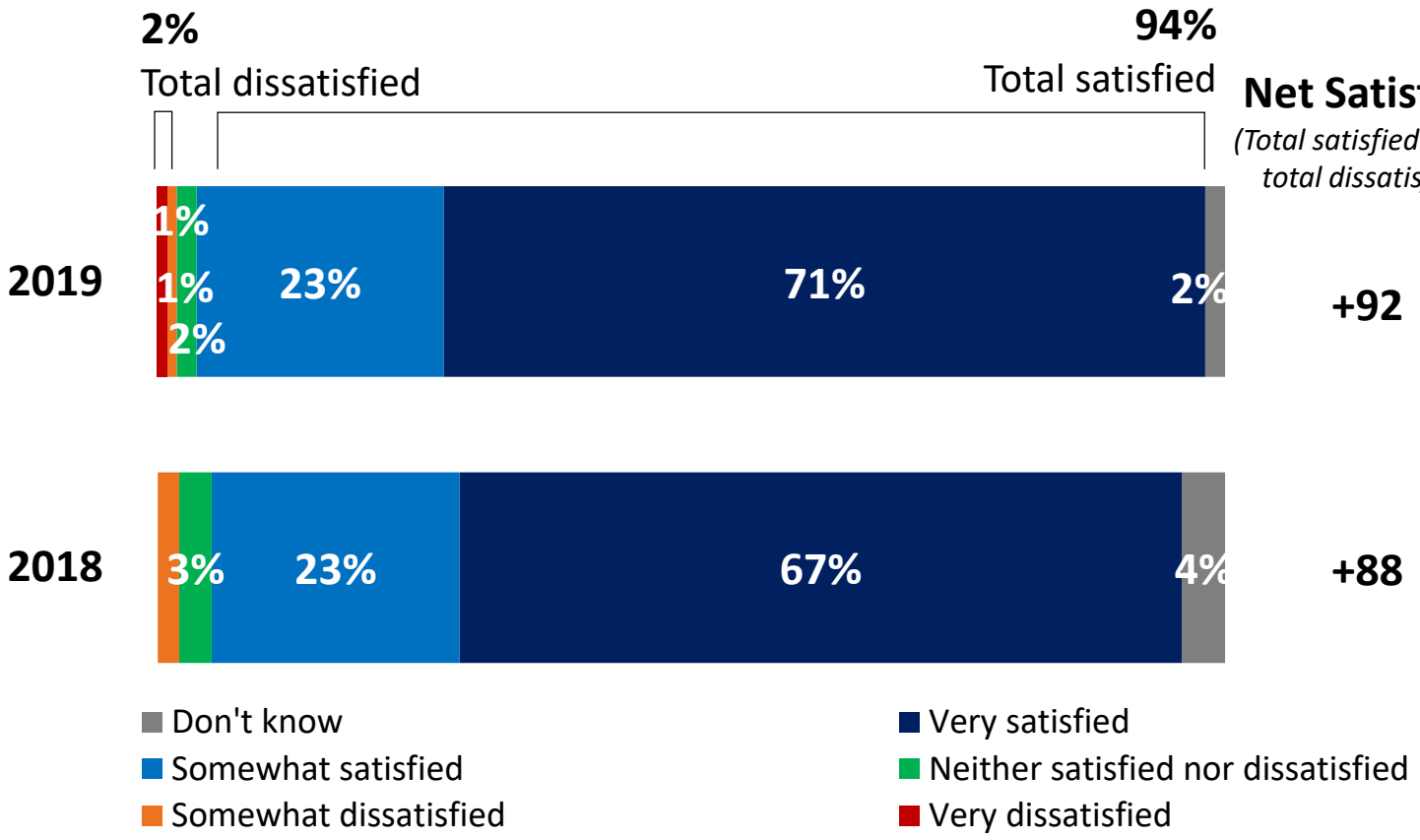
Note: Boxes indicate whether or not a question is a driver of one of the customer satisfaction metrics. Coloured asterisks indicate which question it is a driver of: * CSAT, * Overall Impression, or * NPS.

Appendix A: Detailed Results



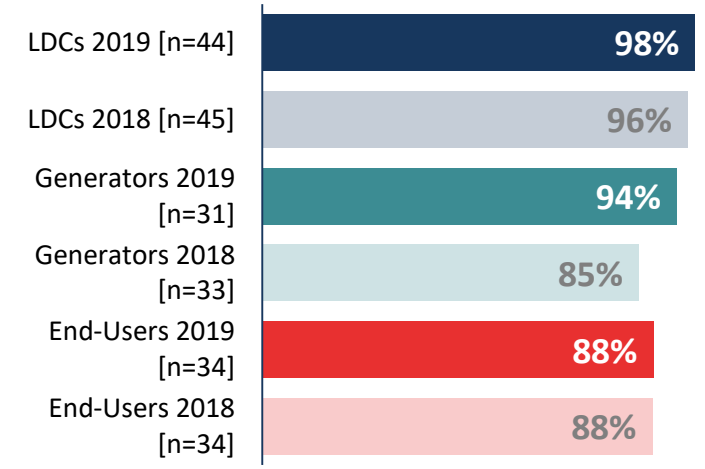
Satisfaction with Key Account Executive: Solid (94%) and intense (71% *very* satisfied) satisfaction with Key Account Executives

F34. How satisfied or dissatisfied are you with the service you receive from your Hydro One Key Account Executive?
[Asked of all respondents, n=109]



Not shown: In 2019, 1% have never had an interaction with their Key Account Executive

Total Satisfaction ▶▶ By Customer Type



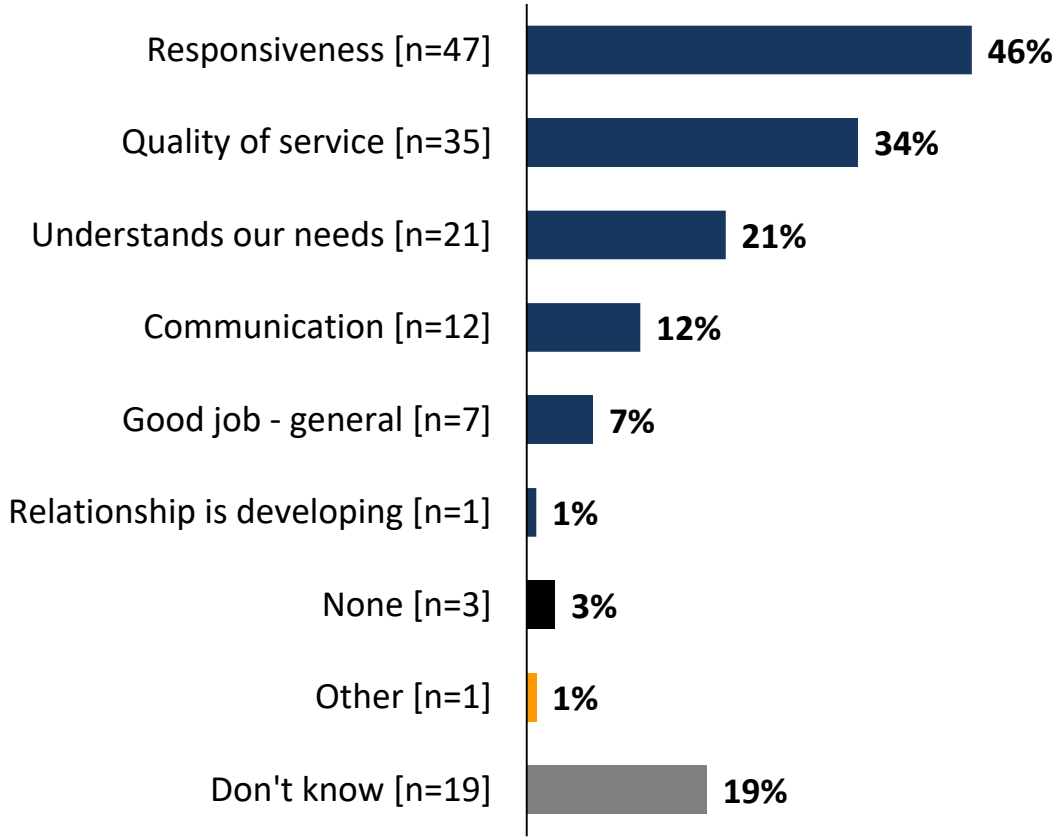
Key Insights

- Not only is satisfaction with the service from Key Account Executives solid (94%), it is also intense (71% *very* satisfied), up 4 points from 2018 (67% *very* satisfied).
- The intensity of satisfaction here is higher than it is for any other metric in the survey.
- LDCs are almost universally satisfied (98%), with End-Users and Generators (88% and 94%, respectively) very solid, but not quite as satisfied.

Reasons for Satisfaction and Dissatisfaction: Satisfaction with KAEs is primarily due to the responsiveness (46%) and quality of service (34%)

Q **F35.** Is there any particular reason why you're **satisfied** with your Hydro One **Key Account Executive**?

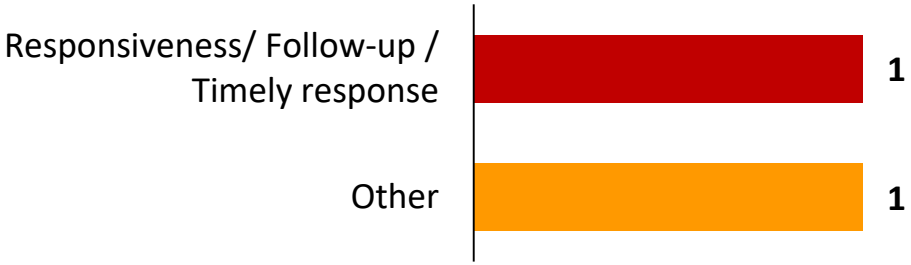
[Asked of those that are somewhat or very satisfied, open-ended, n=102]



Refused (5%) not shown.

Q **F36.** Is there any particular reason why you're **dissatisfied** with your Hydro One **Key Account Executive**?

[Asked of those that are somewhat or very dissatisfied, open-ended, n=2]



Key Insights

- A plurality of LTX customers who are satisfied with their KAE attribute it to "responsiveness" (46%) and "quality of service" (34%).
- One of the two customers who are dissatisfied with their KAE cite "responsiveness" as a reason for dissatisfaction.

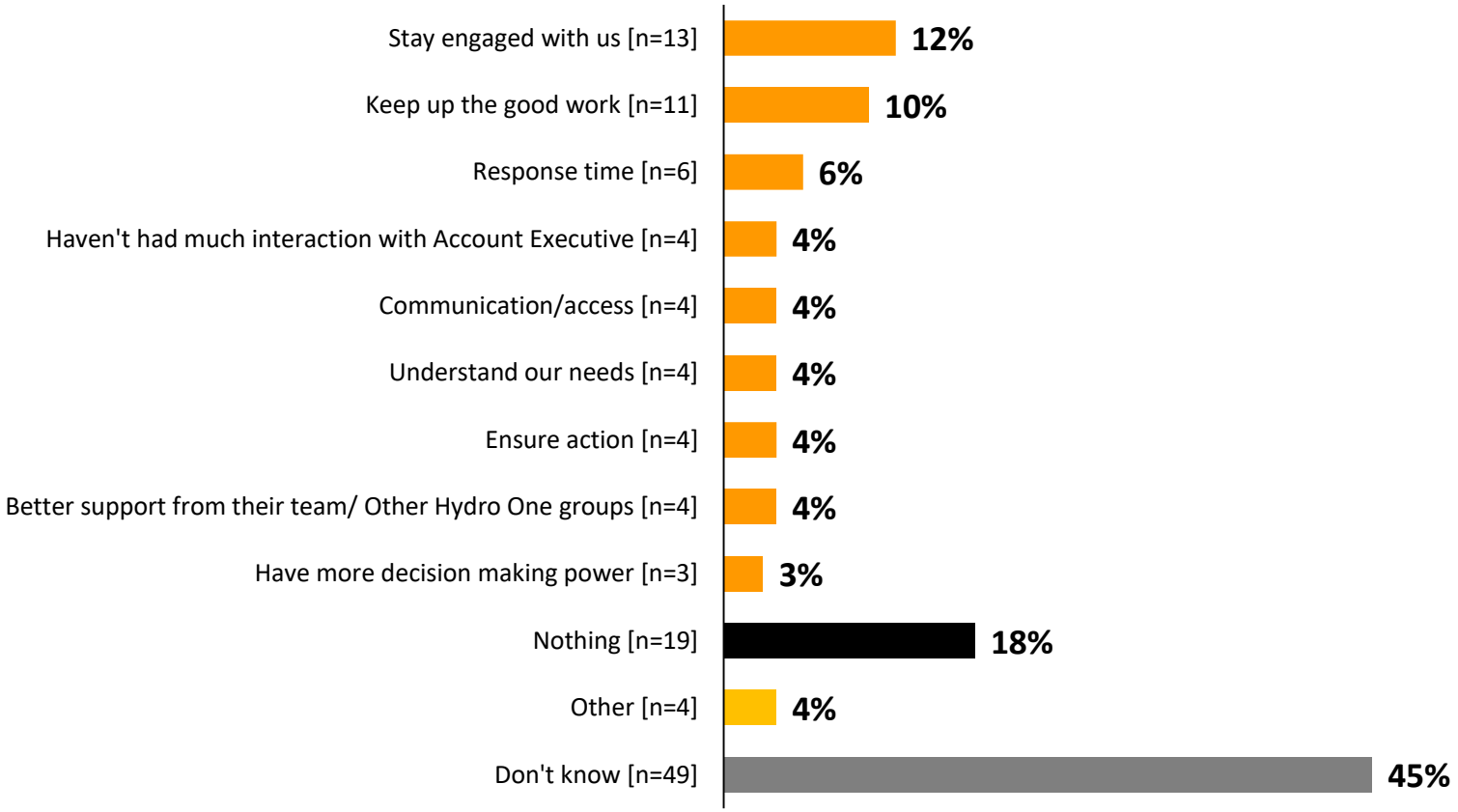
NOTE: Multiple mentions were recorded in these open-ended questions. As such, percentages may add up to over 100%.

Areas of Improvement | KAEs: Nearly 2-in-3 (63%) say nothing or don't know, 10% say keep up the good work suggesting no major weaknesses

Q

F37. What, if anything, can your **Key Account Executive** do to better serve you and your organization?

[Asked of all respondents who have had an interaction with their Key Account Executive, open-ended, n=108]



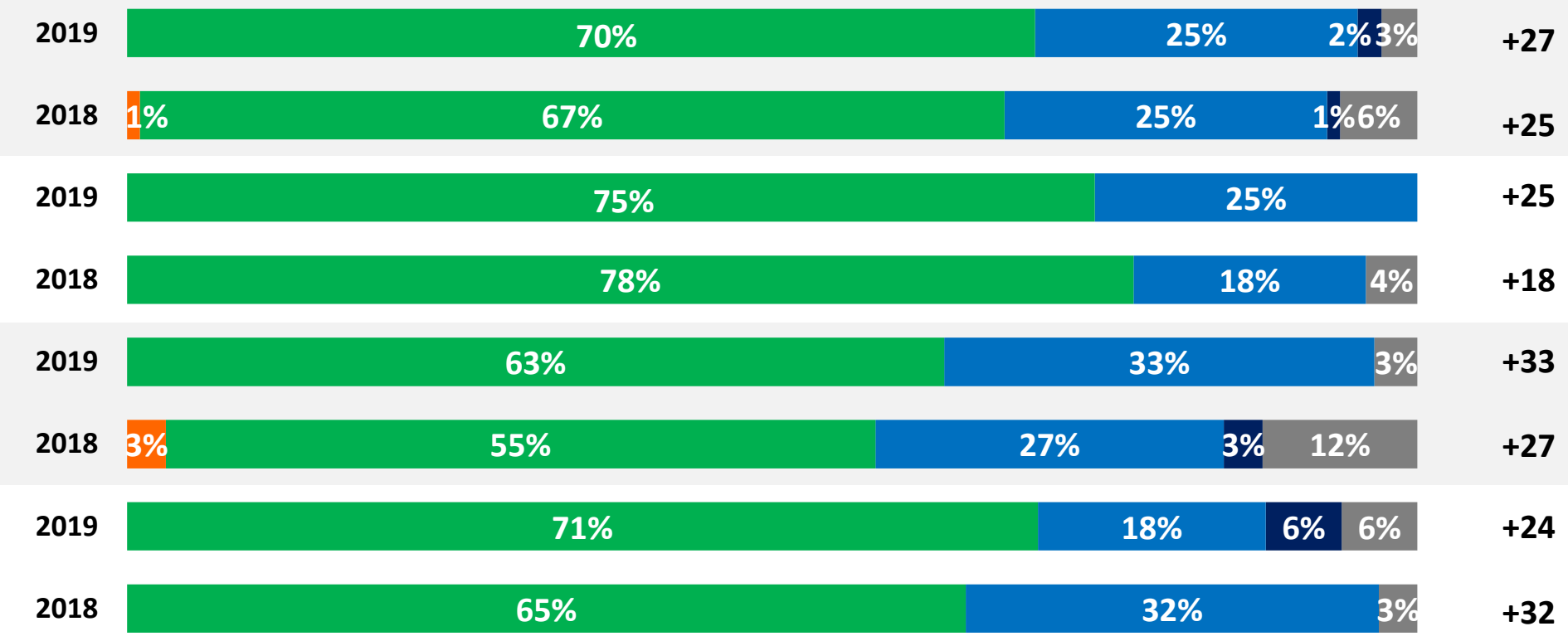
Key Insights

- Almost 3-in-4 responses to an invitation to provide feedback on how KAEs can improve their service are a reflection of how highly satisfied LTX customers are on this metric:
  - 45% "don't know"
  - 18% "nothing"
  - 10% "keep up the good work"
- "Stay engaged with us" (12%) is the top mentioned area of improvement.
- Responses to this invitation for feedback confirm how solidly and intensely satisfied LTX customers are with their Key Account Executives.

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

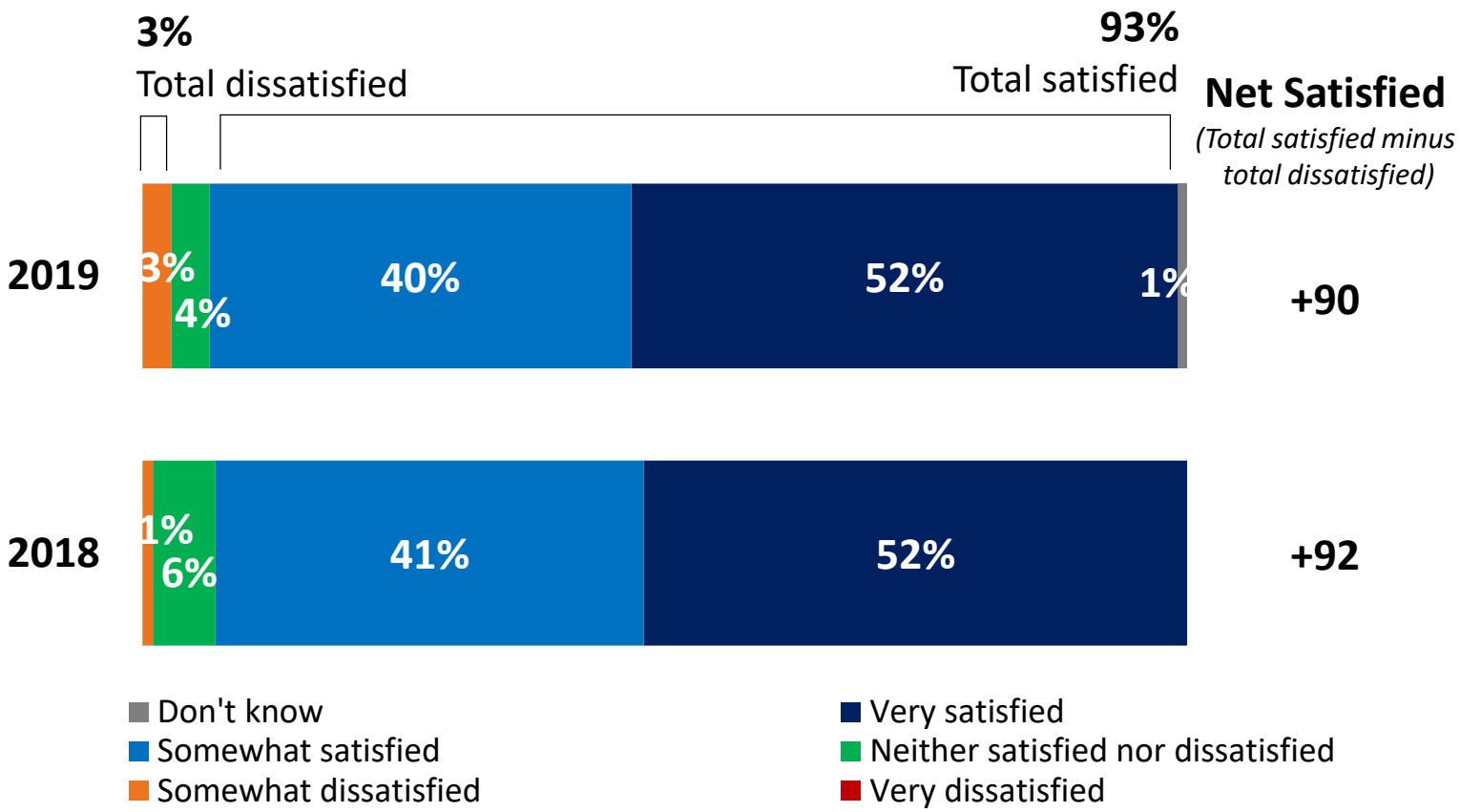
Level of Engagement: Most (70%) say they are happy with the current level of engagement with their KAE, but 1-in-4 (27%) want more

F38. Would you like more or less engagement with your Hydro One **Key Account Executive**?
[Asked of all respondents who have had an interaction with their Key Account Executive, n=108]

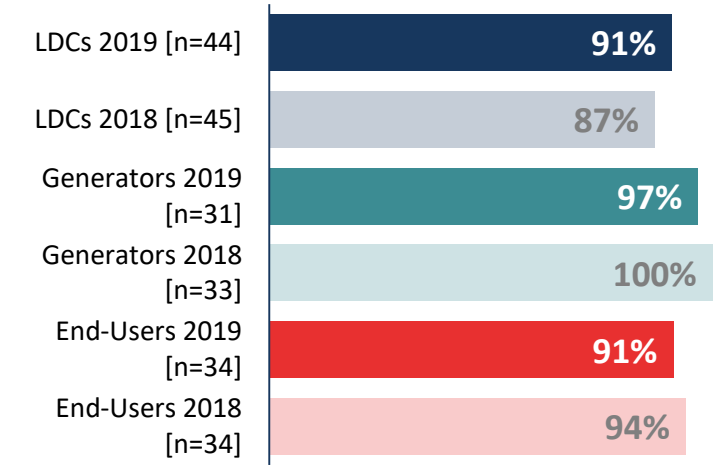


Overall Satisfaction, Customer Service: Almost all (93%) are satisfied with customer service; highest satisfaction among Generators

Q **F30.** Overall, how satisfied or dissatisfied are you with the **customer service** provided to your organization by Hydro One?
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type



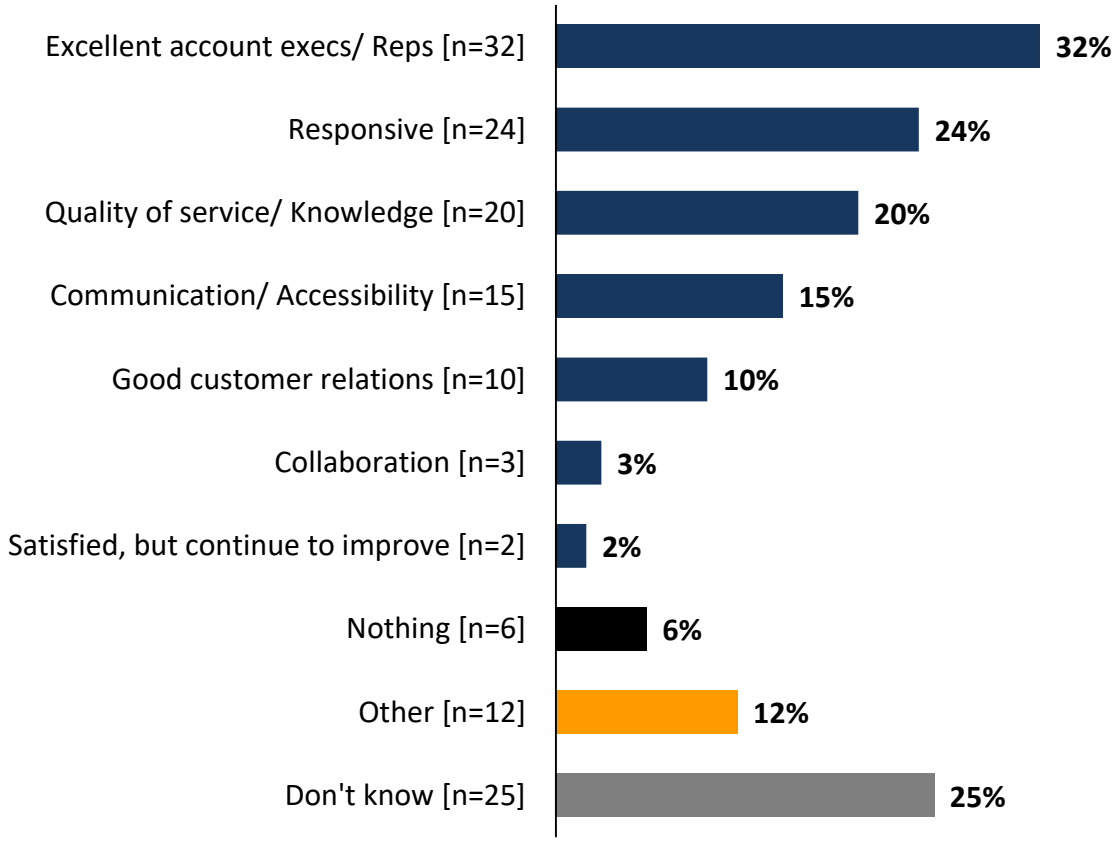
Key Insights

- Satisfaction with customer service among LTX customers is solid; half (52%) say they are *very* satisfied, and another 2-in-5 (40%) are *somewhat* satisfied.
- Almost all (97%) Generators are satisfied with customer service; marginally lower among End-Users (91%) and LDCs (91%).

Reasons for Satisfaction and Dissatisfaction: Excellent KAEs and responsiveness are the primary reasons cited for satisfied customers

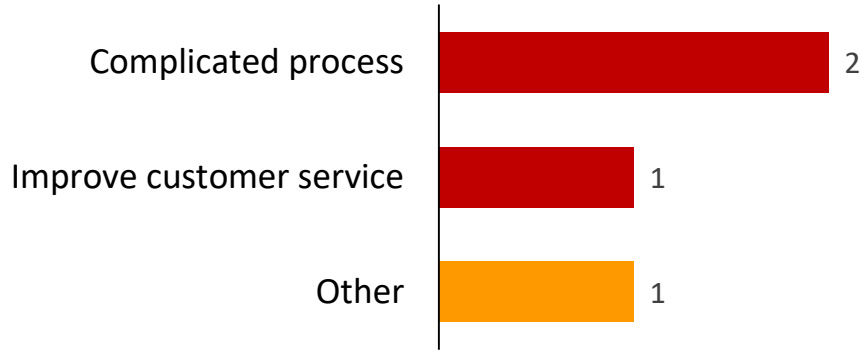
Q **F31.** Is there any particular reason why you're **satisfied** with the customer service provided by Hydro One?

[Asked of those that are somewhat or very satisfied, open-ended, n=101]



Q **F32.** Is there any particular reason why you're **dissatisfied** with the customer service provided by Hydro One?

[Asked of those that are somewhat or very dissatisfied, open-ended, n=3]



Key Insights

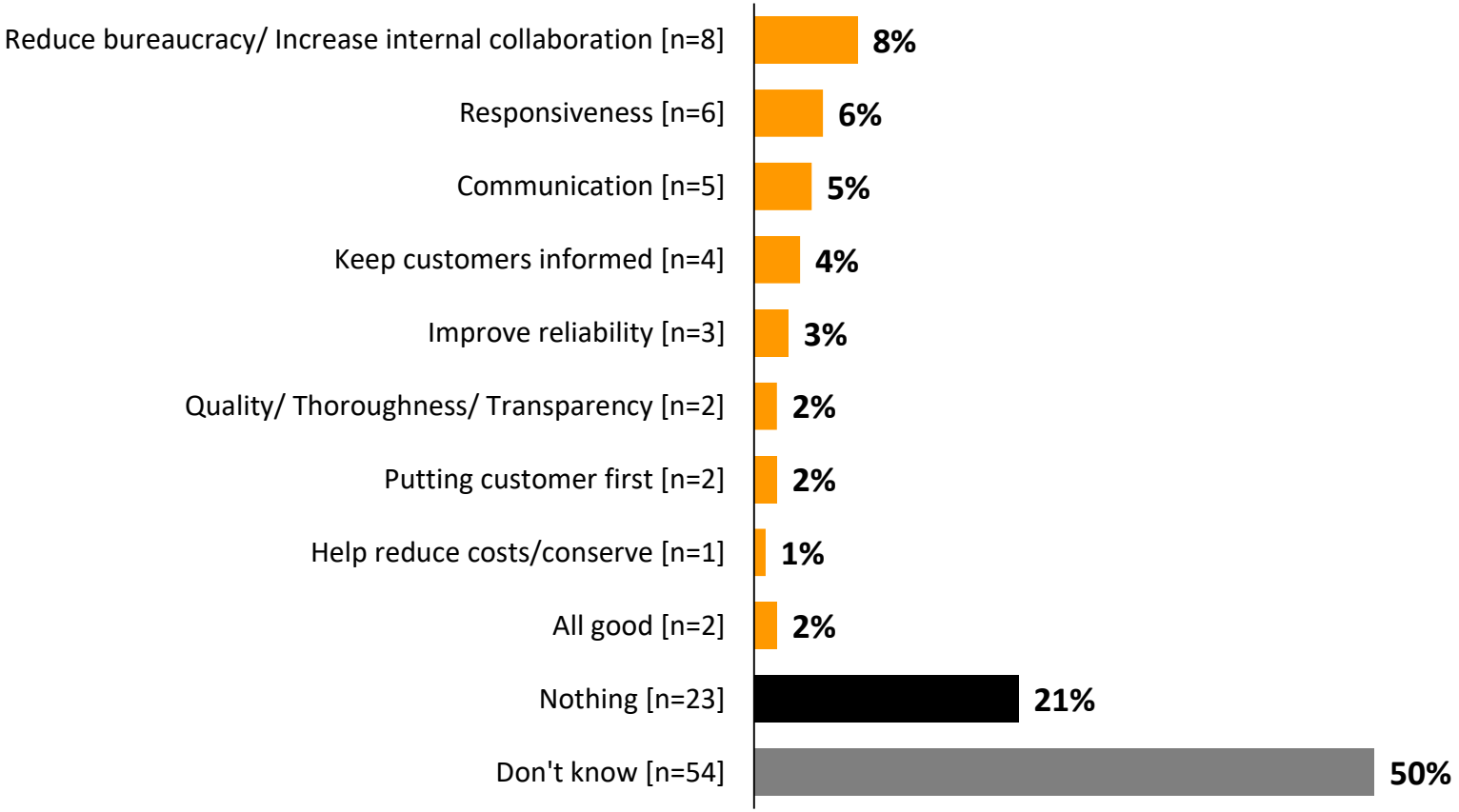
- "Excellent account reps" (32%) and "responsiveness" (24%) are top mentions for reasons that customers are satisfied with the customer service they receive from Hydro One.
- 1-in-4 (25%) don't know why they are satisfied.
- Two mentions of complicated process and one mention of need to improve customer service as a reason for dissatisfaction.

NOTE: Multiple mentions were recorded in these open-ended questions. As such, percentages may add up to over 100%.

Areas of Improvement | Customer Service: Half (50%) have no suggestion for how Hydro One could improve their customer service

F43. Is there anything in particular that Hydro One can do to improve your organization's customer service experience?

[Asked of all respondents, n=109]



Key Insights

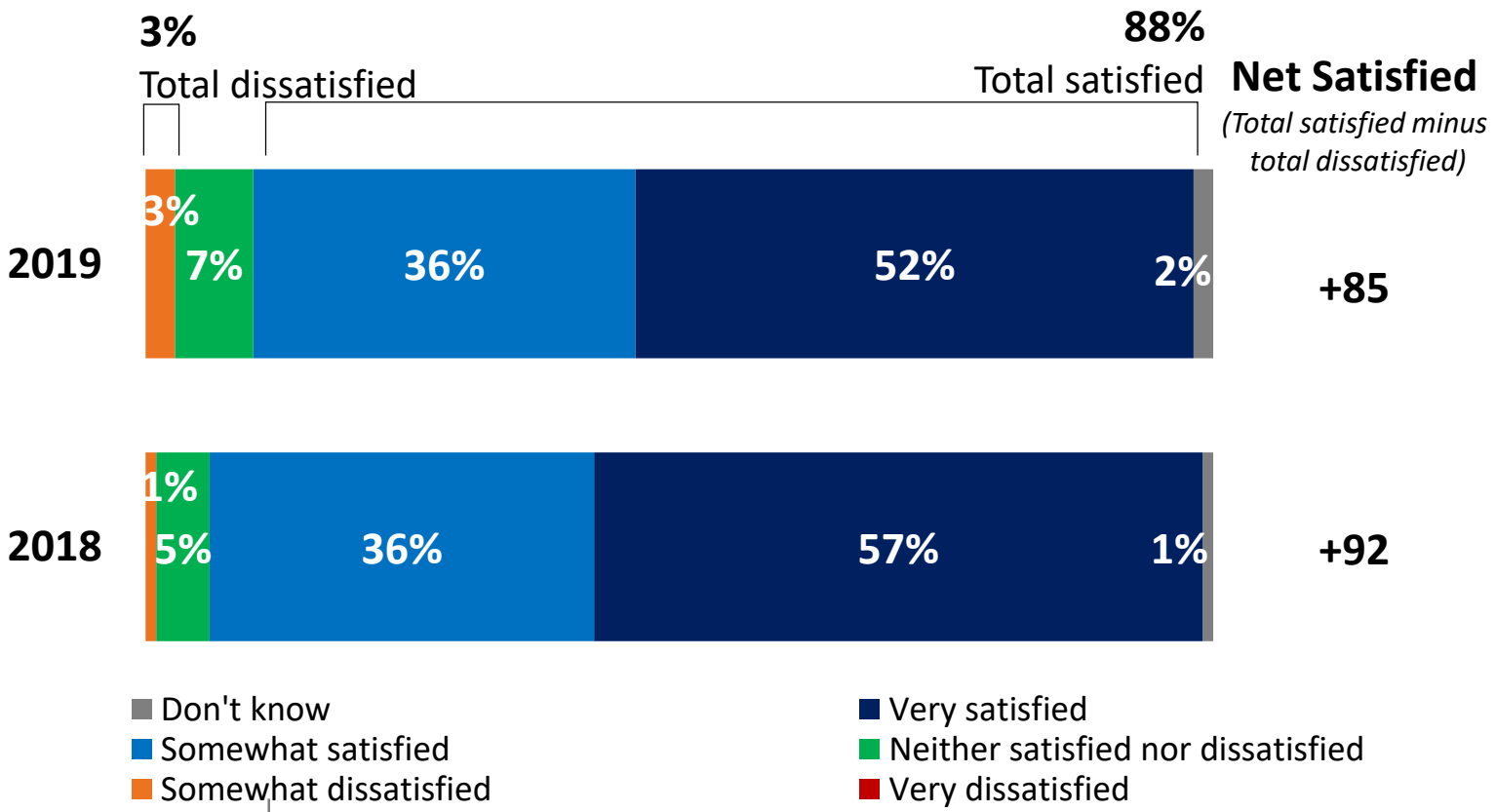
- "Reducing bureaucracy" (8%) and "responsiveness" (6%) are top suggestions for improvement.
- Half (50%) of customers "don't know" how Hydro One could improve customer service. Another 1-in-5 (21%) don't have anything to suggest or say it's "all good" (2%).
- Lack of ready suggestions for improvement is a reflection of high satisfaction with customer service and confirms that there are no obvious issues.

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

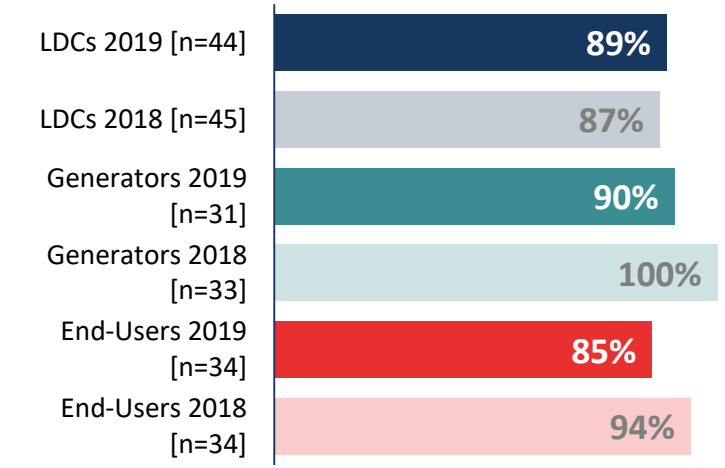
Communication: Almost 9-in-10 (88%) are satisfied with Hydro One's communication; net satisfaction down 7 points from 2018

F44. Thinking about your organization's interactions with Hydro One over the **past year** -- either via email, over the telephone, at the Large Customer Conference, or with in-person meetings – how satisfied or dissatisfied are you with the way Hydro One communicates with you and your organization?

[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type



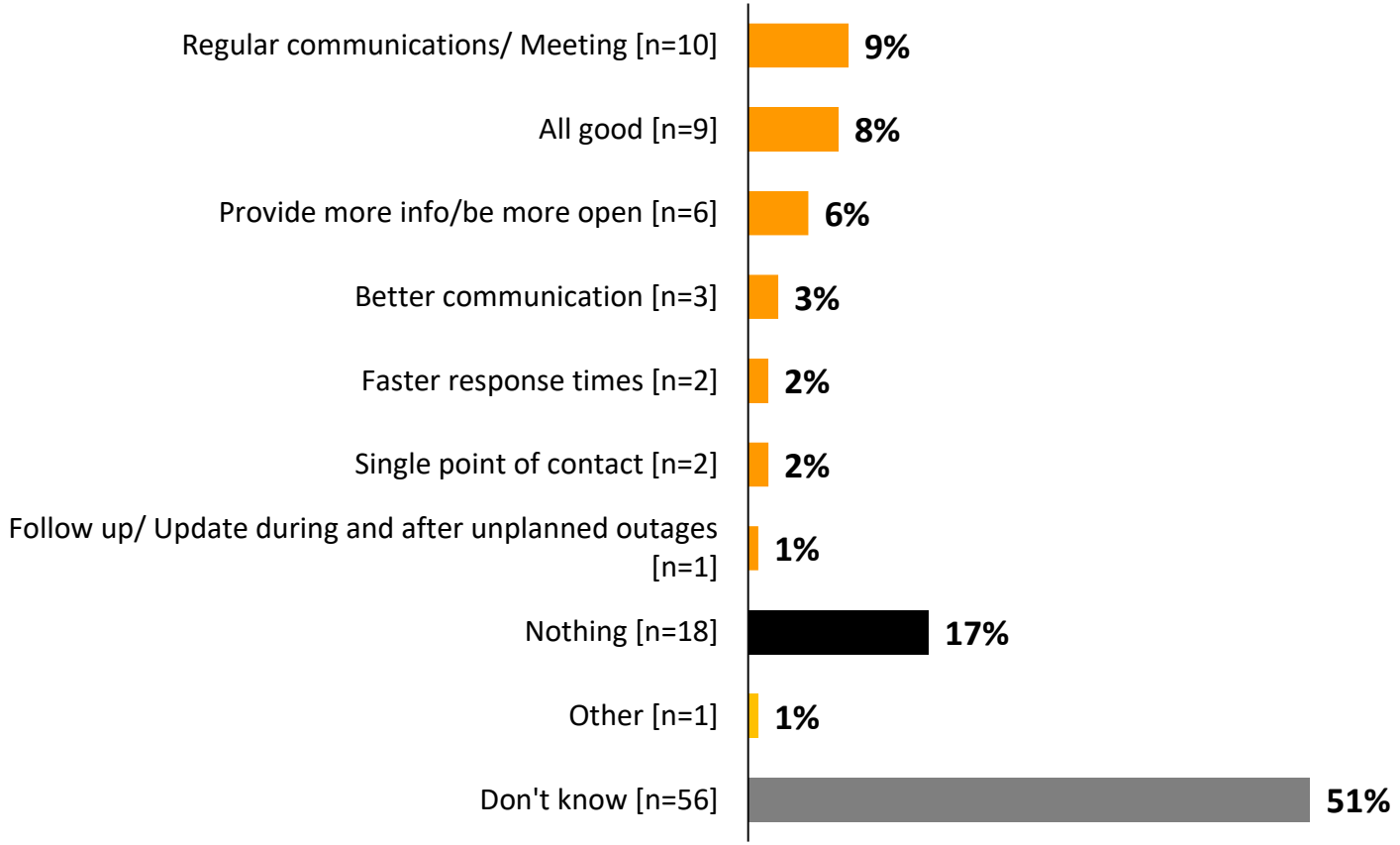
Key Insights

- Similar to overall customer service, satisfaction with communication among LTX customers is solid; most (52%) say they are *very* satisfied, and another third (36%) are *somewhat* satisfied.
- Since 2018, there has been some erosion of intensity.
- Between the three customer types, Generators score highest (90%) and End-Users lowest (85%).

Areas of Improvement | Communication: Half (51%) have no suggestion for how Hydro One could improve their communications

F45. Is there anything in particular that Hydro One can do to improve the way it communicates with your organization?

[Asked of all respondents, open-ended, n=109]



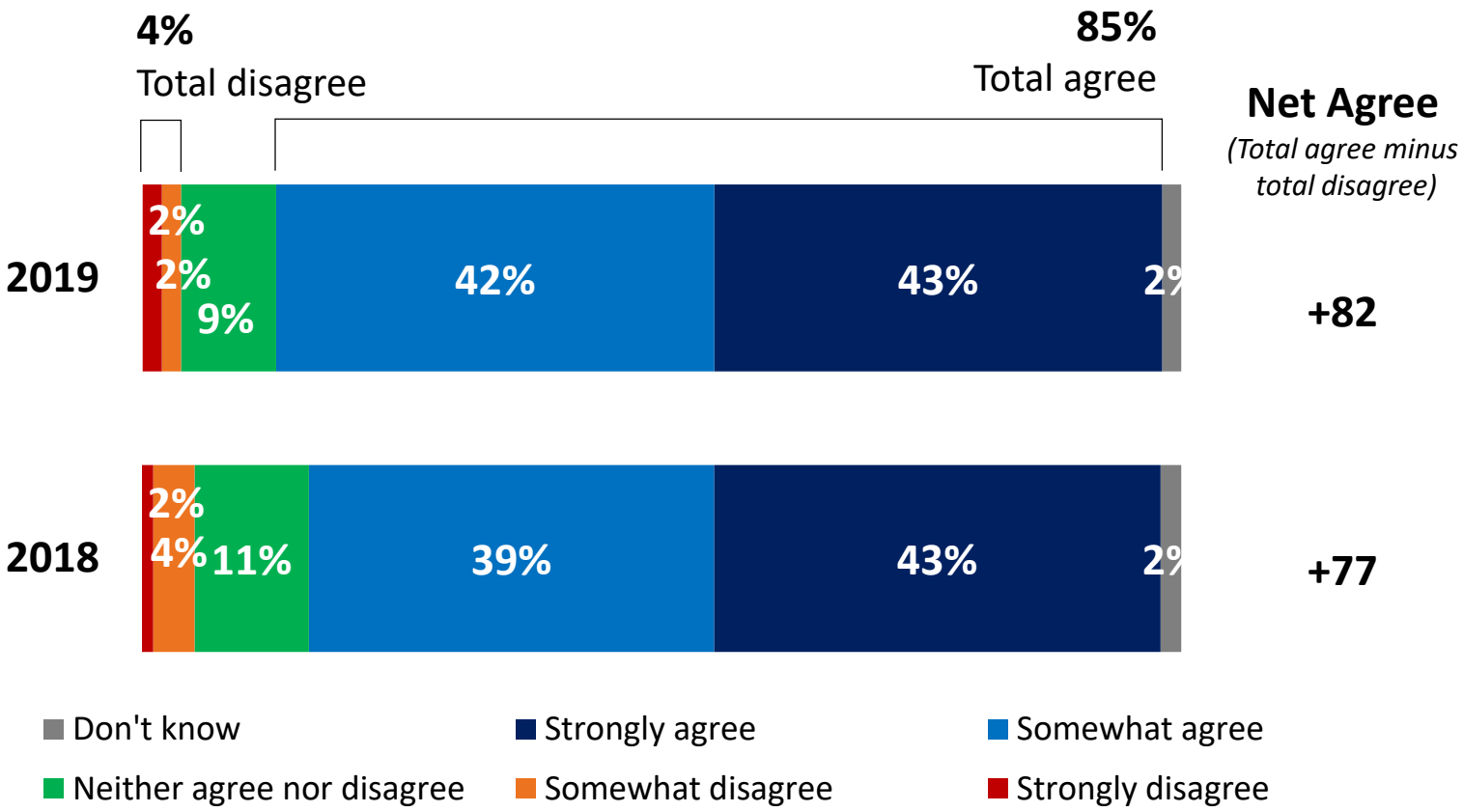
Key Insights

- Half (51%) of LTX customers "don't know" how Hydro One can improve the way it communicates with them. Another 17% say nothing and 8% say it's "all good".
- As noted with overall customer service. The lack of ready suggestions for improvement is a reflection of the high level of satisfaction with communication.
- The responses suggest customers want Hydro One to keep doing what they are doing, but to do it even better. This presents an opportunity to solidify current practices and optimize communications for transparency and prompt response times.

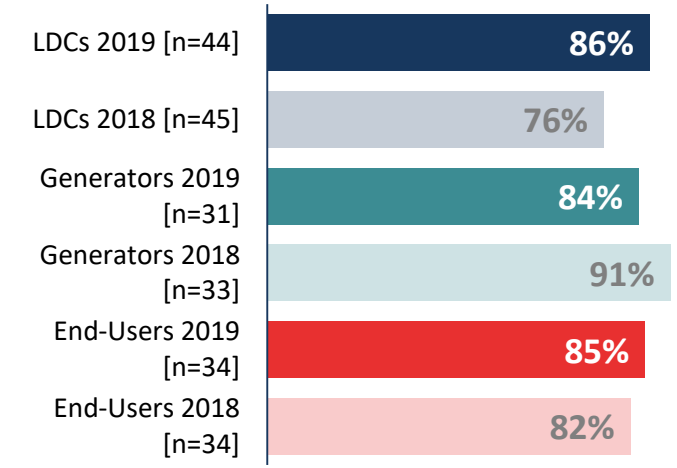
NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.
Refused (3%) not shown.

Quality Advice and Guidance: 85% of LTX customers say that Hydro One staff are providing quality advice and guidance

Q Please indicate if you agree or disagree with the following statements.
D17. Hydro One staff provide my organization with quality advice and guidance when I have questions about my service.
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type

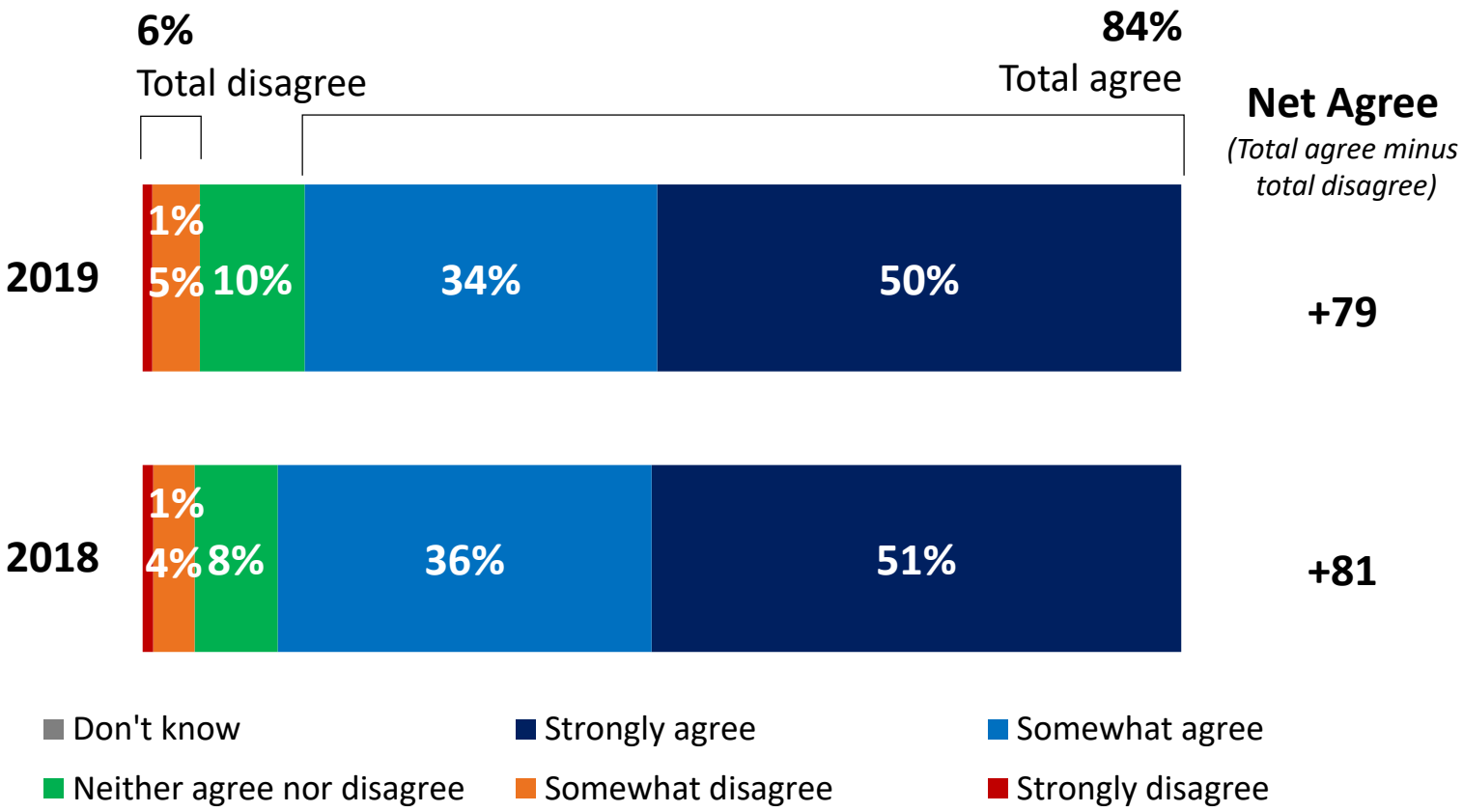


Key Insights

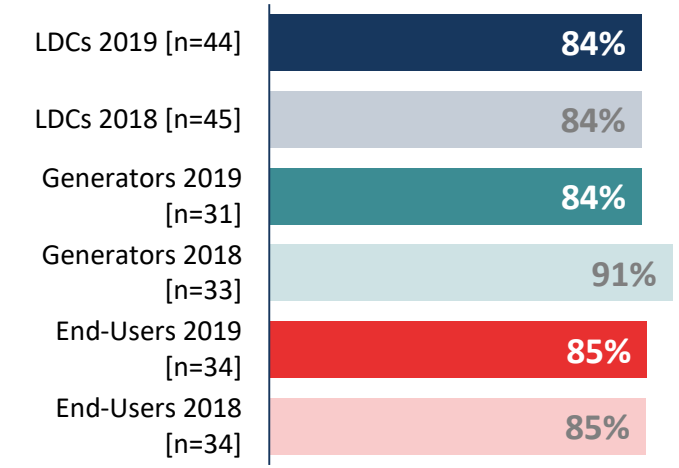
- A strong majority (85%) of LTX customers agree that Hydro One staff provides their organization with quality advice and guidance. They are as likely to *strongly* agree (43%) as they are to only *somewhat* agree (42%). Net agreement is up 5 points from 2018.
- Agreement is consistent among all three customer types. Compared to 2018, agreement levels decreased among Generators (84%), and increased among LDCs (86%)

Accessibility: Over 8-in-10 (84%) LTX customers agree that Hydro One staff are easily accessible; net agreement down 2 points from 2018

Q Please indicate if you agree or disagree with the following statements.
D16. Hydro One staff are easily accessible to my organization.
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type

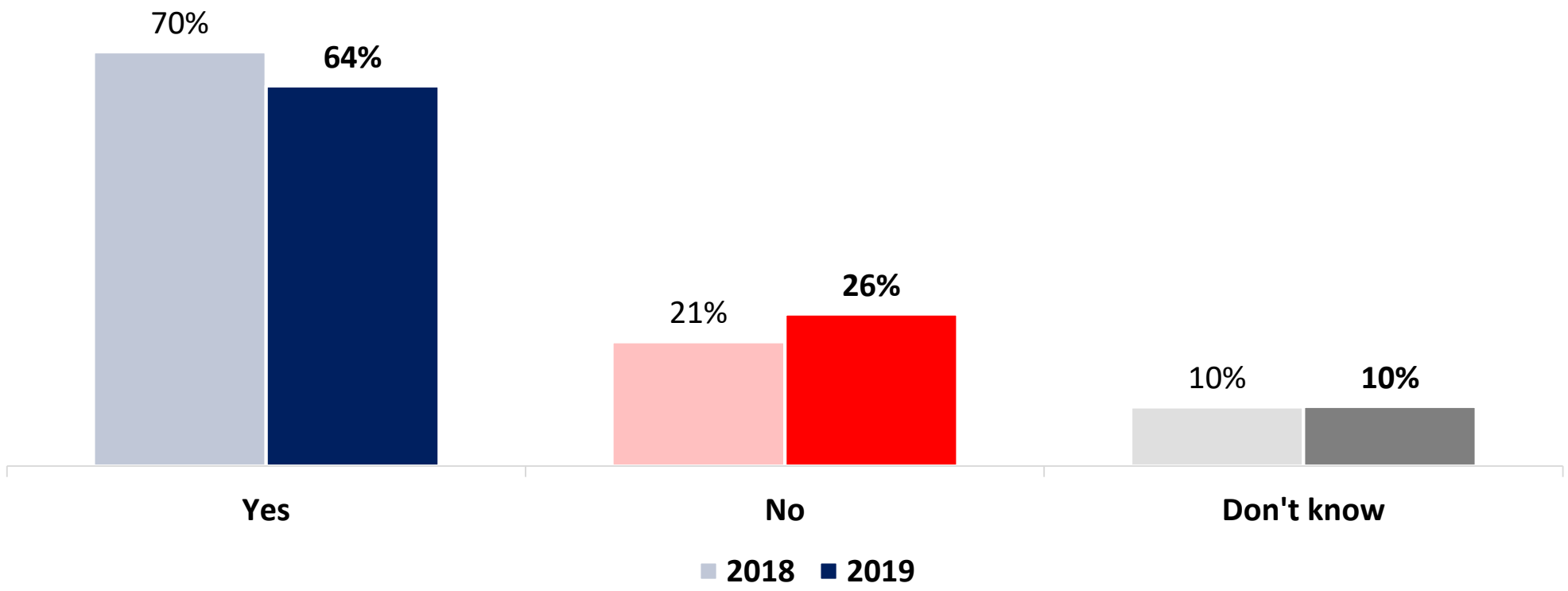


Key Insights

- Half (50%) of LTX customers *strongly* agree that staff are easily accessible, and another third (34%) *somewhat* agree.
- Regardless of customer type, total agreement is consistently high, falling within a narrow range from 84% for LDCs to 85% for End-Users, on par with 2018.

Experience with Planned Outages: Less than 2-in-3 (64%) recall experiencing a *planned* power outage; down 6 points from 2018

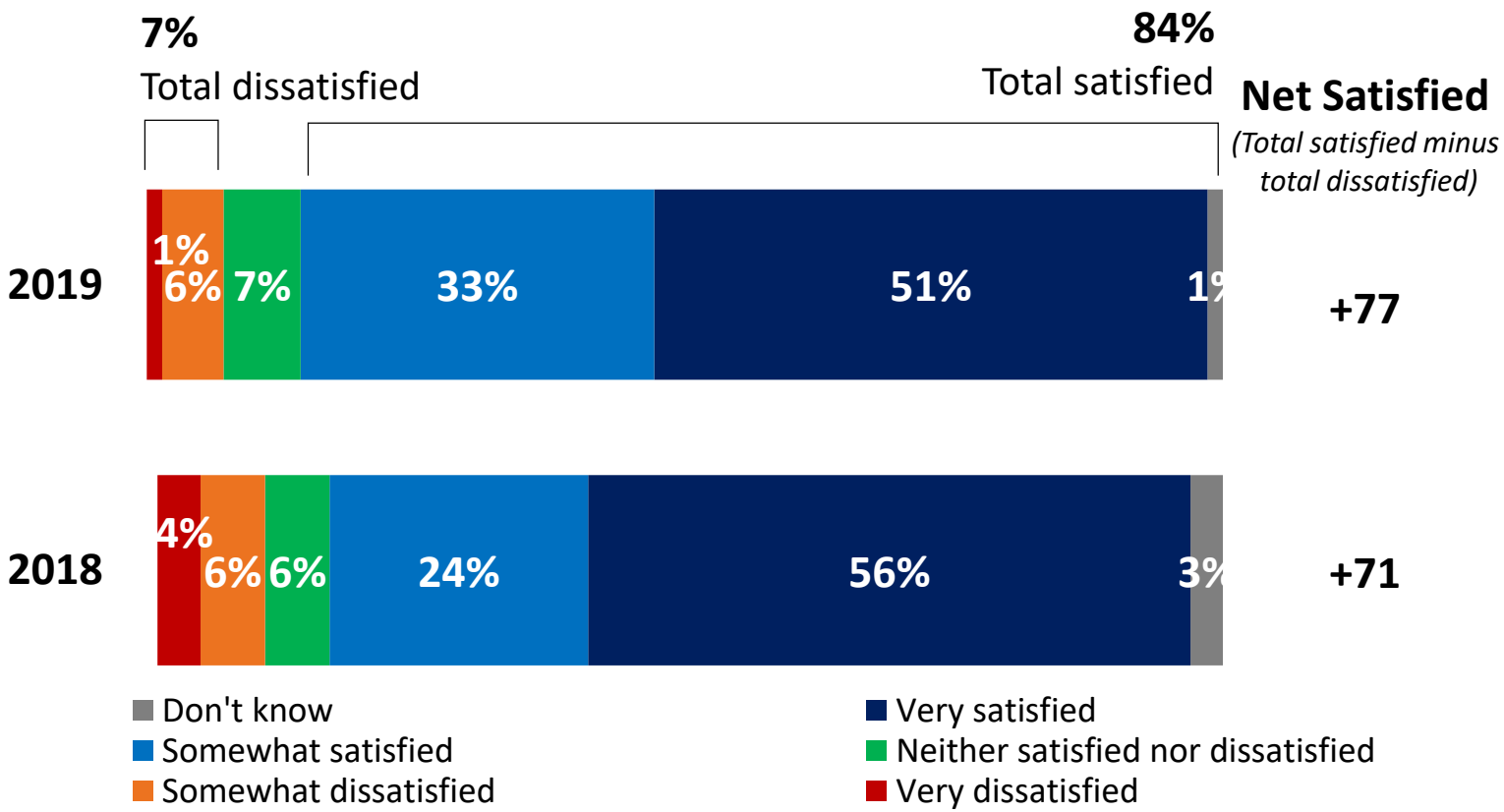
E27. In the past year, has your organization experienced any **planned power outages (or loss of supply)** with Hydro One?
[Asked of all respondents, n=109]



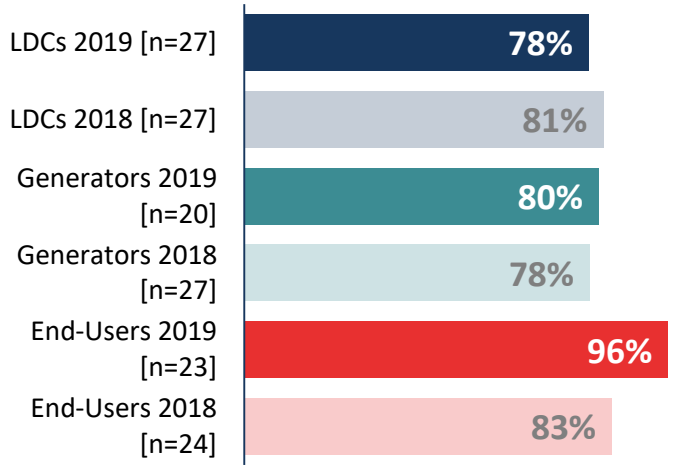
Satisfaction with Planned Outages: Among those who recall a planned outage, most (84%) are satisfied the management of it

E28. Generally, how satisfied or dissatisfied are you with the way your **planned power outages** are managed by Hydro One?

[Asked of those who could recall experiencing a planned outage in the past year, n=70]



Total Satisfaction ▶▶ By Customer Type



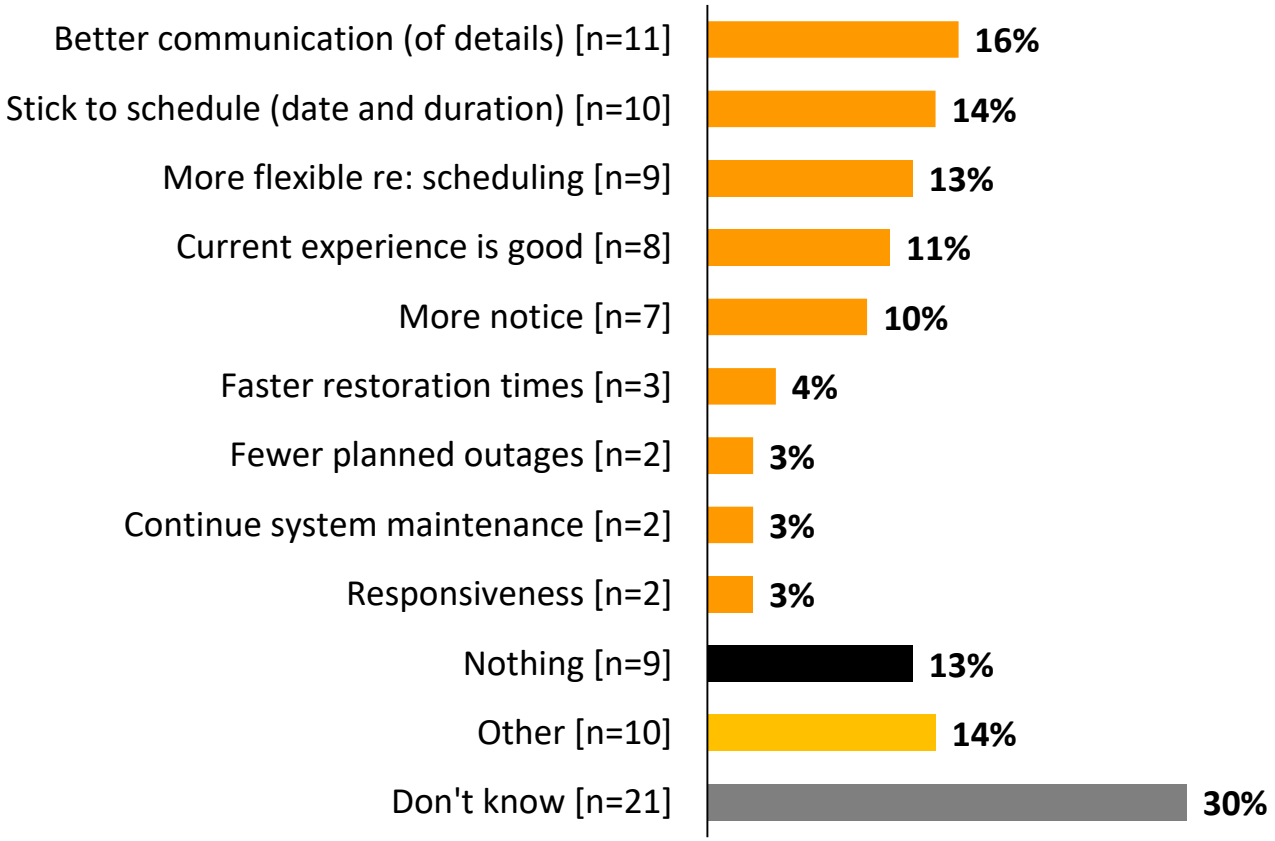
Key Insights

- LTX customers who have experienced a planned outage are highly satisfied (84% total satisfaction) with how these outages are managed by Hydro One. In fact, a majority (51%) are *very* satisfied.
- Satisfaction for LDCs and Generators is on par with 2018 results. End-Users spiked in satisfaction with almost all (96%) of those who experienced an outage feeling satisfied.

Areas of Improvement | Planned Outages: Top mentions reference scheduling; specifically, committing to schedule (14%), flexibility (13%)

E29. Is there anything in particular Hydro One can do to improve your organization's experience during planned outages?

[Asked of those who could recall experiencing a planned outage in the past year, open-ended, n=70]



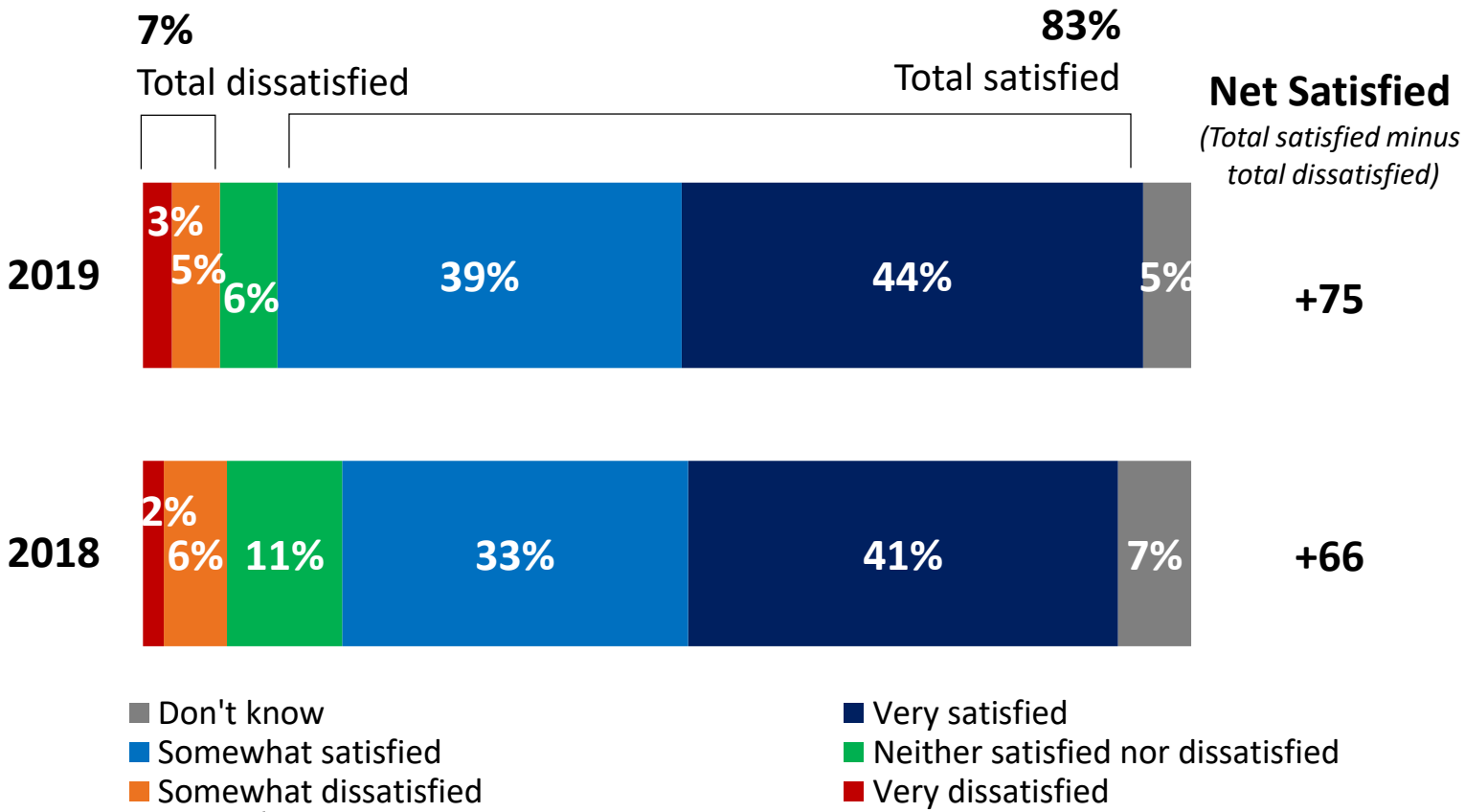
Key Insights

- A majority of LTX customers who have experienced a planned outage don't have any particular suggestions for improving Hydro One's service:
  - 30% "don't know"
  - 13% "nothing"
  - 11% "current experience is good"
- Top mentions of improvement are about sticking to scheduled date, time and duration (14%) and more flexibility when planning scheduled outages (13%).

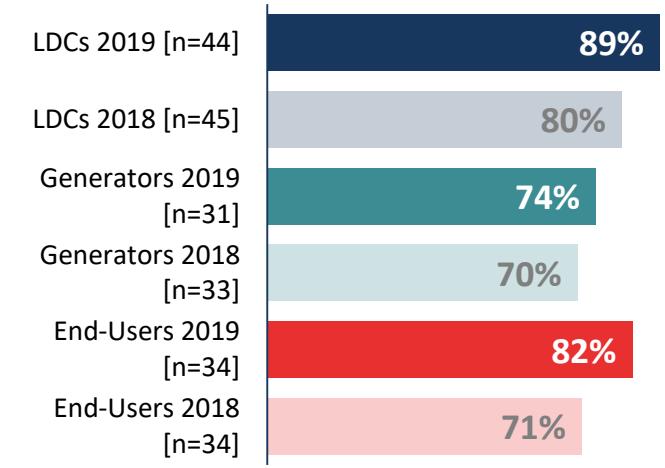
NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Quality of Power: 8-in-10 (83%) LTX customers are satisfied with the quality of the power delivered to their organization

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E22. The quality of power delivered to your organization (as judged by the absence of voltage fluctuations that may affect your organization's facilities and equipment).
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type

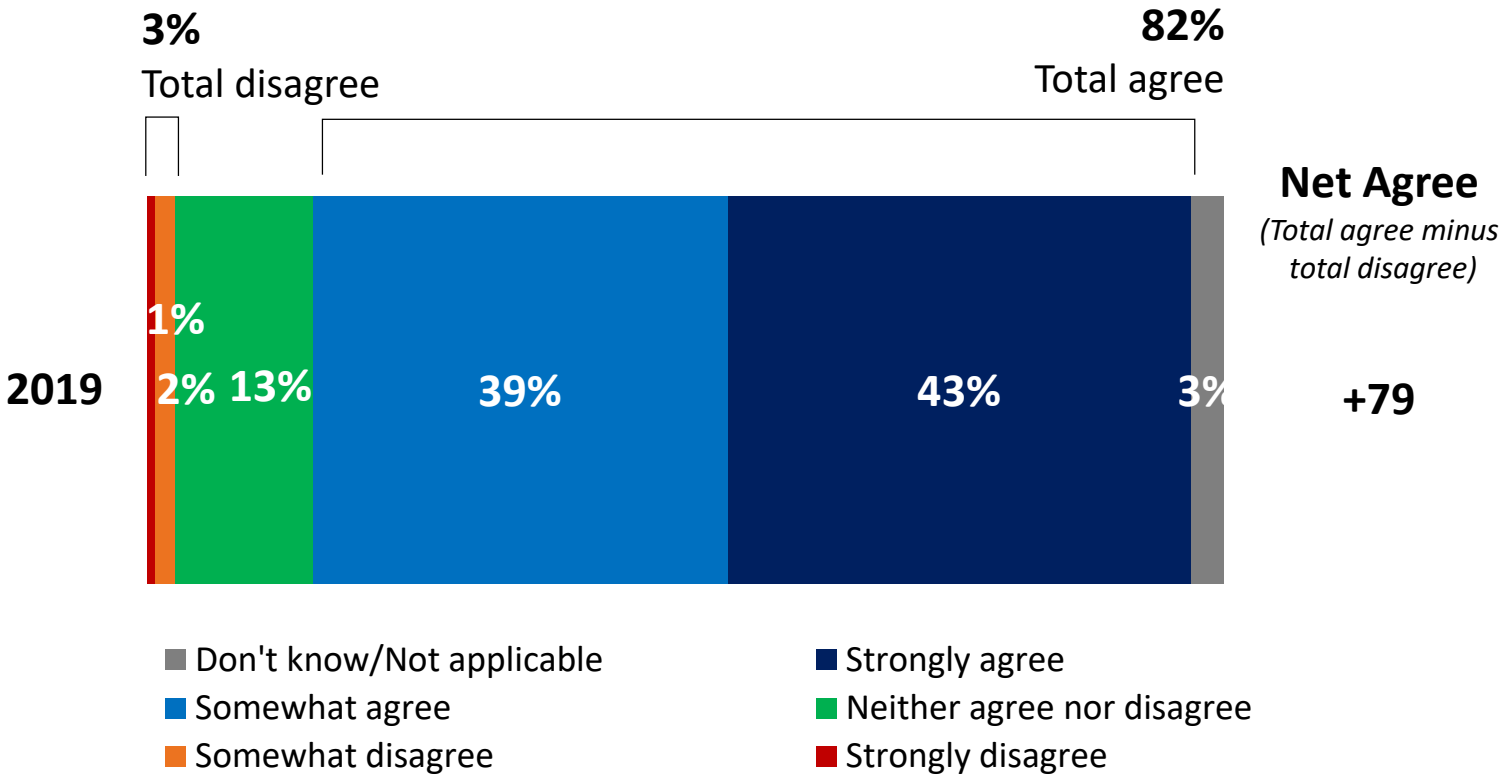


Key Insights

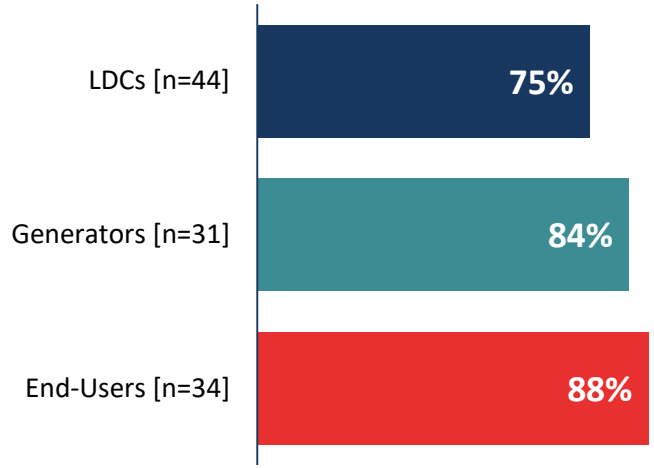
- 8-in-10 (83%) LTX customers are satisfied with the quality of the power delivered to their organization, up 9 points from 2018.
- LDCs are the most satisfied with their power quality (89%), with End-Users (82%) and Generators (74%) tailing behind. Satisfaction among all customer groups has increased from 2018.

Trustworthiness: 8-in-10 (82%) of LTX customers agree that Hydro One is trustworthy; highest among End-Users

Q Please indicate if you agree or disagree with the following statements.
[NEW] D12. Hydro One is trustworthy.
[Asked of all respondents, n=109]



Total Agree ▶▶ By Customer Type

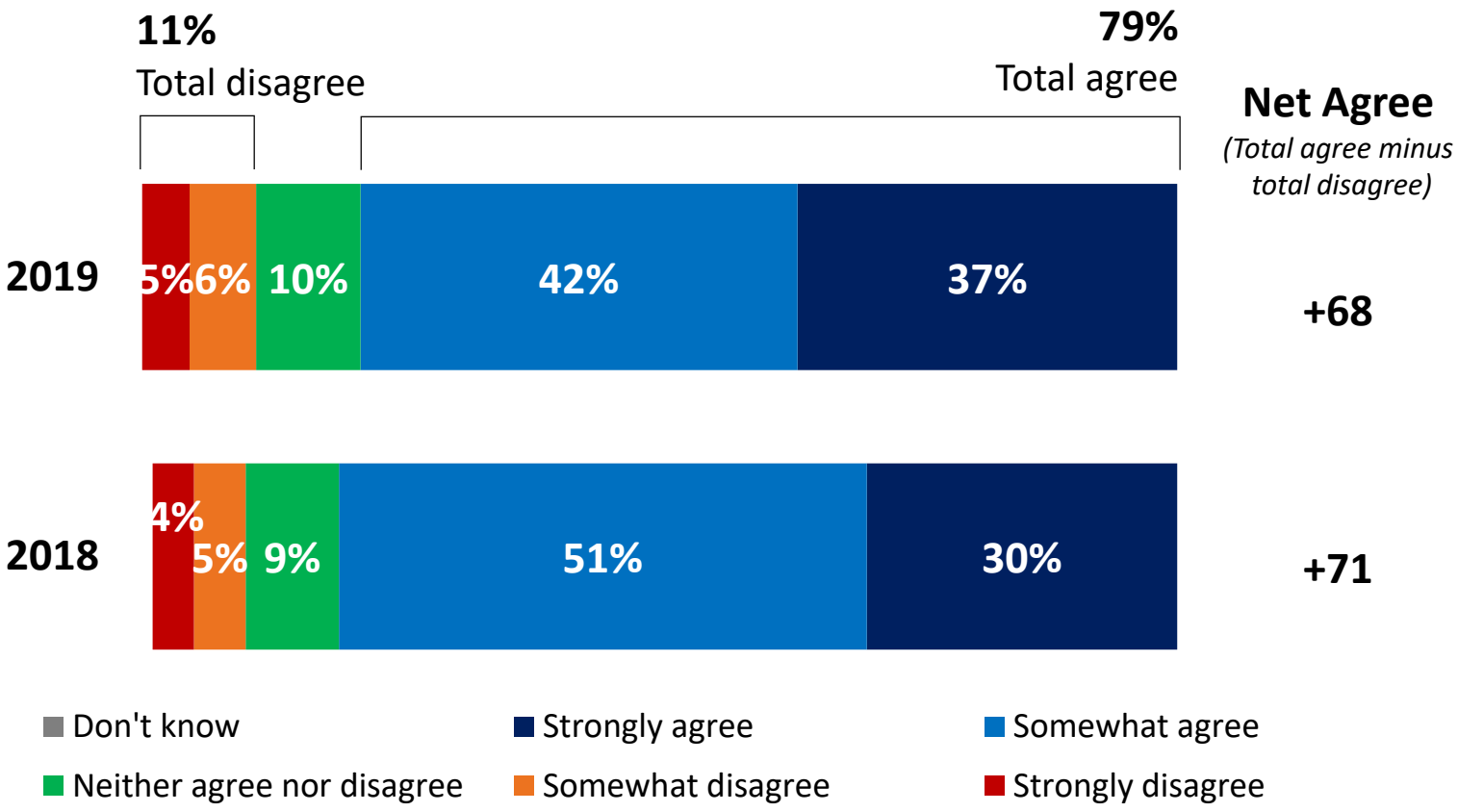


Key Insights

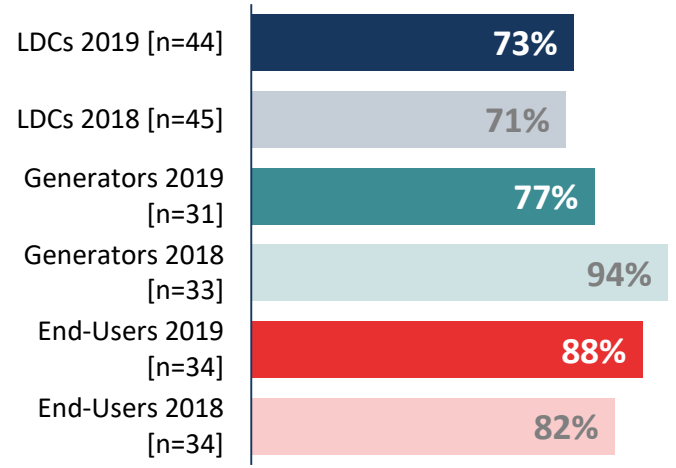
- A strong majority (82%) of LTX customers agree that Hydro One is trustworthy. They are as likely to *strongly* agree (43%) as they are to only *somewhat* agree (39%).
- Agreement is highest among End-Users (88%), and lowest among LDCs (75%).

Prompt Response to Customer Needs: 4-in-5 (79%) LTX customers agree that Hydro One responds to their needs in a timely manner

Please indicate if you agree or disagree with the following statements.
D14. Hydro One responds to the needs of my organization in a timely manner.
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type

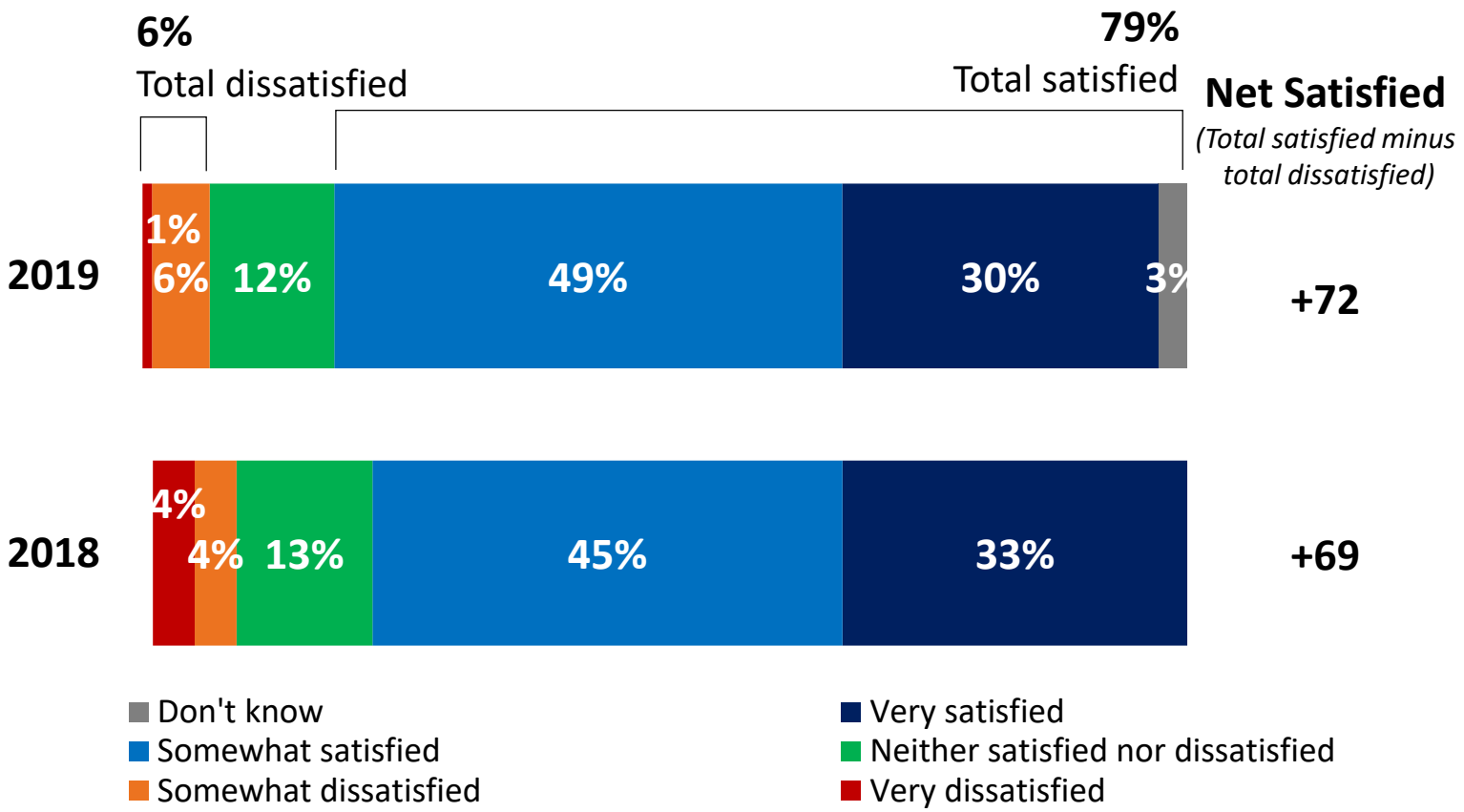


Key Insights

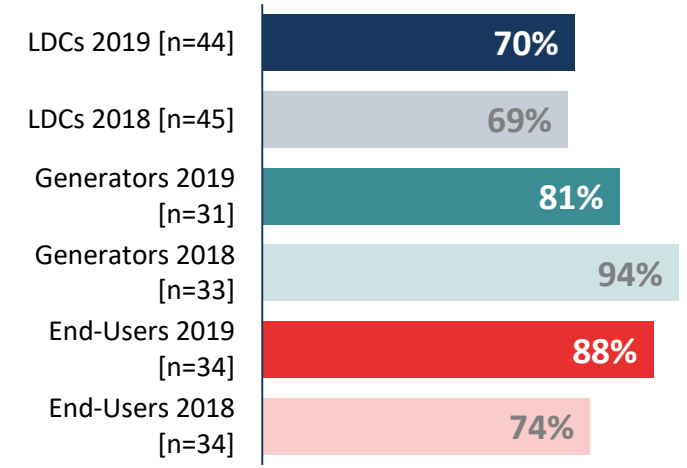
- There is solid total agreement (79%) on this metric, along with an increase in intensity over 2018.
- However, net agreement is down marginally.
- End-Users (88%) are more likely than Generators (77%) and LDCs (73%) to feel Hydro One is responding in a timely manner. Satisfaction among Generators has dropped from 2018.

Keeping Commitments: Most (79%) are satisfied with Hydro One's ability to keep commitments; net satisfaction up 3 points from 2018

How satisfied or dissatisfied are you with the following aspects of Hydro One?
D8. Hydro One's ability to keep commitments
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type



Key Insights

- LTX customers are generally satisfied (79%) with Hydro One's ability to keep commitments, but there is room for a gain in intensity on this metric. Net satisfaction is up 3 points compared to 2018.
- Generators decreased in satisfaction from 2018 while End-Users increased. End-Users (88%) are more satisfied than LDCs (70%) and marginally more than Generators (81%).

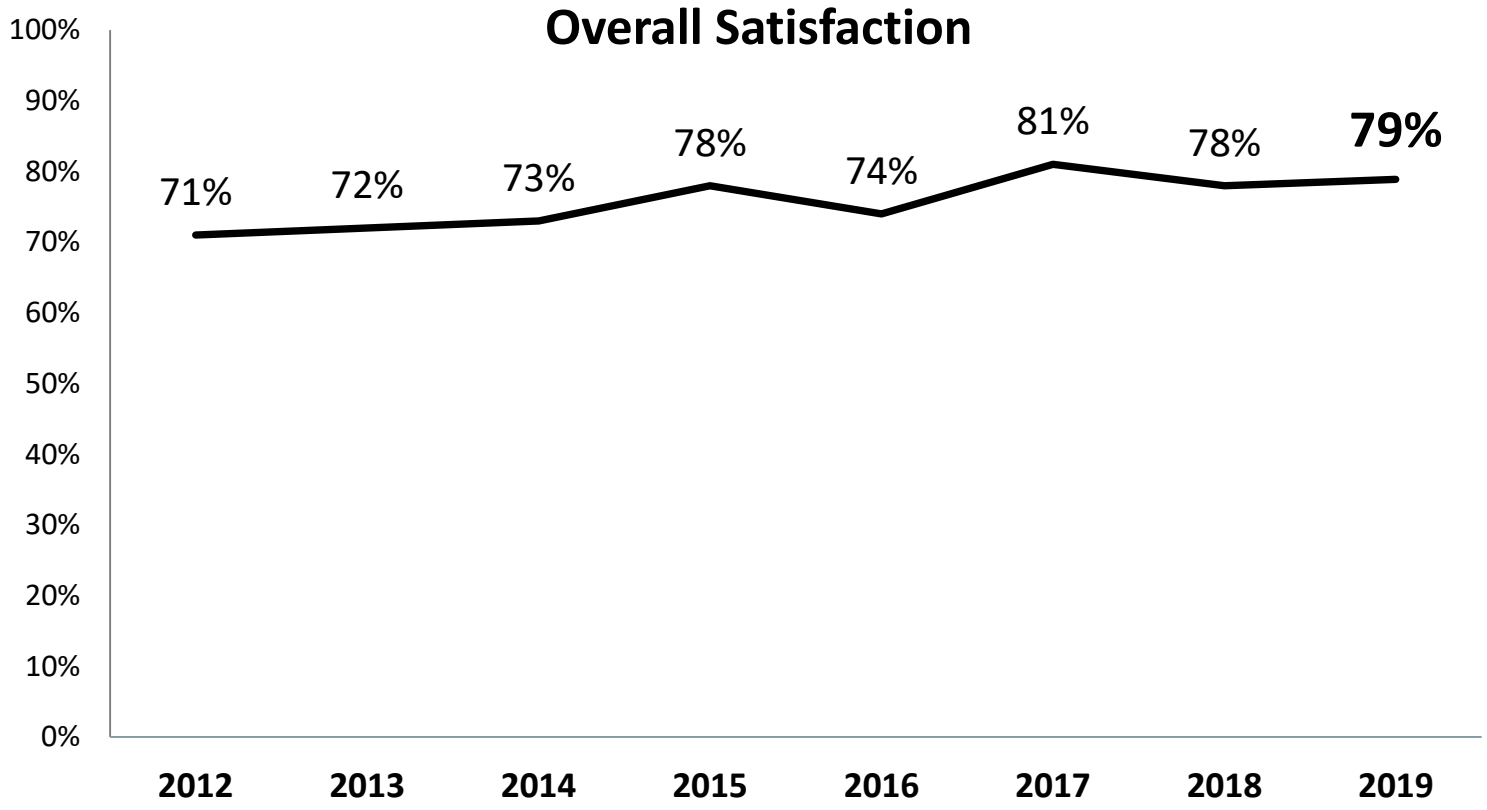
Keeping Commitments: About 8-in-10 (79%) are satisfied with Hydro One's ability to keep commitments; on par with 2018

Q

D8. How satisfied or dissatisfied are you with the following aspects of Hydro One…Hydro One's ability to keep commitments?

PREVIOUSLY: To what extent do you agree with the following statements…Hydro One keeps commitments.

[Asked of all respondents, n=109]



Key Insights

- Hydro One has essentially maintained the level of satisfaction on this metric that was achieved in 2017.

NOTE: Prior to 2018, the response "Don't know" was excluded from this analysis. Response "Don't know" (0% in 2018, 1% in 2019) included.

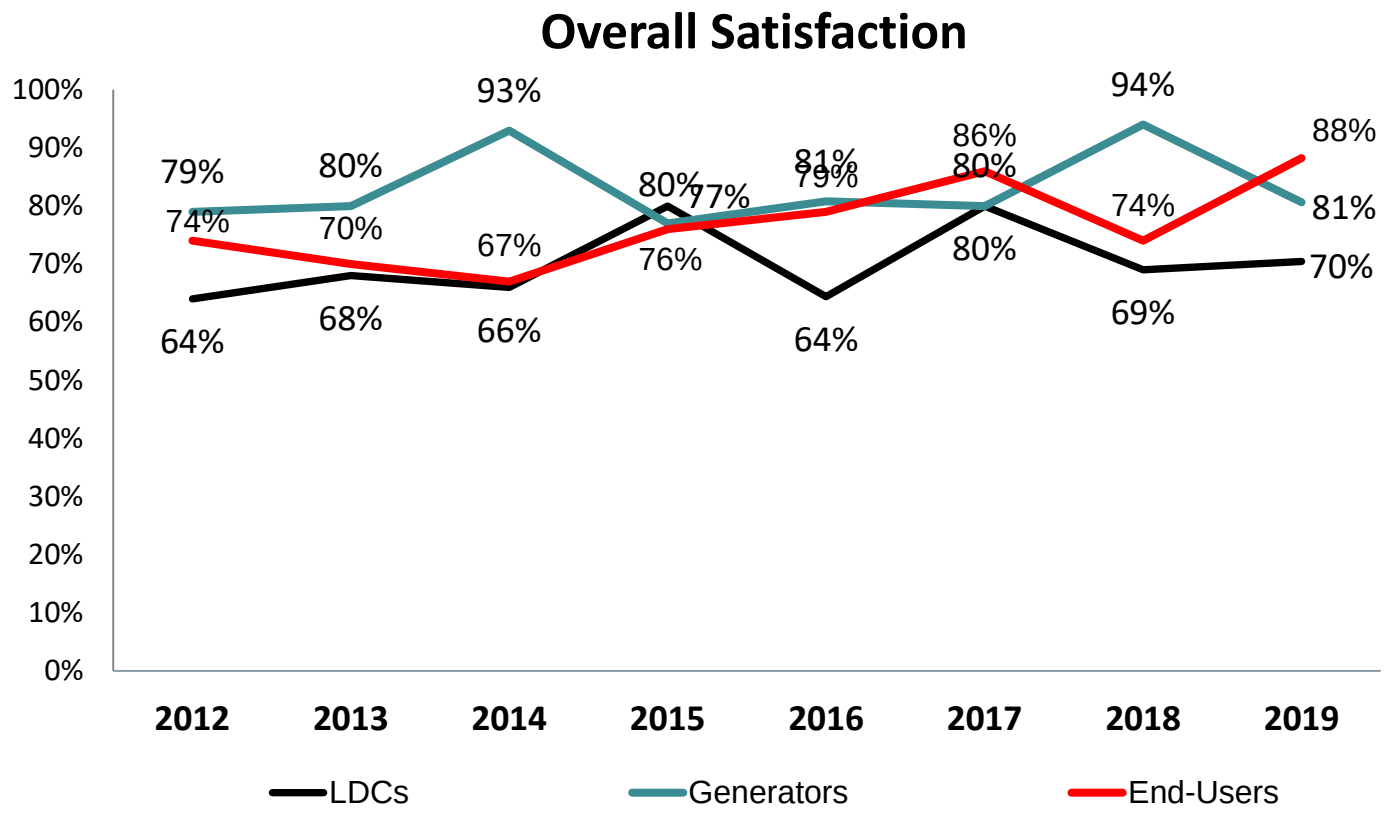
Keeping Commitments (By Segment): Satisfaction is highest among End-Users (88%), then Generators (81%); LDCs (70%) below average

Q

D8. How satisfied or dissatisfied are you with the following aspects of Hydro One…Hydro One's ability to keep commitments?

PREVIOUSLY: To what extent do you agree with the following statements…Hydro One keeps commitments.

[Asked of all respondents, LDCs n=44, Generators n=31, End-Users n=34]



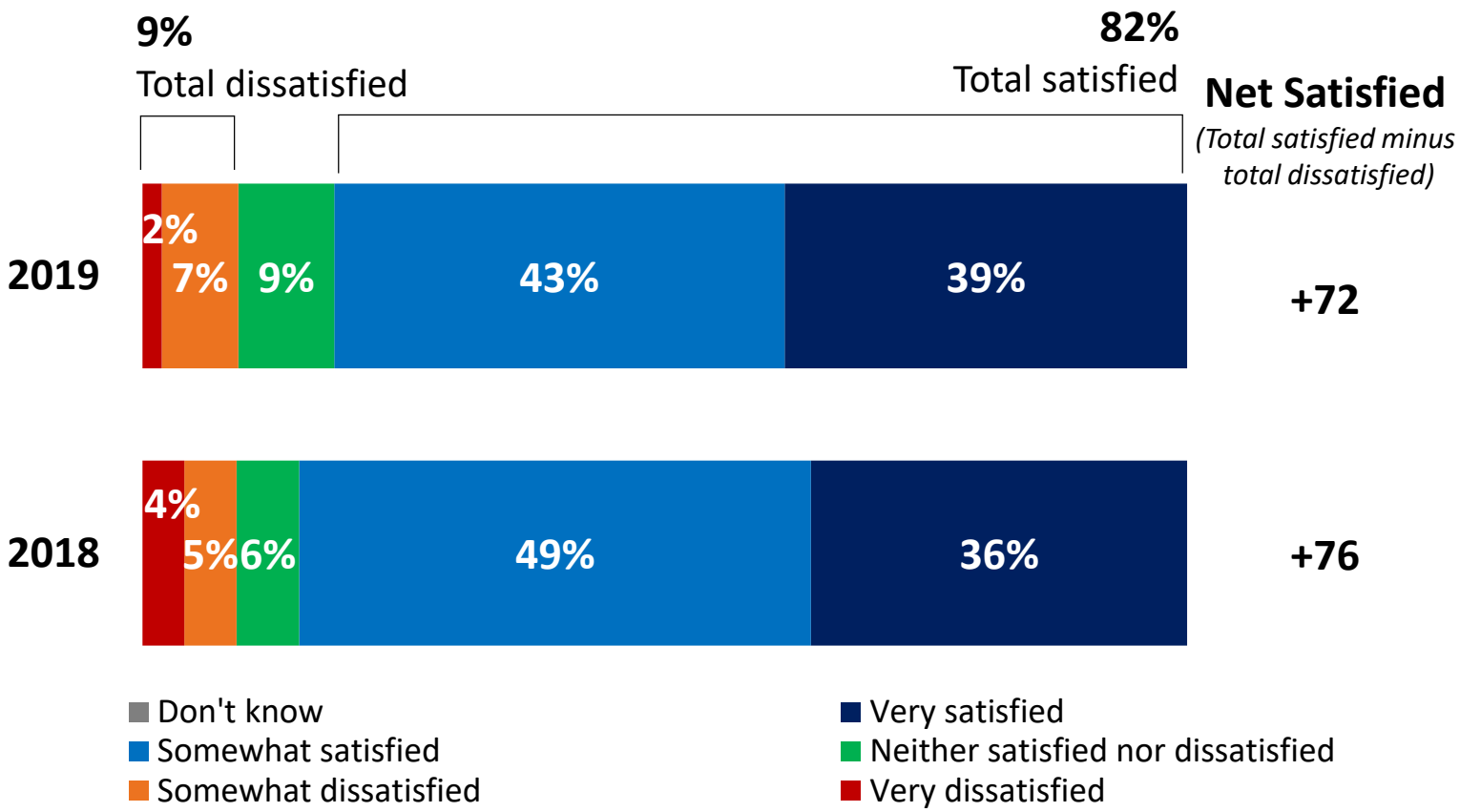
Key Insights

- Arriving at an all-time high of 88% in 2019, satisfaction on this metric has recovered among End-Users since the drop in 2018.
- Generators have returned on par with 2017 satisfaction levels, dropping 13 point from 2018. Due to small sample size, this change falls just short of being a significant difference.
- Satisfaction among LDCs has remained stable with 2018 after rising and falling every year since tracking began in 2012.

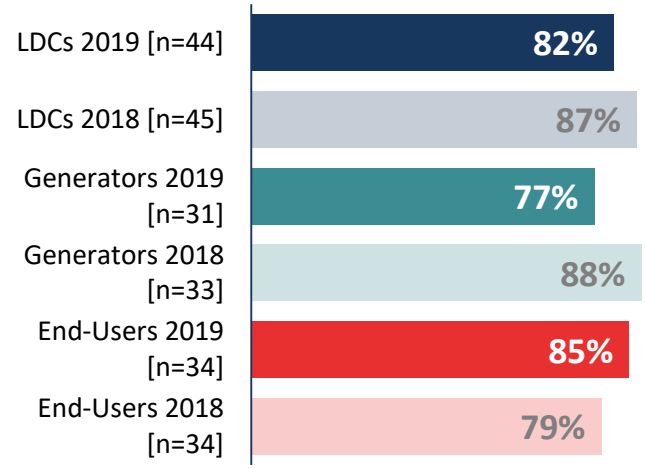
NOTE: Prior to 2018, the response "Don't know" was excluded from this analysis. Response "Don't know" (2% in 2018, 1% in 2019) included.

Understanding Business Needs: Majority (82%) of LTX customers are satisfied with Hydro One's understanding of their business needs

Q How satisfied or dissatisfied are you with the following aspects of Hydro One?
D9. Hydro One's understanding of your business needs
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type



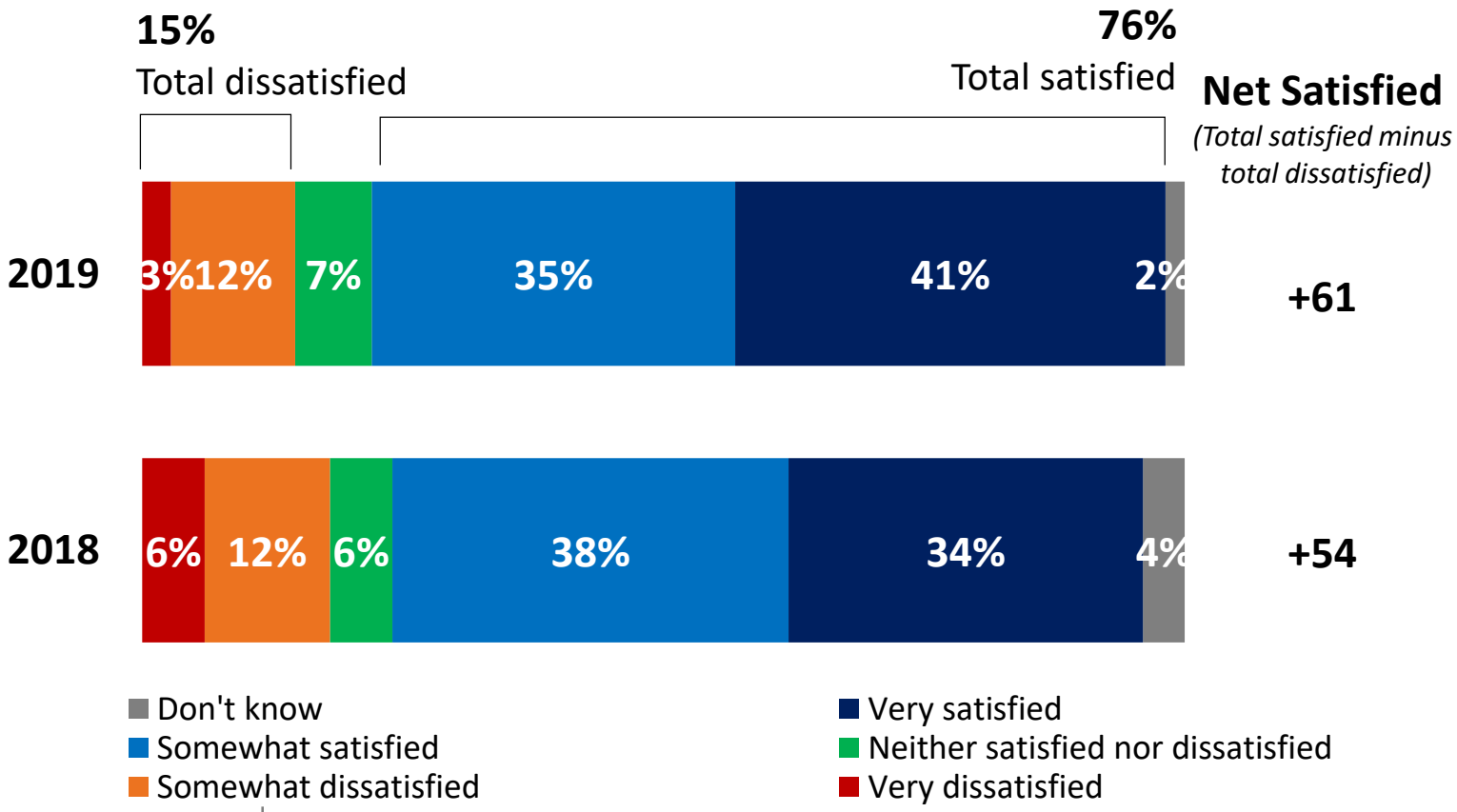
Key Insights

- Satisfaction is divided fairly evenly between those *somewhat* satisfied (43%) that Hydro One understands their business needs, and *very* satisfied (39%). Net satisfaction is down 4 points from 2018.
- Satisfaction is highest among End-Users (85%) and LDCs (82%), and marginally lower among Generators (77%).

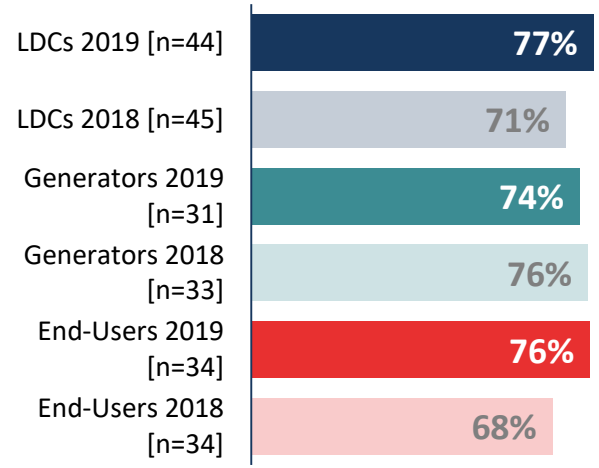
NOTE: 2019 differences between customer type that are statistically significant at a 95% confidence interval are indicated.

Reliability of Electricity Service: 3-in-4 (76%) LTX customers are satisfied with the reliability of their electricity service

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E20. The reliability of your electricity service (as judged by the number of unplanned power outages your organization experiences).
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type

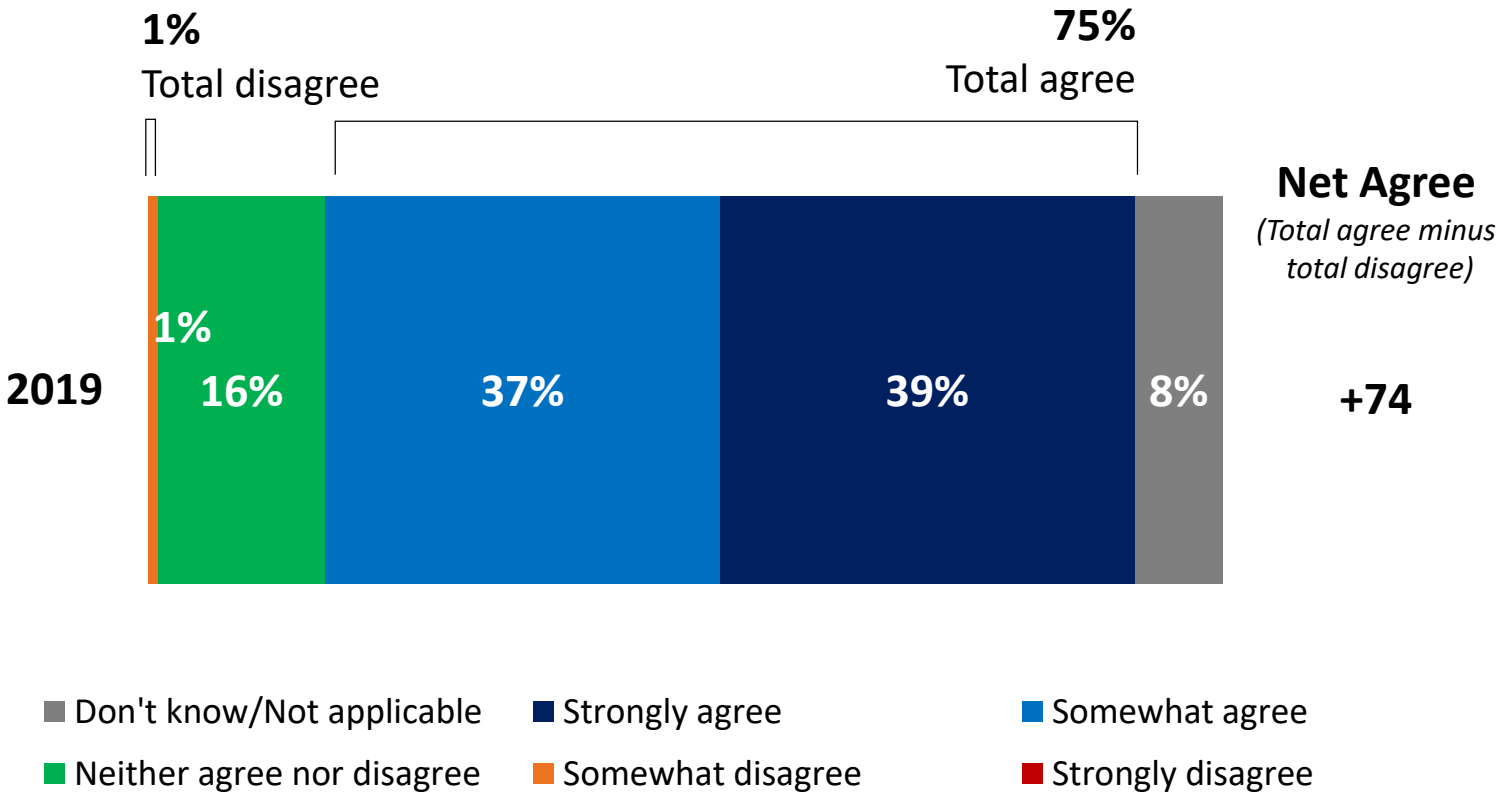


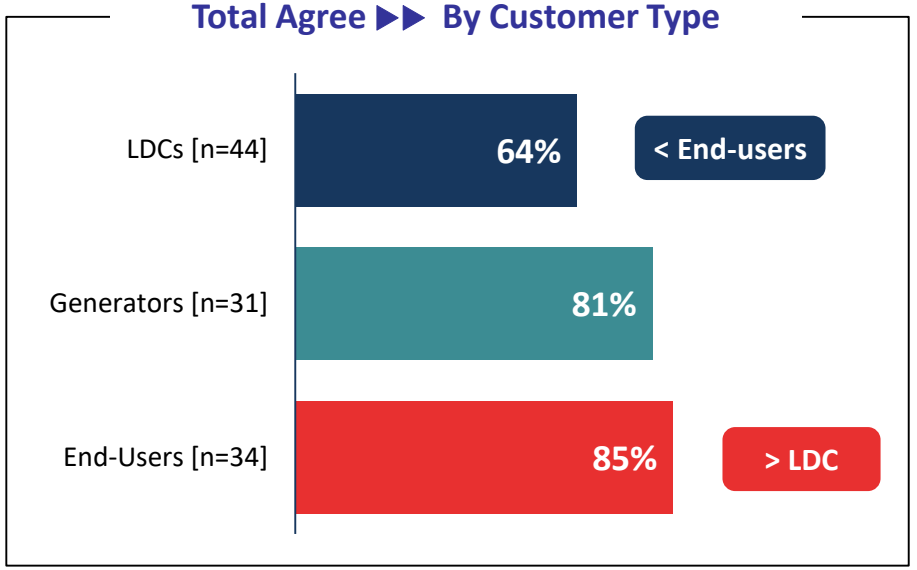
Key Insights

- There is still room for improvement on intensity, but most (76%) LTX customers are satisfied with the reliability of their electricity service, up five points from 2018.
- End-Users are on par with the average (76%), while LDCs are marginally higher (76%) and Generators are marginally lower (74%). LDC and End-User satisfaction has improved compared to 2018 while Generators have marginally decreased.

Work Crews: 3-in-4 (75%) LTX customers agree that Hydro One's work crews do an excellent job

Q Please indicate if you agree or disagree with the following statements.
[NEW] D14. Hydro One's work crews do an excellent job.
[Asked of all respondents, n=109]





Key Insights

- Three-quarters (75%) of LTX customers agree that Hydro One's work crews do an excellent job. They are as likely to *strongly* agree (39%) as they are to only *somewhat* agree (37%).
- Agreement is significantly higher among End-Users (85%) than LDCs (64%).

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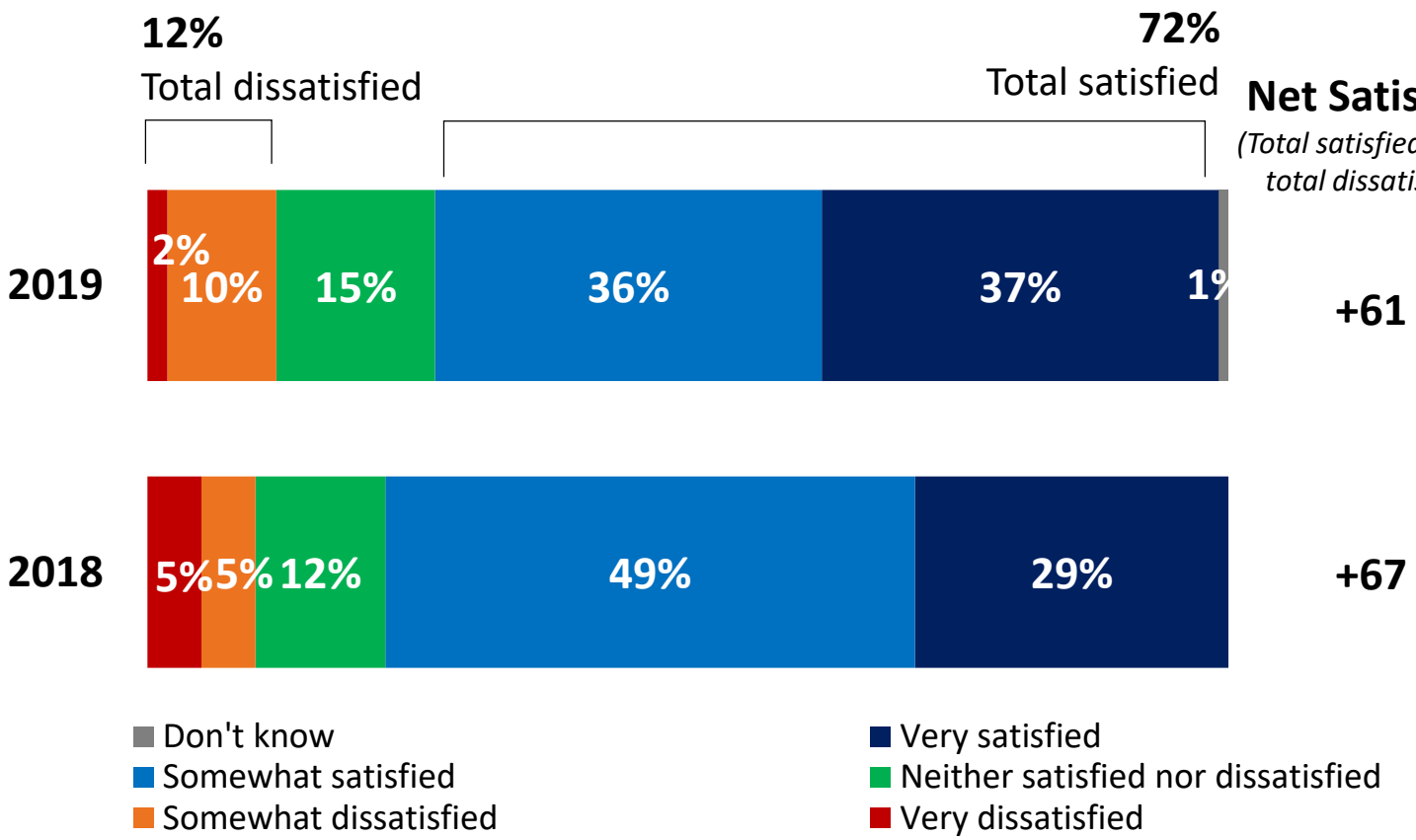
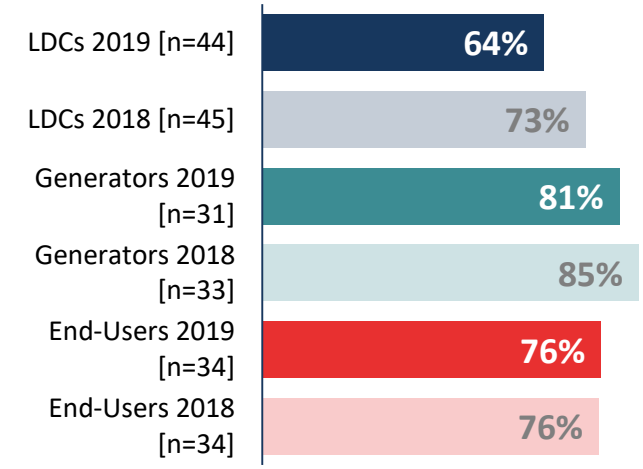
NOTE: 2019 differences between customer type that are statistically significant at a 95% confidence interval are indicated.

Ease of Doing Business: 7-in-10 (72%) are satisfied with the ease of doing business; net satisfaction down 6 points from 2018

Q How satisfied or dissatisfied are you with the following aspects of Hydro One?
D7. Ease of doing business with Hydro One
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type

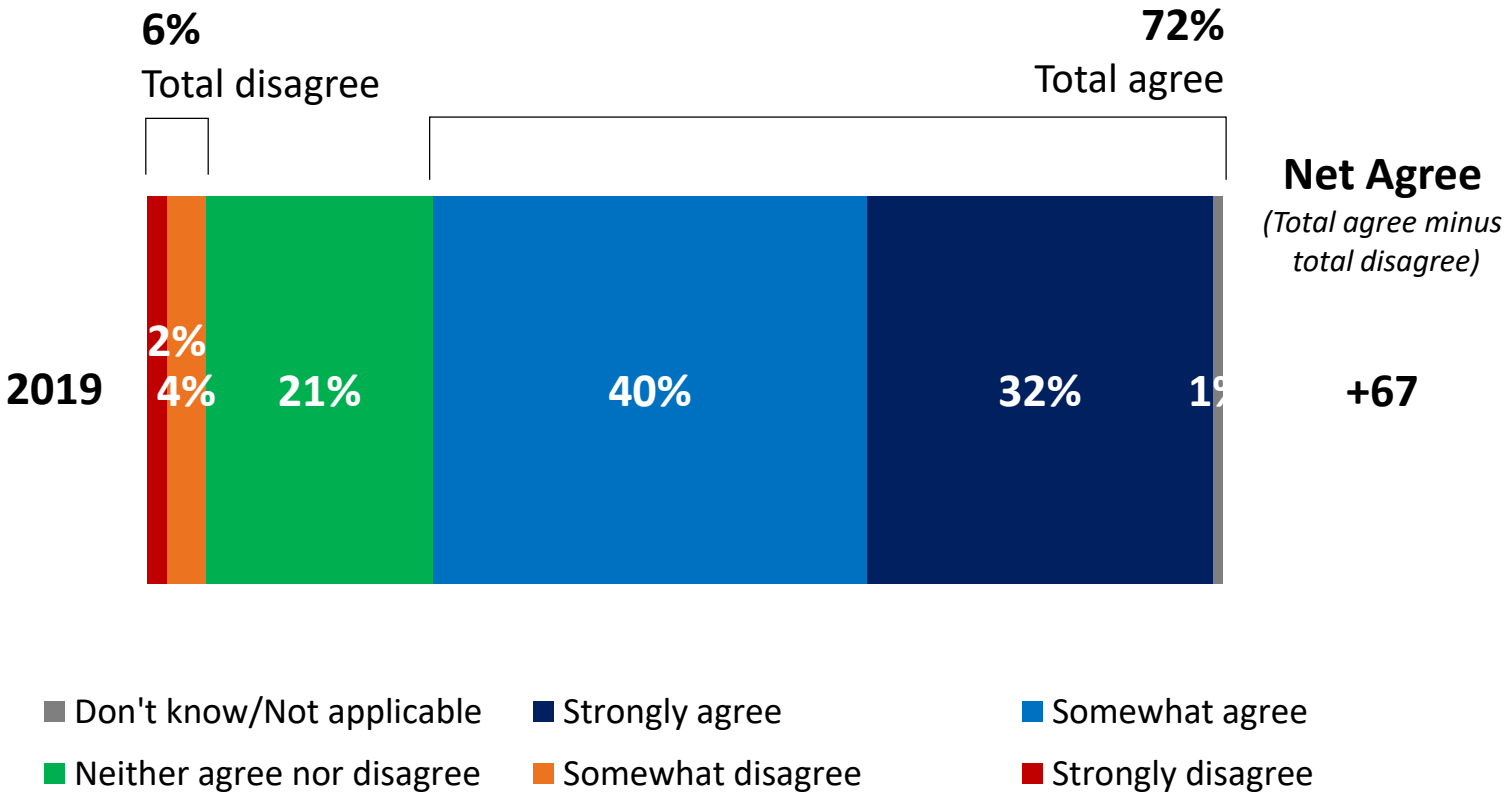


Key Insights

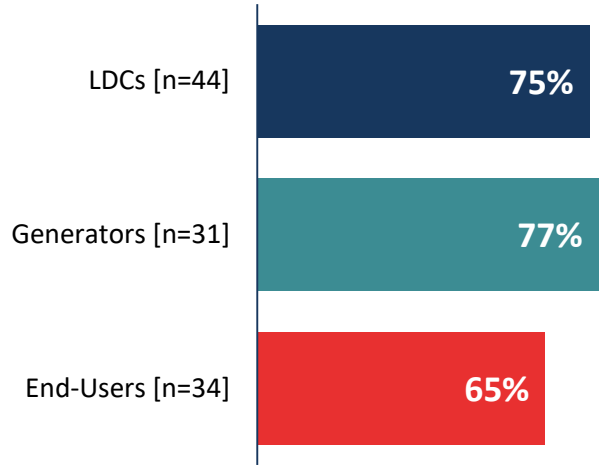
- Most (72%) LTX customers are satisfied with the ease of doing business with Hydro One, and there has been an increase in intensity on this metric.
- However, net satisfaction is down 6 points due to losses on moderate satisfaction.
- At 81%, Generators are the most satisfied customers on this metric, followed by End-Users (76%). LDCs (64%) fall below average.

Fairness: 7-in-10 (72%) LTX customers agree that Hydro One is fair; highest among Generators

Q Please indicate if you agree or disagree with the following statements.
[NEW] D11. Hydro One is fair.
[Asked of all respondents, n=109]



Total Agree ▶▶ By Customer Type

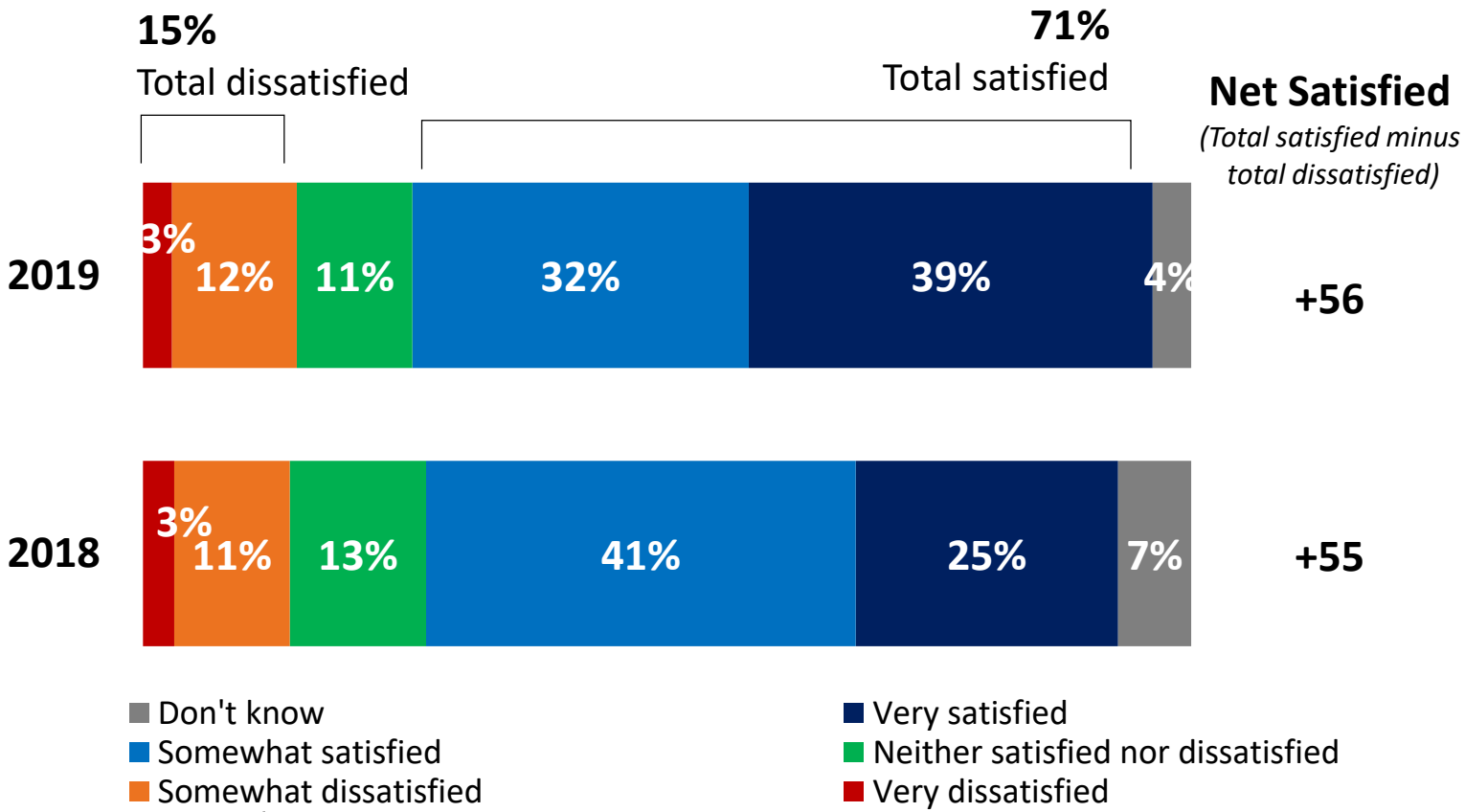


Key Insights

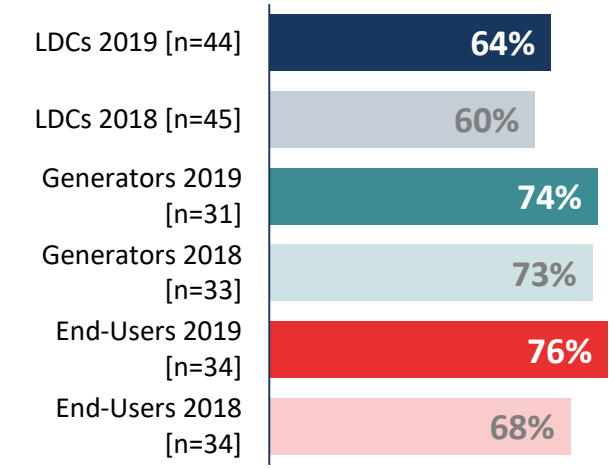
- 7-in-10 (72%) LTX customers agree Hydro One is fair. There is an opportunity to increase intensity on this metric by shifting customers from *somewhat* (40%) to *strongly* (32%) agree.
- Generators (77%) are most likely to agree Hydro One is fair, while End-Users (65%) are least likely.

Time to Restore Power: 7-in-10 (71%) are satisfied with the time it takes to restore power after an unplanned outage

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E21. The amount of time it takes to restore power when unplanned power outages occur.
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type

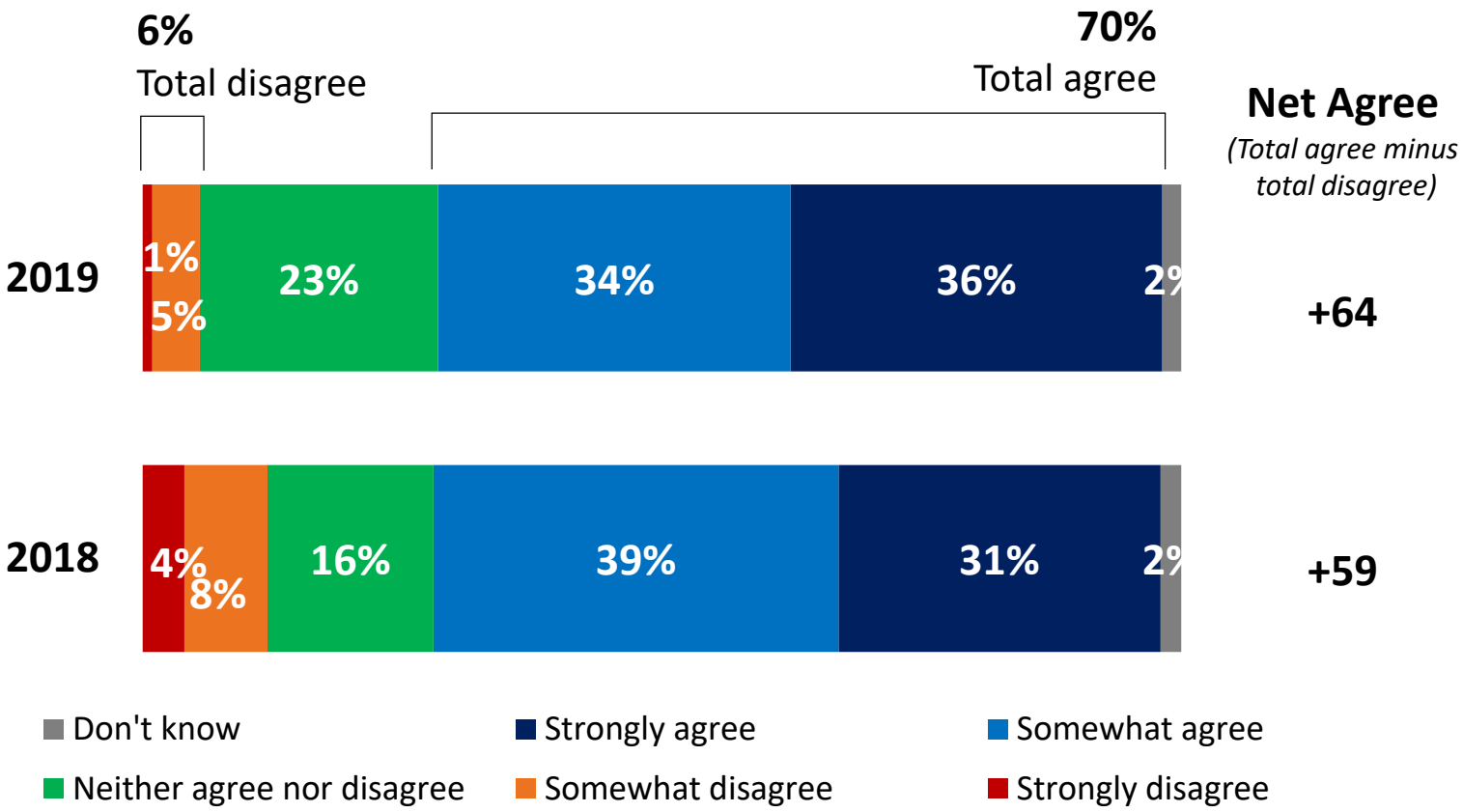


Key Insights

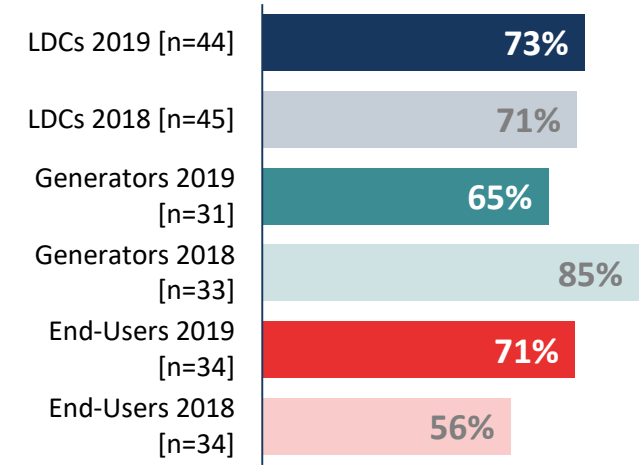
- 7-in-10 (71%) are satisfied with the the time it takes to restore power after an unplanned outage, up 5 points from 2018.
- While net satisfaction holds steady, there has been a notable improvement in intensity on this metric over the past year.
- Compared to 2018, satisfaction with restoration time has marginally increased among all customer groups.

Trusted Business Partner: 7-in-10 (70%) LTX customers consider Hydro One a trusted business partner; highest among LDCs

Q Please indicate if you agree or disagree with the following statements.
D10. Hydro One is more than an electricity utility, it is a trusted business partner to my organization.
[Asked of all respondents, n=109]



Total Satisfaction ▶▶ By Customer Type

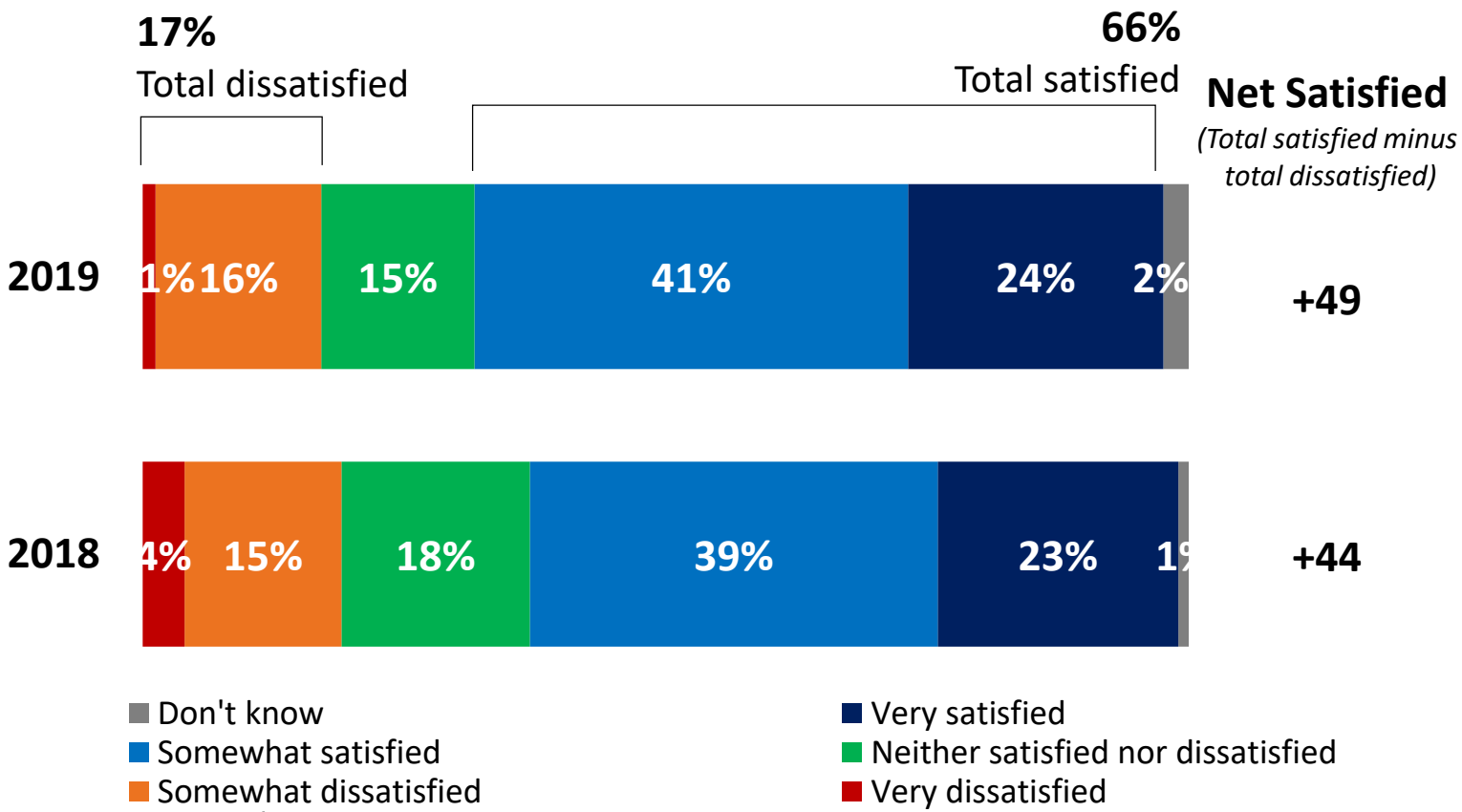


Key Insights

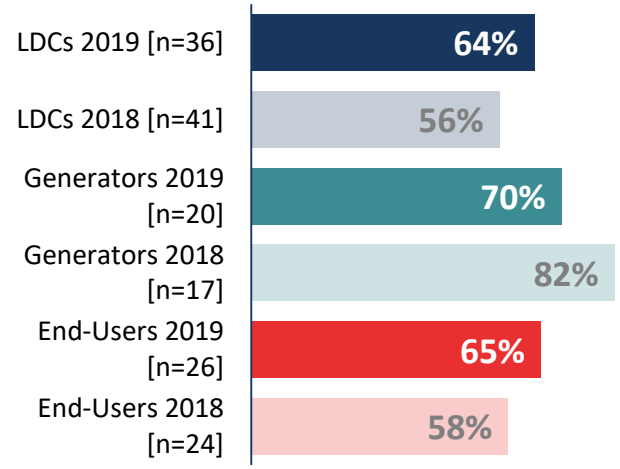
- 7-in-10 (70%) LTX customers consider Hydro One a trusted business partner. There is an opportunity to increase intensity on this metric by shifting customers from *somewhat* (34%) to *strongly* (36%) agree. Net satisfaction is up 5 points from 2018.
- LDCs (73%) are most likely to consider Hydro One a trusted business partner, while Generators (65%) are least likely, dropping 20 points from last year.

Communication During Unplanned Outages: 2-in-3 (66%) of those who have experienced unplanned outages are satisfied with communication

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E23. The communication of information during unplanned outages.
[Asked of those who could recall experiencing an unplanned outage in the past year, n=82]



Total Satisfaction ▶▶ By Customer Type

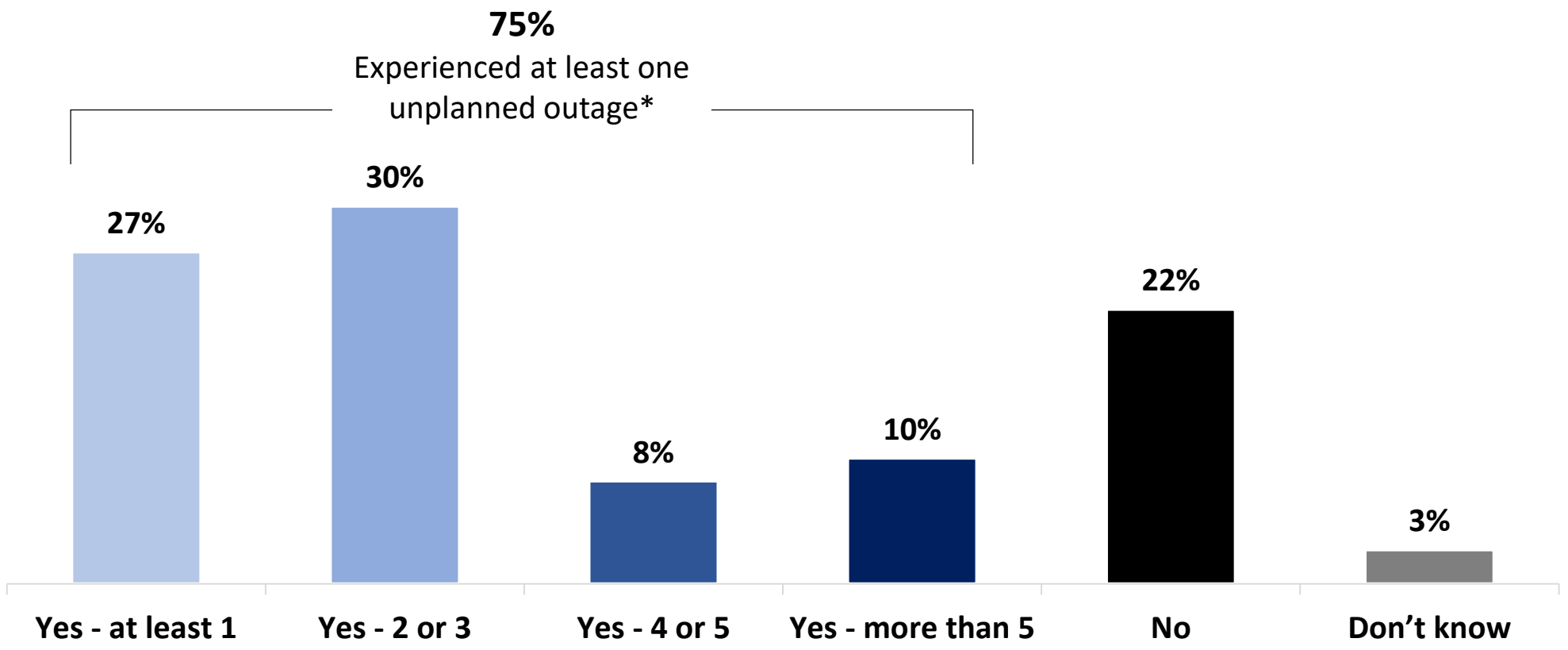


Key Insights

- There is room for improvement on total satisfaction (66%) as well as intensity (currently 24% *very* satisfied), but a majority of LTX customers who can recall an unplanned outages are satisfied with communications during such events.
- Generators (70%) are most satisfied, compared to End-Users (65%) and LDCs (64%). However, satisfaction among Generators decreased from 2018 whereas satisfaction of LDCs and End-Users has increased.

Experience with Unplanned Outages: Three-quarters (75%) recall experiencing an unplanned outage in the past year

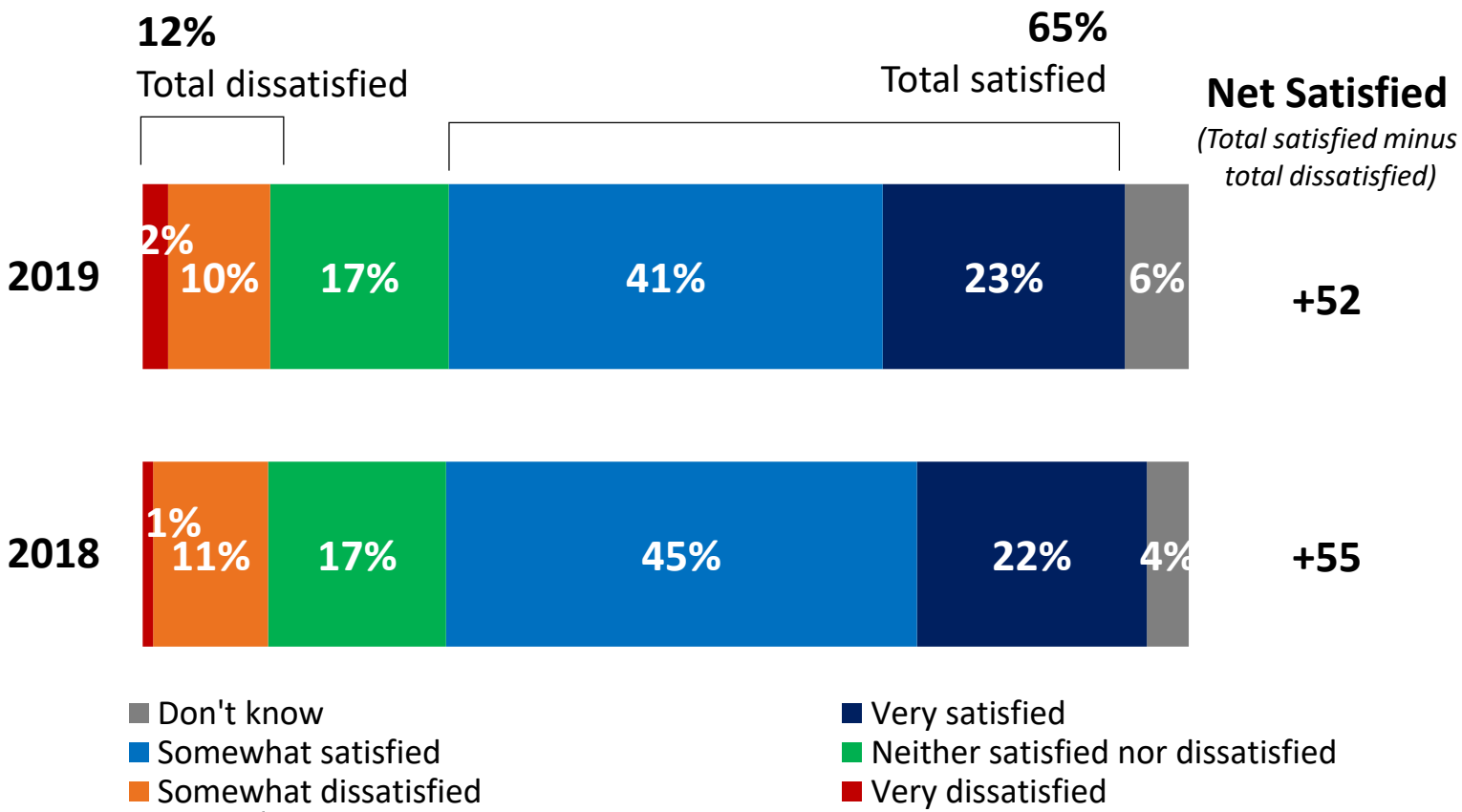
Q **E23.** In the past year, has your organization experienced any **unplanned power outages** with Hydro One?
[Asked of all respondents, n=109]



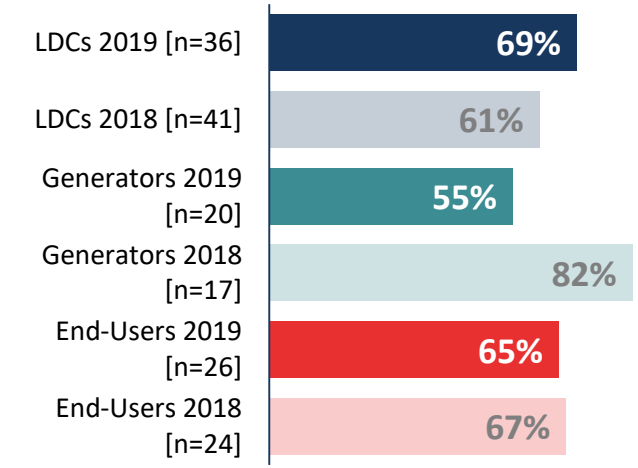
Note: * In 2018, **73%** had experienced an unplanned outage (only "yes" or "no" response options were provided)

Accuracy of Duration Estimate: 2-in-3 (65%) who have experienced an unplanned outage are satisfied with duration estimate accuracy

For each statement, please indicate your level of satisfaction of dissatisfaction.
E25. The accuracy of information provided regarding the duration of unplanned outages.
[Asked of those who could recall experiencing an unplanned outage in the past year, n=82]



Total Satisfaction ▶▶ By Customer Type



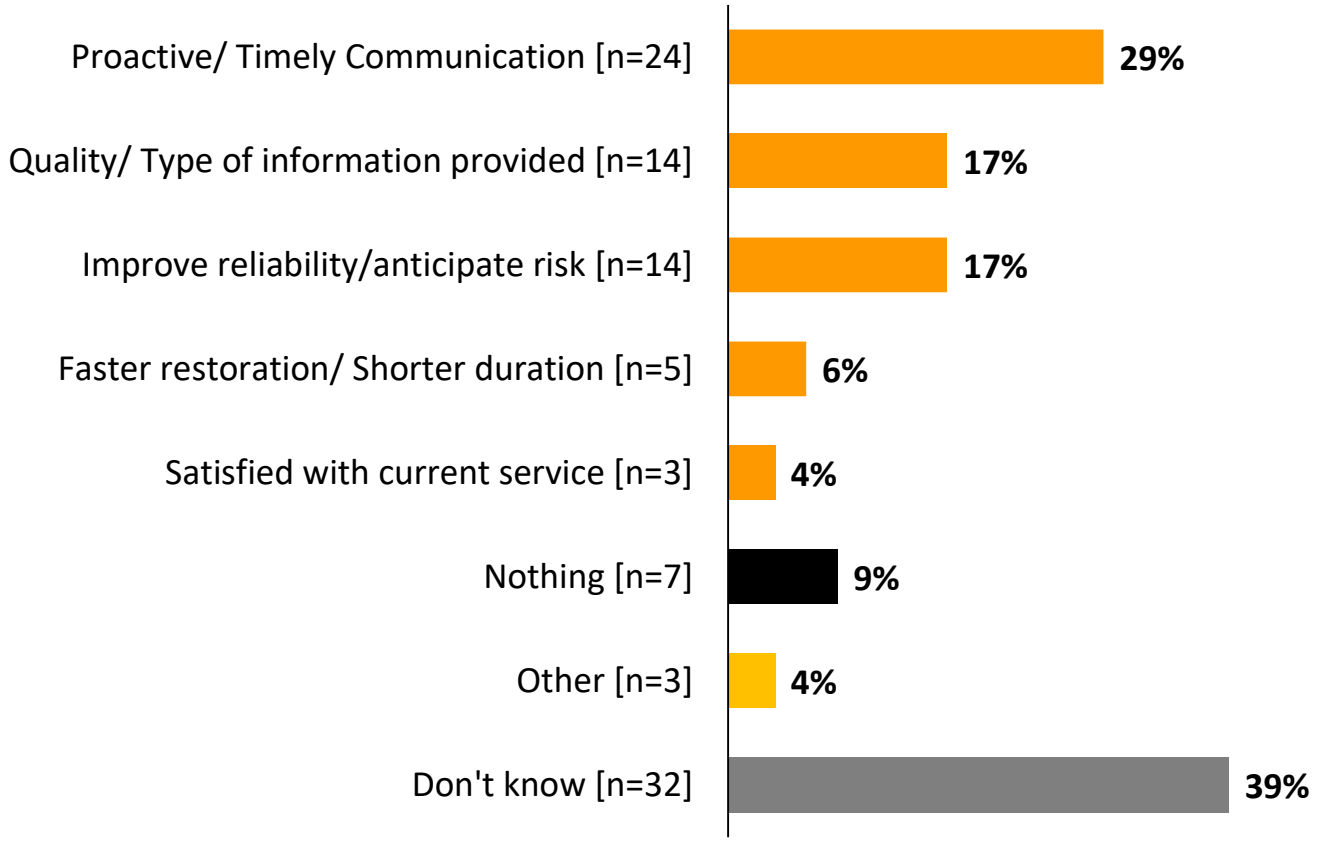
Key Insights

- Two-thirds (65%) are satisfied with the accuracy of information regarding the duration of unplanned outages. There is room for improvement here as customers are almost twice as likely to be *somewhat* satisfied (41%) rather than *very* satisfied (23%).
- Satisfaction with duration estimates dropped significantly among Generators in 2019.

Areas of Improvement | Unplanned Outages: 3-in-10 (29%) would like improvement on "proactive/timely communication"

E25. Is there anything in particular Hydro One can do to improve your organization's experience during unplanned outages?

[Asked of those who could recall experiencing an unplanned outage in the past year, open-ended, n=82]



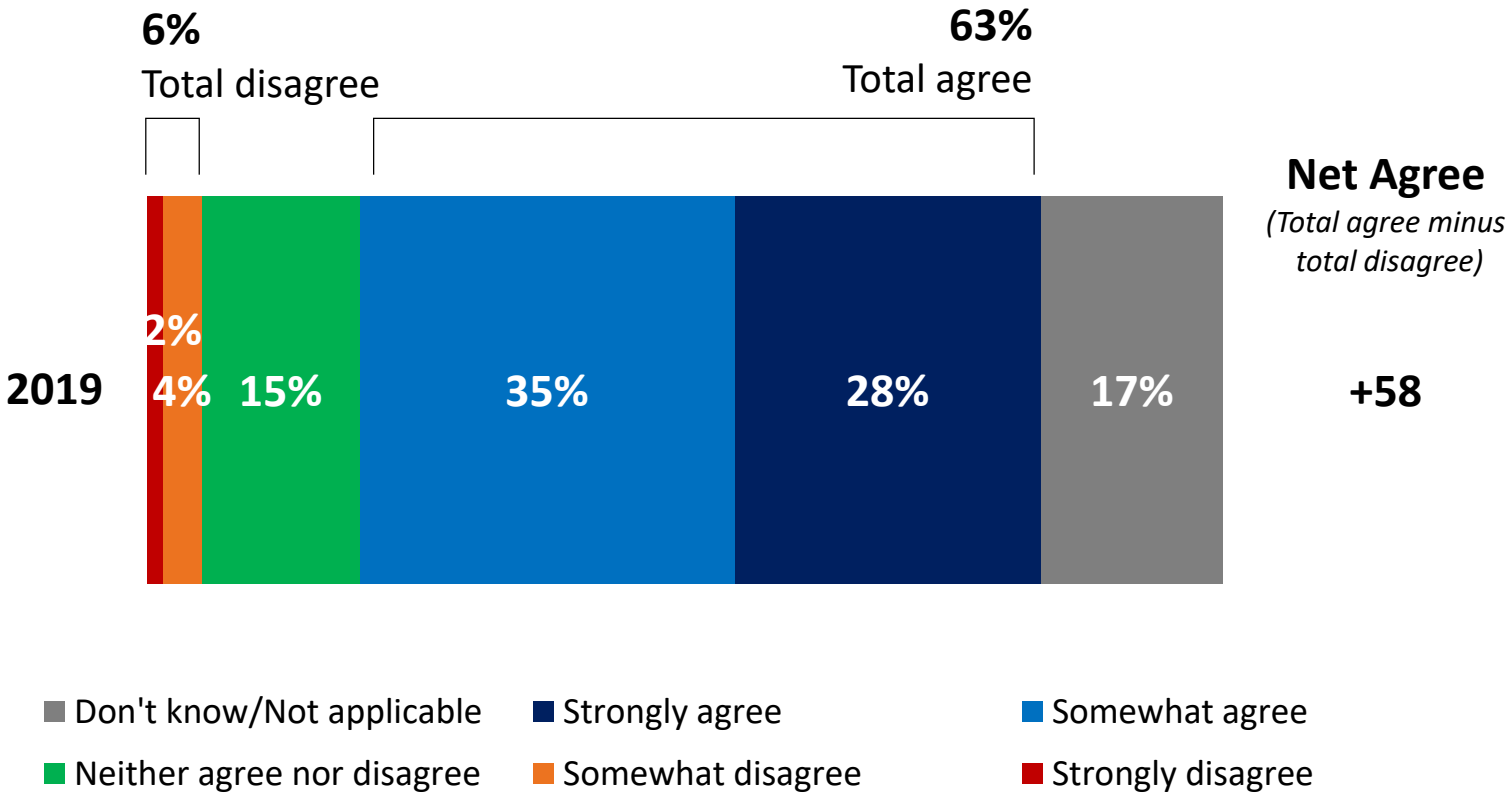
Key Insights

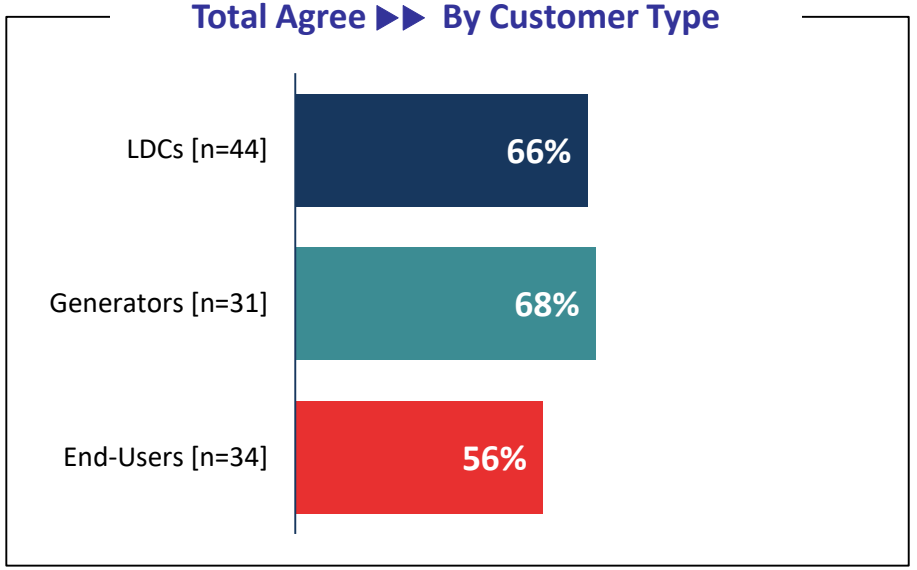
- A majority of LTX customers who recall experiencing an unplanned outage don't have a specific suggestion on how Hydro One could improve (39% "don't know", 9% "nothing", 4% "satisfied with current service"). This confirms that there are no obvious weaknesses.
- Some would like improvements on "proactive/timely communication" (29%), "quality of information" (17%), or "improving reliability/anticipating risk" (17%).

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Top Level Management: 3-in-5 (63%) LTX customers agree that Hydro One has responsible and competent top-level management

Q Please indicate if you agree or disagree with the following statements.
[NEW] D13. Hydro One has responsible and competent top-level management.
[Asked of all respondents, n=109]



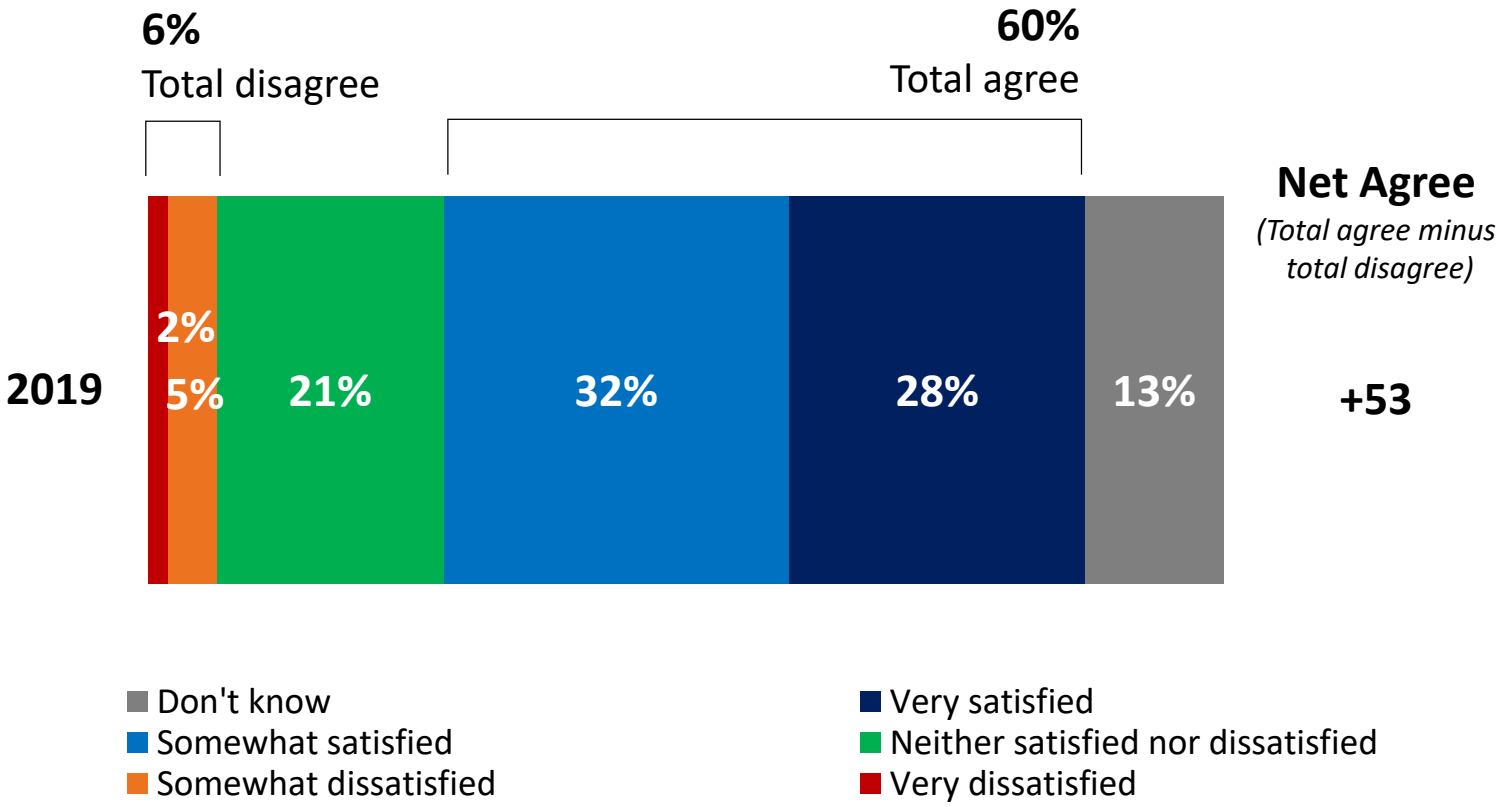


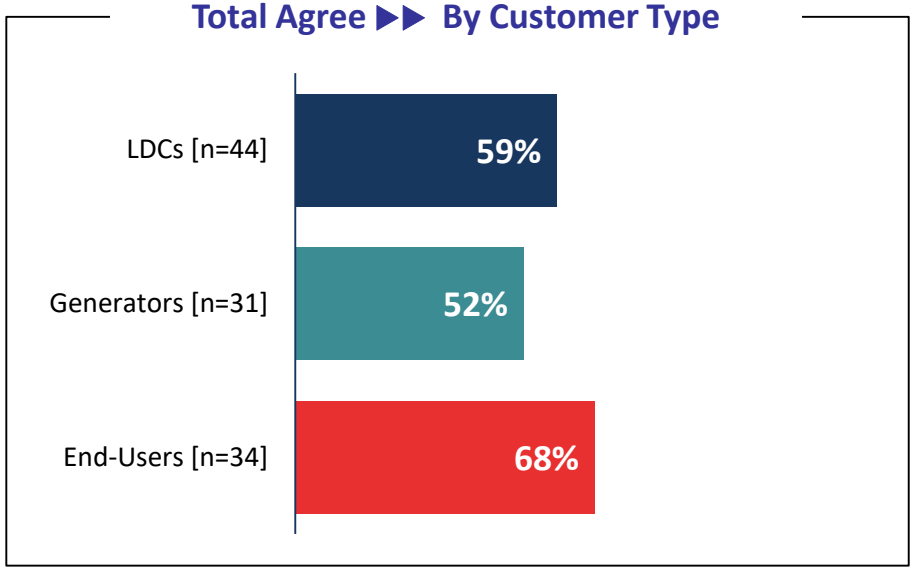
Key Insights

- While most (63%) feel H1 has responsible and competent top level management, 15% *neither agree nor disagree* and an additional 17% *don't know.* There is an opportunity for gains here by shifting customers from ambivalent or unsure to agreement.
- Generators (68%) are most likely to agree on this measure, while End-Users (56%) are least likely.

Impact on Local Community: 3-in-5 (60%) are satisfied with Hydro One's impact on their local community; highest among End-Users

Q How satisfied or dissatisfied are you with the following aspects of Hydro One?
[NEW] D10. Hydro One's impact on your local community.
[Asked of all respondents, n=109]



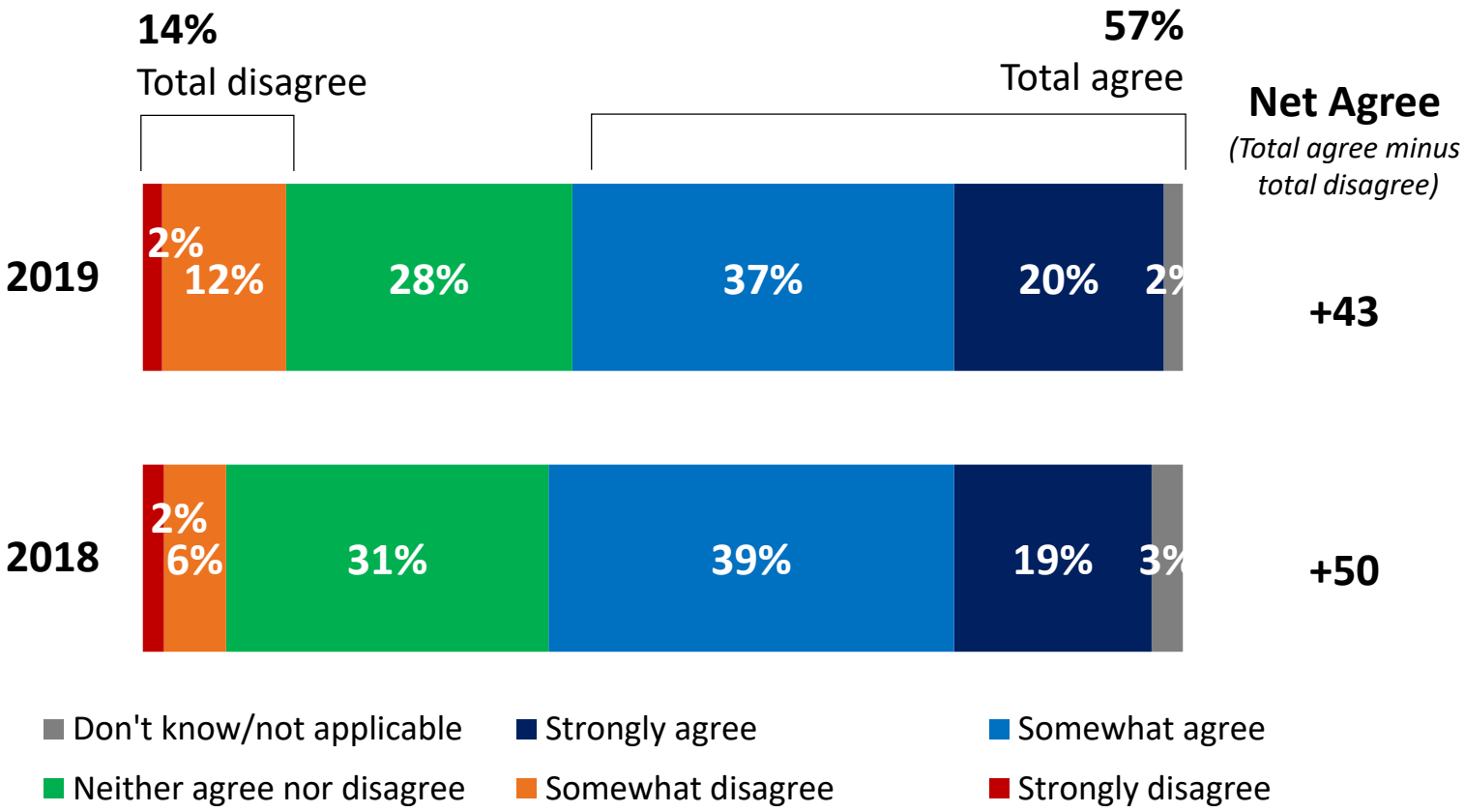


Key Insights

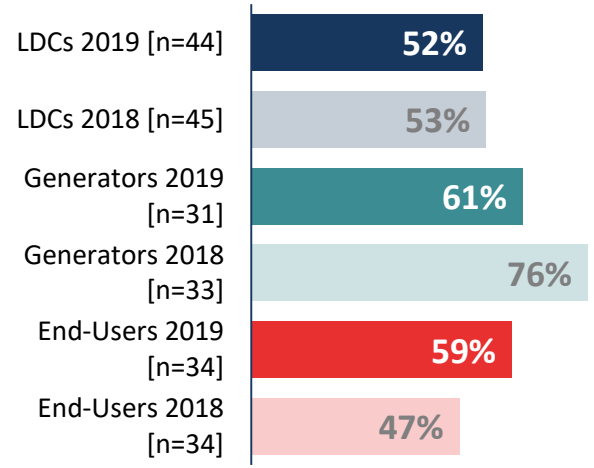
- A majority (60%) of LTX customers are satisfied with Hydro One's impact on their local community. 2-in-10 (21%) are *neither satisfied nor dissatisfied*, leaving an opportunity for gains here by shifting customers from ambivalent or unsure to agreement.
- Agreement is highest among End-Users (68%); slightly lower among LDCs (59%) and Generators (52%).

Value for Money: Majority (57%) agree that Hydro One provides good value for money; net agreement down 7 points from 2018

Q Please indicate if you agree or disagree with the following statements.
D18. Hydro One provides my organization with good value for money.
[Asked of all respondents, n=109]



Total Agree ▶▶ By Customer Type

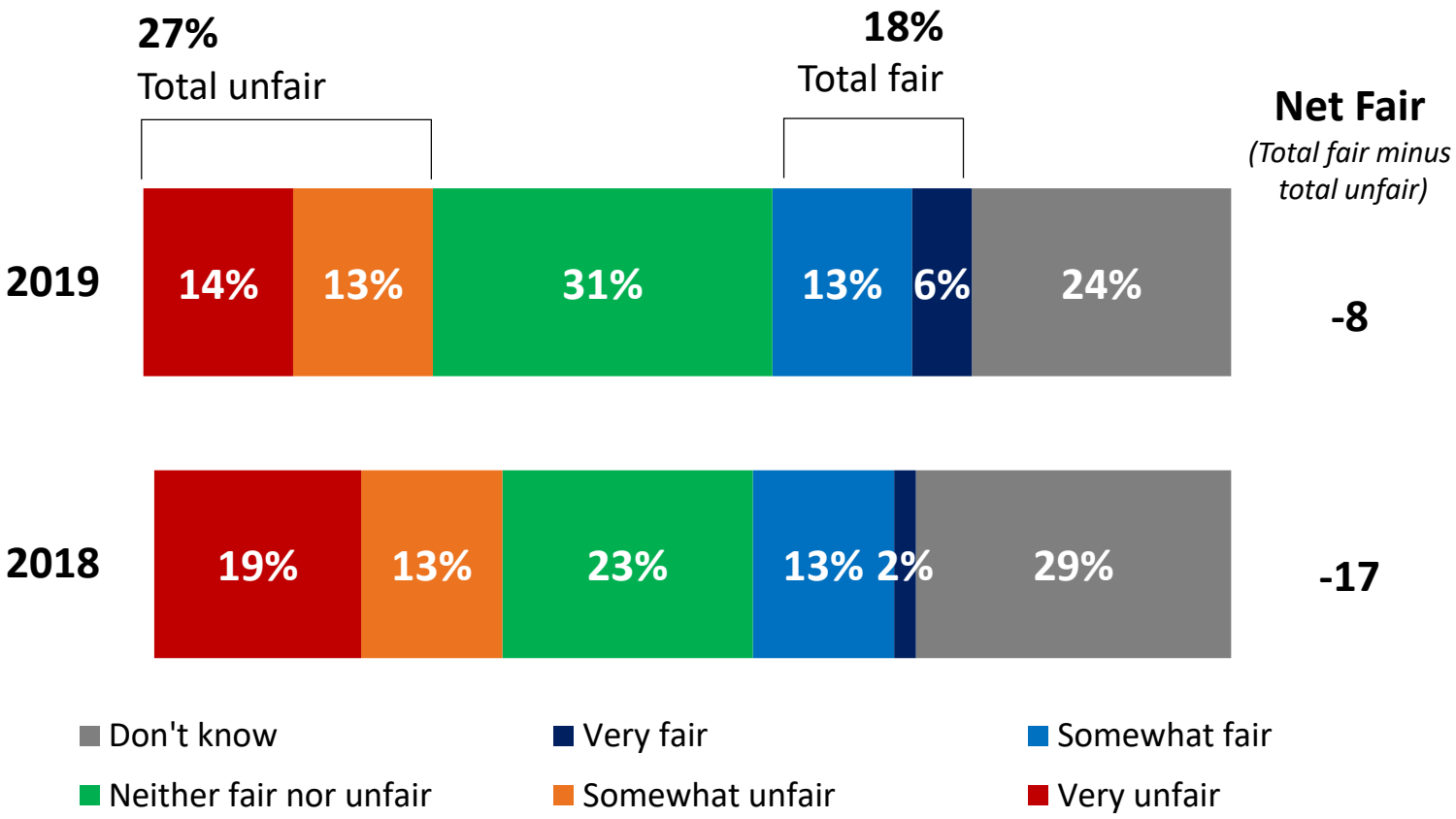


Key Insights

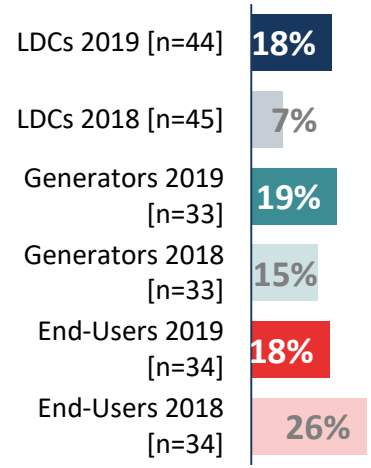
- While agreement (58%) is on par with 2018, *neither agree nor disagree* has decreased and disagreement has increased; dropping net agreement 7 points lower than 2018.
- Nearly 3-in-10 (28%) LTX customers neither agree nor disagree. There is an opportunity for gains here by shifting customers from ambivalence to agreement.
- Generators, though still having highest agreement (61%) have dropped in agreement compared to 2018.

Fairness of the Global Adjustment: Nearly 3-in-10 (27%) feel the GA is unfair, but most are either neutral (31%) or don't know (24%)

G50. How fair do you think the following charges on your bill are?
The Global Adjustment (GA)
[Asked of all respondents, n=109]



Total Fair ▶▶ By Customer Type

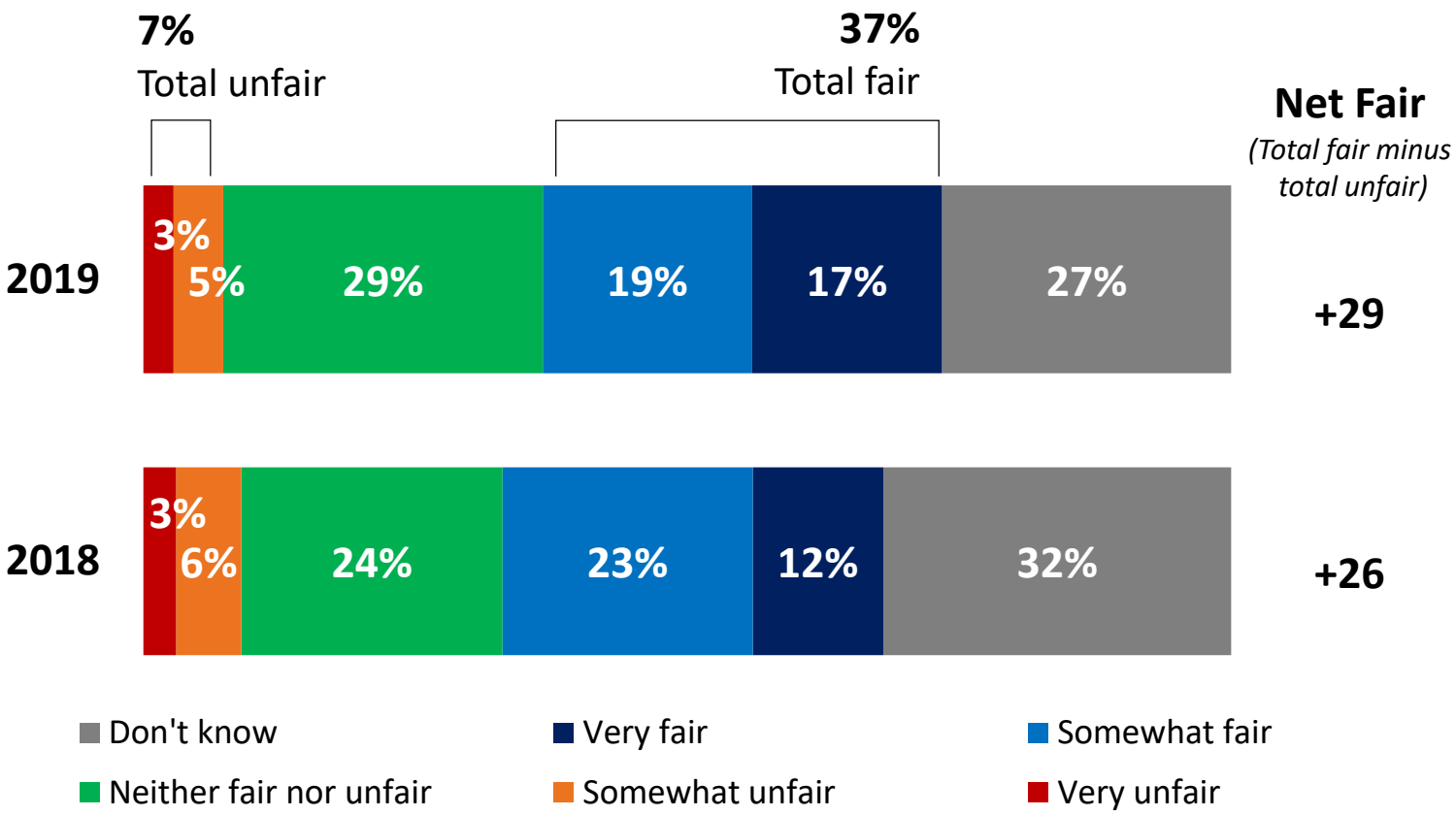


Key Insights

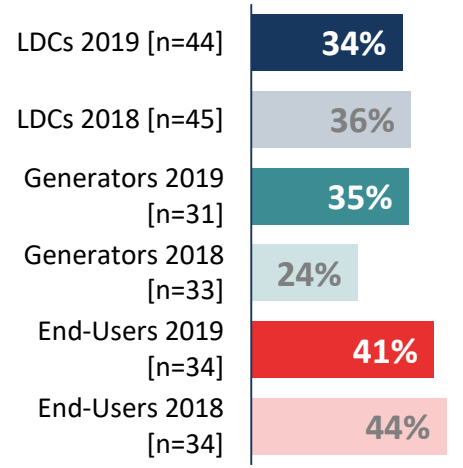
- LTX customers tend to find the GA unfair, but a plurality do not have an opinion one way or the other.
- All user groups are equally likely to find the charge fair.

Fairness of the HOEP: More than one-third (37%) say the HOEP is fair; customers next most likely to say neutral (29%) or don't know (27%)

G51. How fair do you think the following charges on your bill are?
The Hourly Ontario Energy Price (HOEP)
[Asked of all respondents, n=109]



Total Fair ▶▶ By Customer Type



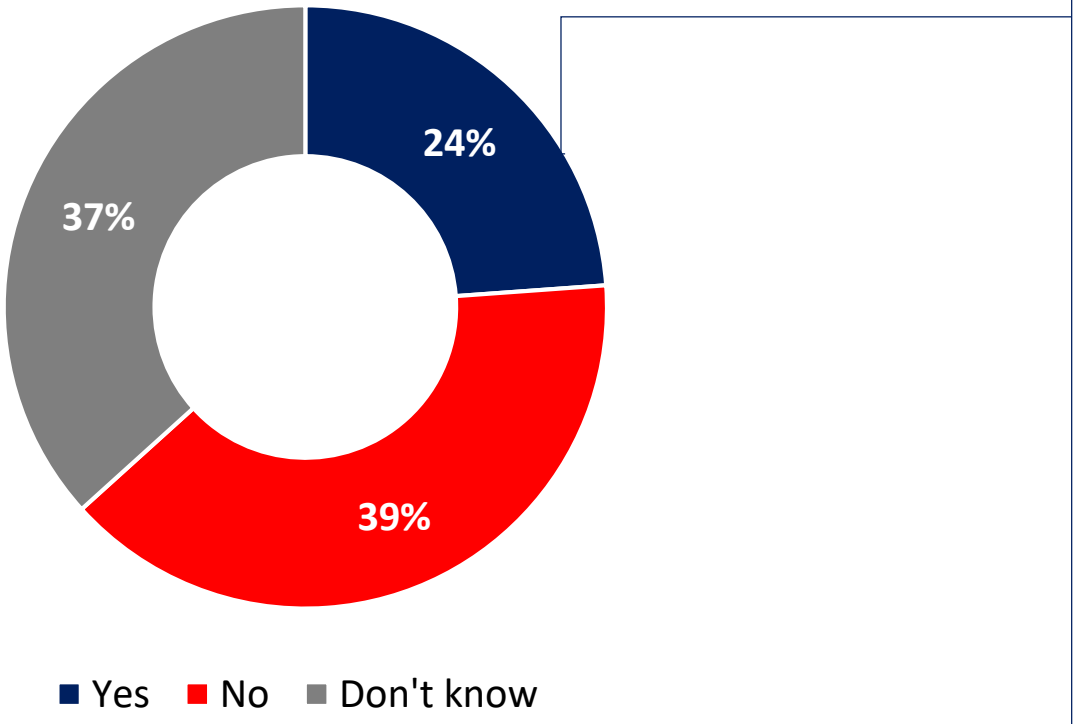
Key Insights

- Most LTX customers don't have an opinion or are ambivalent about the Hourly Ontario Energy Price, but those who do have an opinion are more likely to deem it fair (37%) than unfair (7%).
- End-Users (41%) are marginally more likely to say the HOEP charge on their bill is fair than LDCs (34%) and Generators (35%).

Additional Services: 1-in-4 (24%) LTX customers would look to Hydro One for additional services

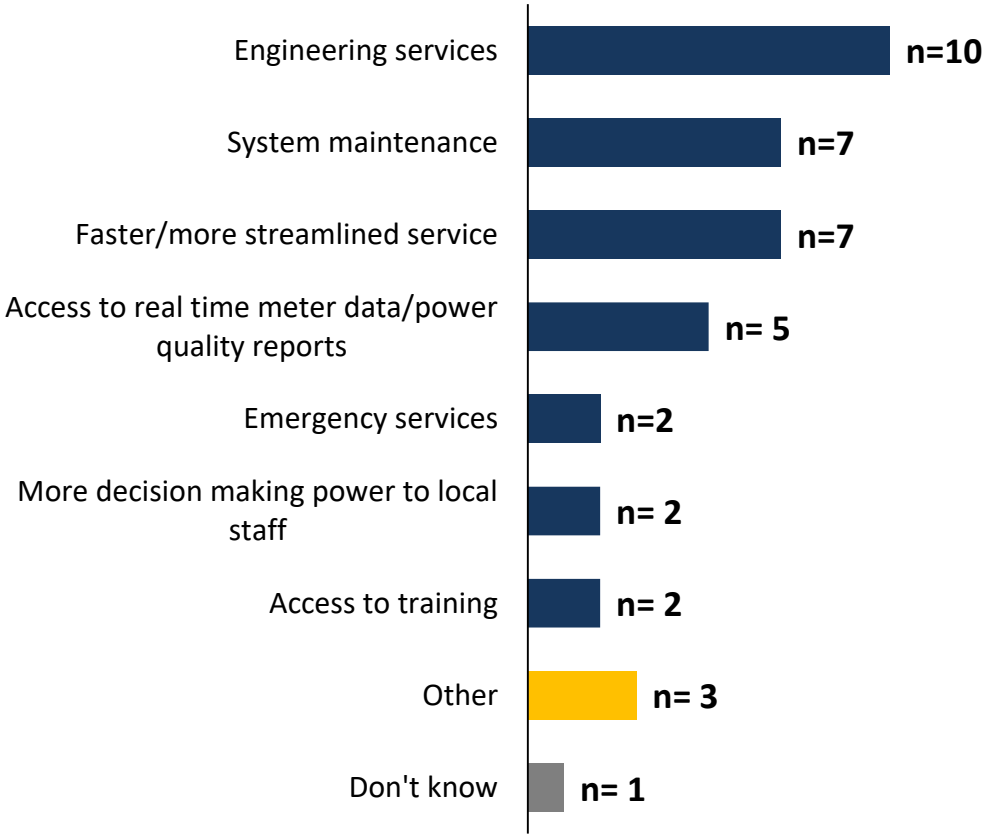
Q **H51.** Are there any additional services that you would look to Hydro One to provide and would be willing to pay for, or perhaps services that are currently offered by Hydro One that could be done differently to better fit your organization's needs?

[Asked of all respondents, n=109]



Q **H52.** Please describe what new services you would like, or how you would like existing services to be changed?*

[Asked of all who said "yes" to previous question, n=26]



NOTE: *Small n-size, interpret with caution.

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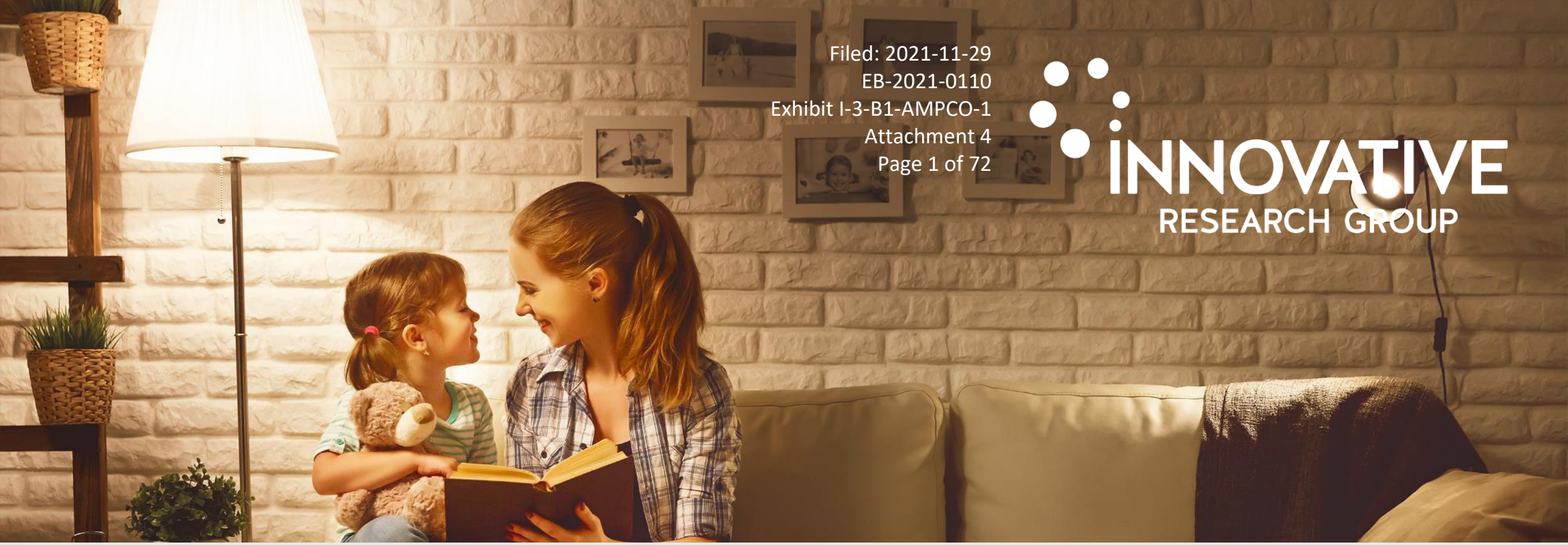
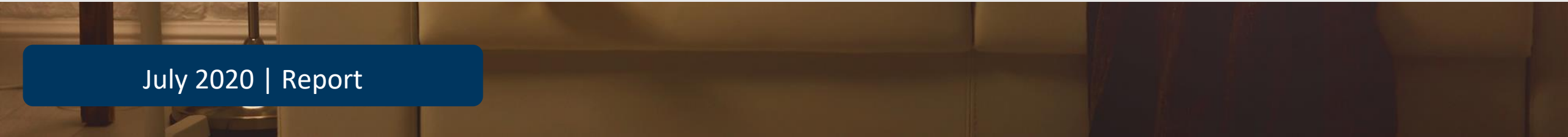


INNOVATIVE RESEARCH GROUP

2020 Large Tx Customer Satisfaction

Understanding Dimensions of Satisfaction and Dissatisfaction

hydro one



July 2020 | Report

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Methodology & Customer Profile

Methodology

The findings presented in this report are based on a customer survey carried out by Innovative Research Group (INNOVATIVE) for Hydro One.

The survey was conducted among large transmission (LTX) customers of Hydro One, from May 5th to July 20, 2020 (a breakdown of customer segments is included in the tables below). Participants were able to complete the survey online or schedule a phone interview. In total, 47 participants completed the survey—all of them chose the online option.

The below tables show the surveyed customer segments and their sample sizes. Most tracking results are based on the 2019 version of the same survey, which had a higher overall response rate and different sample composition.

For the entire sample (n=47), the margin of error around an estimate is +/- 13% at a 95% confidence level. It is even higher for the different sub-samples.

2020

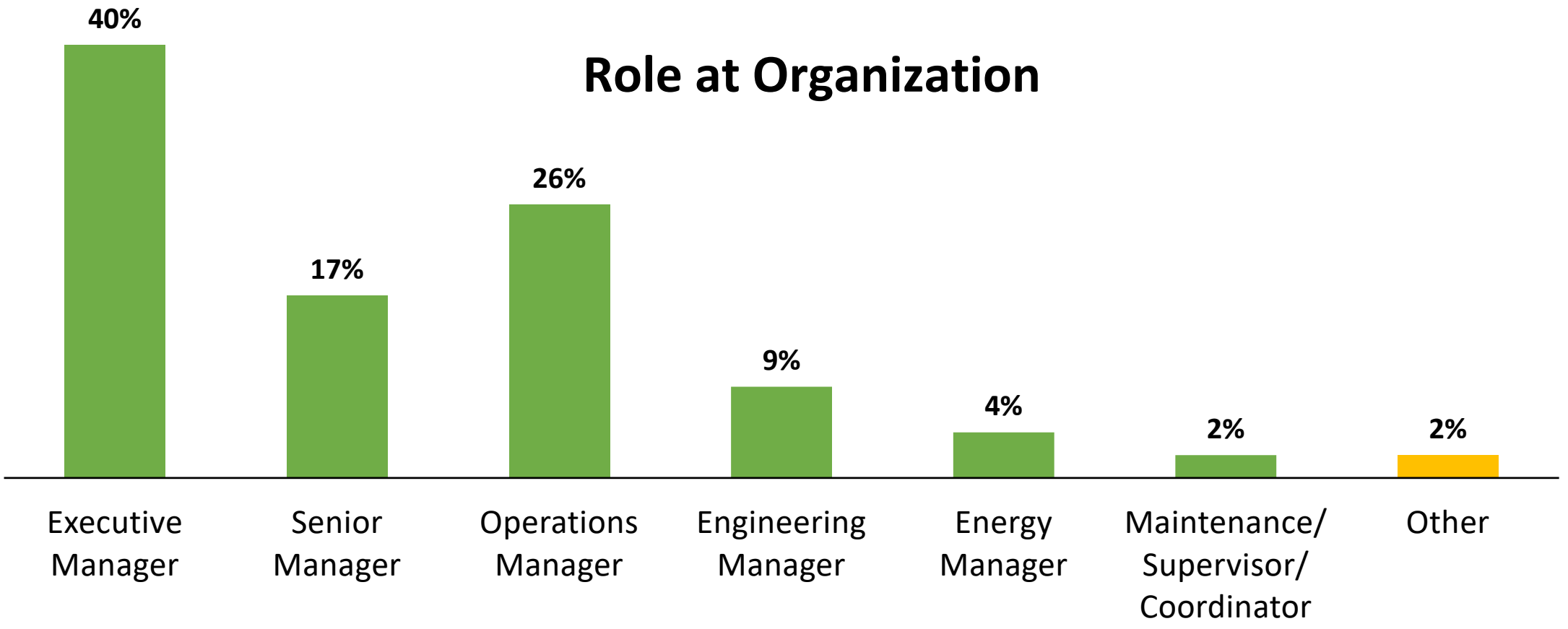
Segment Size	TOTAL LTX	LDCs	Generators	End-Users
Total Population	197	61	71	65
Surveyed	47	22	16	9
% Captured	24%	36%	23%	14%
Sample	100%	47%	34%	19%

2019

Segment Size	TOTAL LTX	LDCs	Generators	End-Users
Total Population	197	61	71	65
Surveyed	109	44	31	34
% Captured	55%	72%	42%	52%
Sample	100%	40%	28%	31%

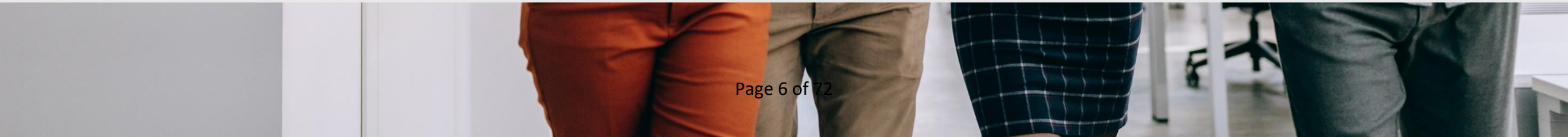
NOTE: *Graphs may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers.*

Firmographics: *LTX Customer Profile*



NOTE: Response "Don't know" (0%) not shown.

Executive Summary



Key Findings | Executive Summary

1 **Overall satisfaction remains high, but marginal downward trend continues.**
Again in 2020, LDCs and Generators are marginally less satisfied than they were a year ago, while End-Users are marginally more satisfied.

2 **Generators and End-Users have a more favourable impression of Hydro One than LDCs.**
Favourable impression among LDCs is ten or more points lower than among the other customer segments.

3 **KAEs and power quality score top marks in satisfaction.**
Satisfaction is highest for service from KAEs and power quality (both at 85%). The lowest levels of satisfaction are for value for money (53%) and rates charged (32%).

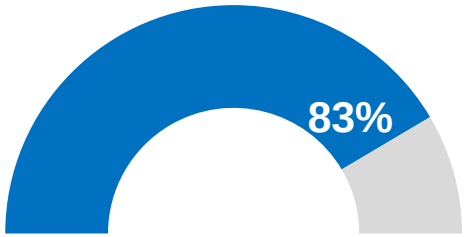
4 **NPS improves as customers shift to Promoters category.**
The proportion of Passive customers decreased 14 points, with most of this group shifting to the Promoters category, resulting in an 8 point gain on NPS landing at +8.

5 **Bills are having more of an impact, and customers feel as protected this year as last year.**
More LTX customers say their hydro bill is impacting their bottom line, but their sense of being protected remains largely unchanged.

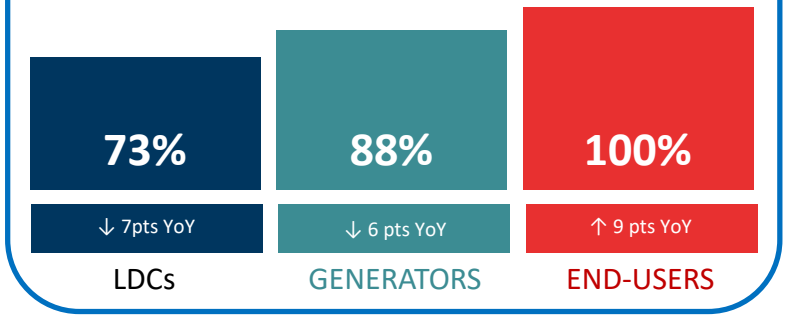
Key Metrics | LTX Customer Satisfaction

OVERALL SATISFACTION

Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?

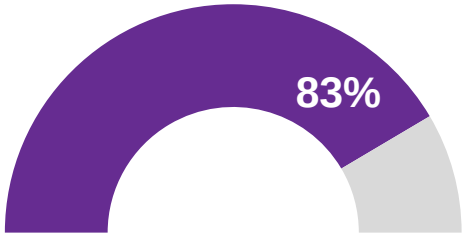


83% of respondents are either **very** or **somewhat satisfied** with service from Hydro One.

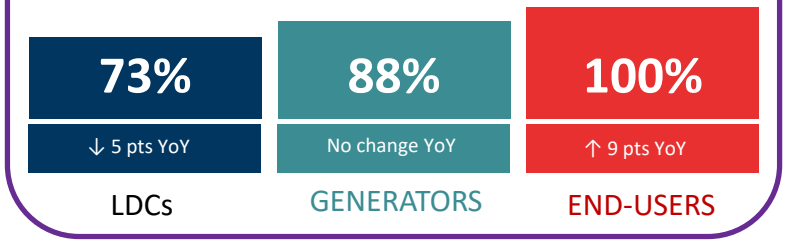


OVERALL IMPRESSION

Now, thinking about your impression of Hydro One more broadly, how would you describe your view of the company?

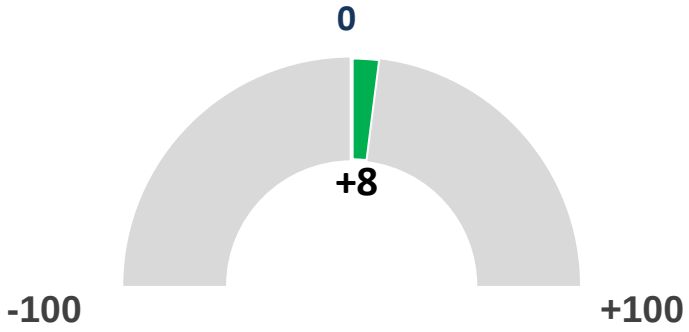


83% of respondents have either a **very** or **somewhat favourable impression** of Hydro One.

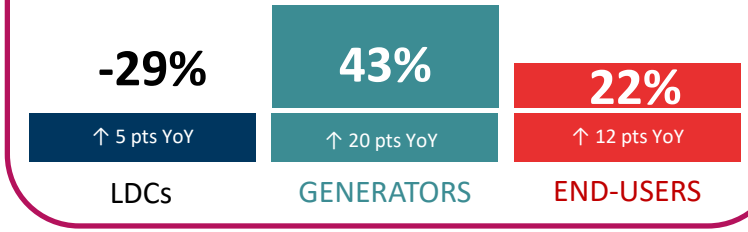


NET PROMOTER SCORE

If you had a choice between several possible providers of electricity, how likely would you be to recommend Hydro One to your colleagues and peers as the preferred electricity utility?

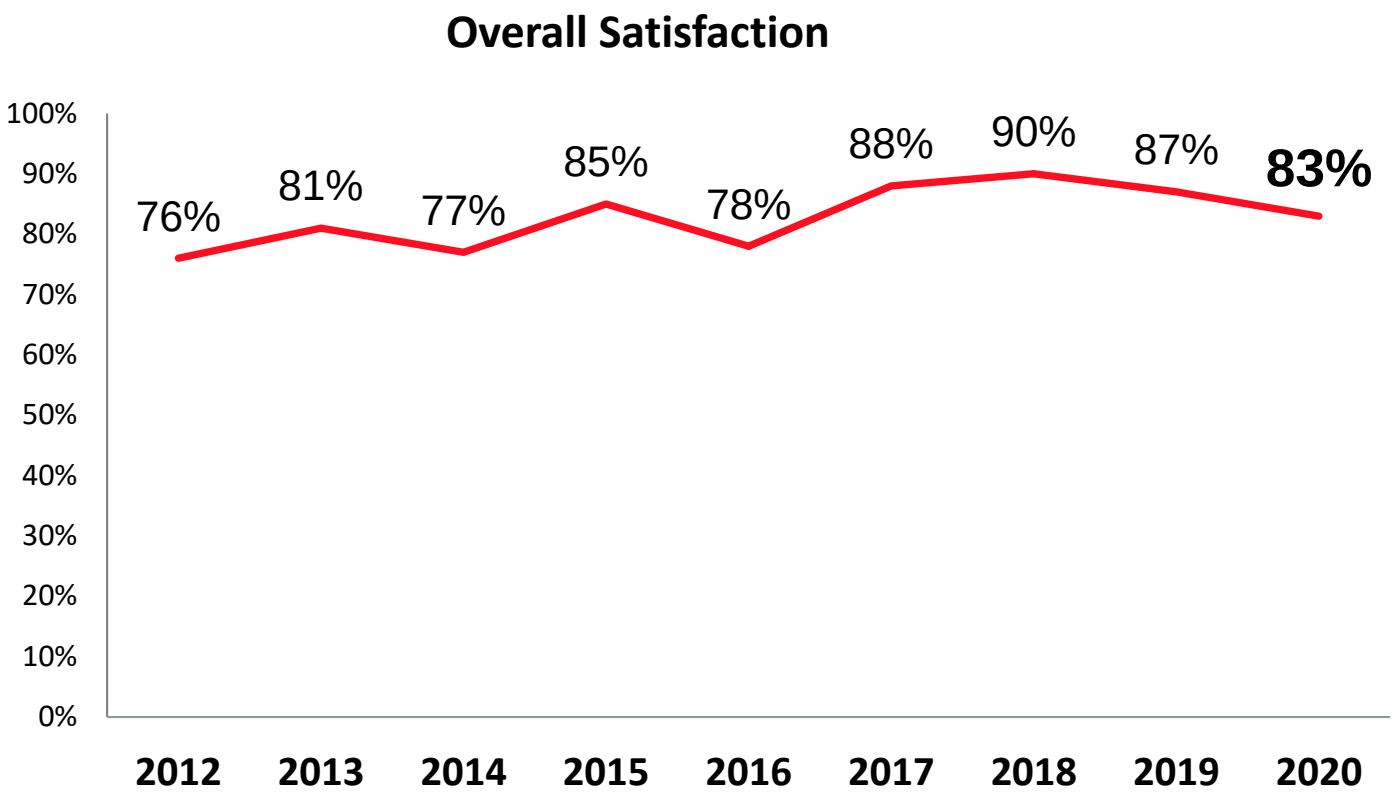


An NPS* of **+8** means that respondents are **more likely to be a promoter than detractor** of Hydro One. Passive respondents are not used in the calculation of NPS, but represent 28% of the sample.



Overall Satisfaction (All LTX): Overall satisfaction remains high, but has dropped seven points since 2018

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?
[Asked of all respondents, n=47]



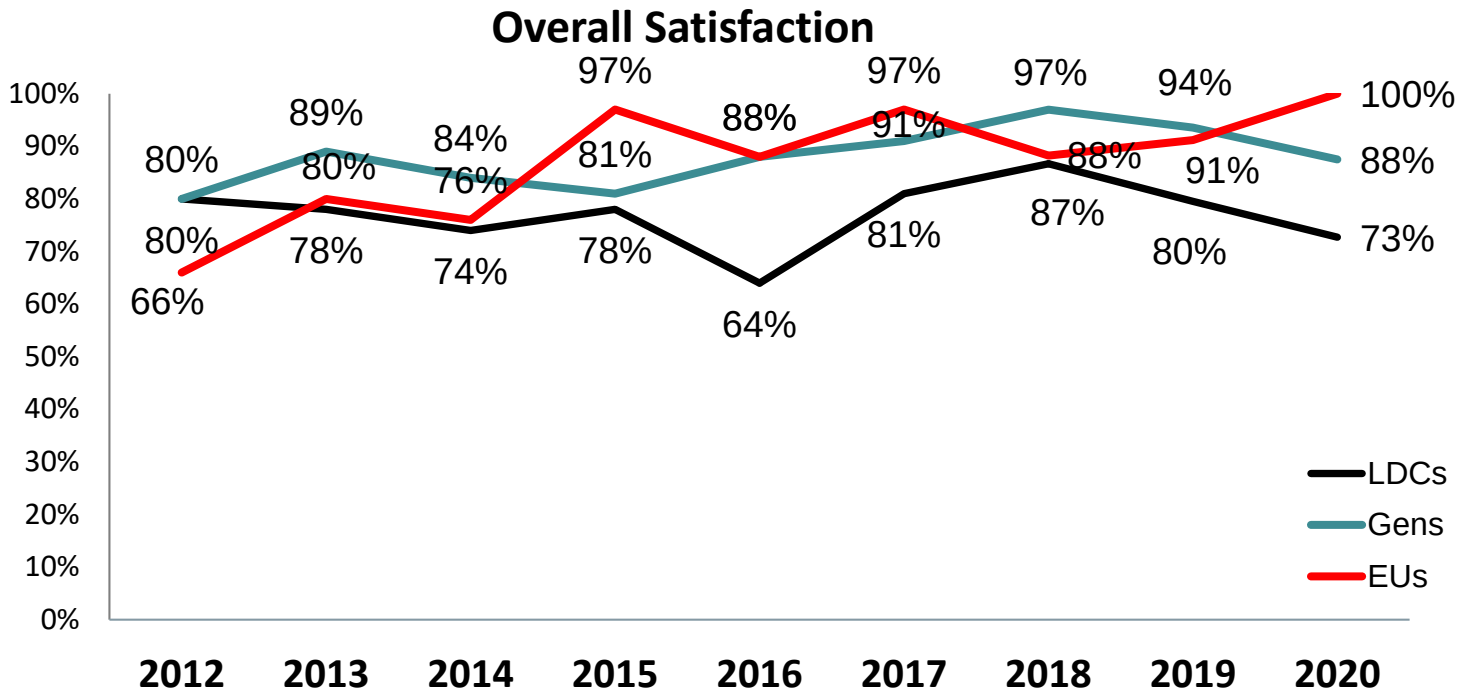
Key Insights

- Overall satisfaction is down four points from 2019.
- Due to the small sample size (n=47), this is not a statistically significant change.
- Nearly half (45%) say they are “very satisfied” with the service from Hydro One.

NOTE: Response “don't know" was excluded from this analysis until 2017 (Don’t know 0% for 2017,2018). “Don’t know” (1%) included in 2019 and 2020 (2%).
Statistically significant changes compared to the results from 2019 are indicated by ↑↓.

Overall Satisfaction (By Customer Type): Of the three groups, LDCs show lowest satisfaction and a drop of 14 points since 2018

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?



	2012	2013	2014	2015	2016	2017	2018	2019	2020
LDCs	80%	78%	74%	78%	64%	81%	87%	80%	73%
Gens	80%	89%	84%	81%	88%	91%	97%	94%	88%
EUs	66%	80%	76%	97%	88%	97%	88%	91%	100%

NOTE: Response "Don't know" (0% in 2017 & 2018) was excluded from this analysis. “Don’t know” (1%) included in 2019.

Key Insights

- Generator satisfaction drops 6 points compared to 2019.
- LDCs drop 7 points for the second year in a row and remains the least satisfied of the three groups.
- End-Users up from 2019.
- Due to the small sample sizes, these are not statistically significant changes.

LTX Customer Type	Total Population	Sample Size
LDCs	61	22
Generators	71	16
End-Users	65	9

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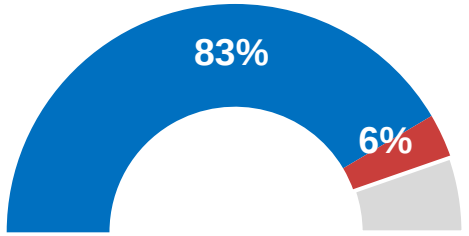
Dimensions of Satisfaction | LTX

Overall Impression*

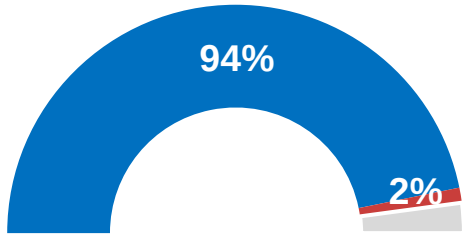
D6. Now, thinking about your impression of Hydro One more broadly, how would you describe your view of the company?



Total Satisfaction ▶▶ By Customer Type

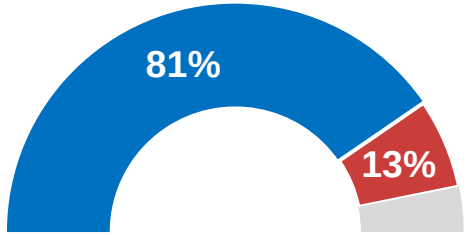
Overall Satisfaction with Customer Service

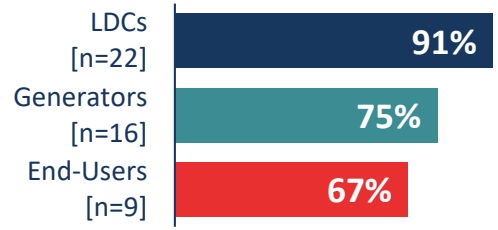
F30. Overall, how satisfied or dissatisfied are you with the customer service provided to your organization by Hydro One?



Overall Satisfaction with Reliability

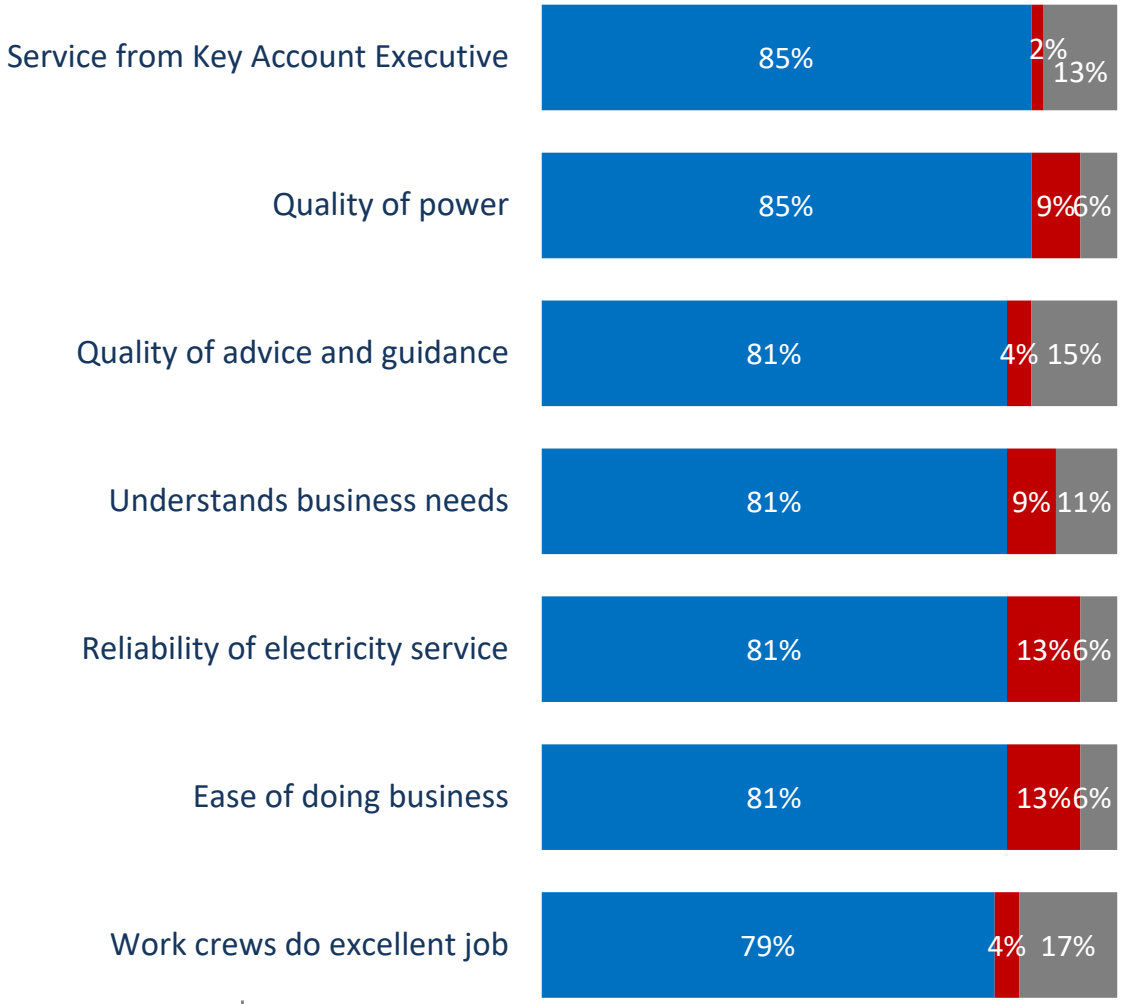
E20. For each statement, please indicate your level of satisfaction or dissatisfaction: The reliability of your electricity service (as judged by the number of unplanned power outages your organization experiences).

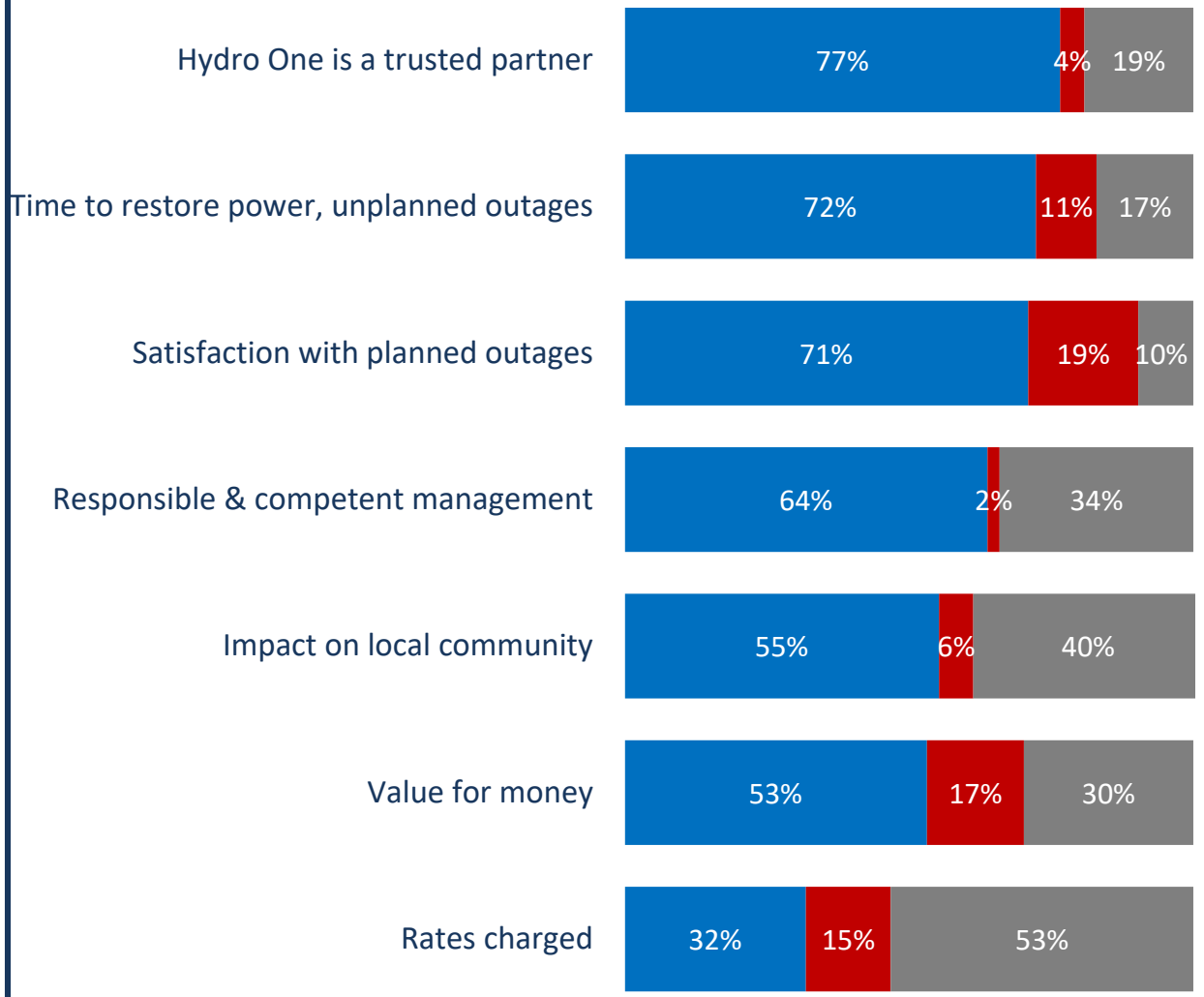




Note: Percentages represent total satisfied/dissatisfied (very and somewhat), or top and bottom two collapses for 5-point scales. *Overall impression represents total favourable/unfavourable.

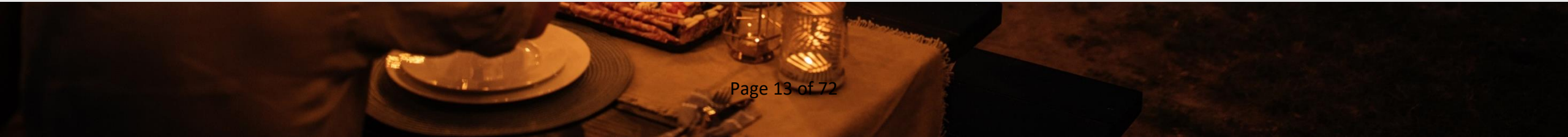
Dimensions of Satisfaction | Details





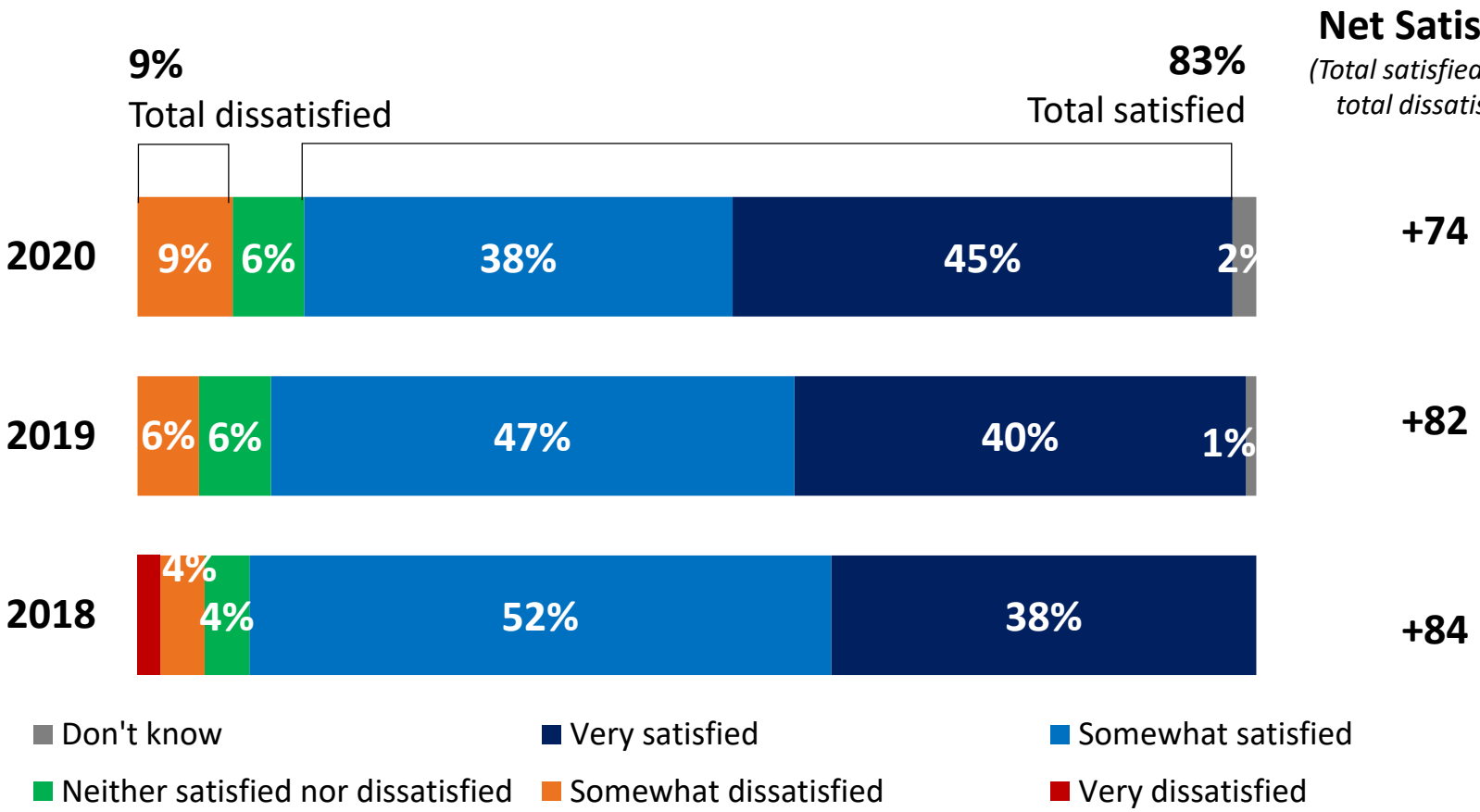
Satisfied/Agree | Dissatisfied/Disagree | Don't know/Neither

Customer Satisfaction



Overall Satisfaction: More than 8-in-10 (83%) LTX customers are satisfied with service; net satisfaction has dropped 10 points since 2018

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?
[Asked of all respondents, n=47]

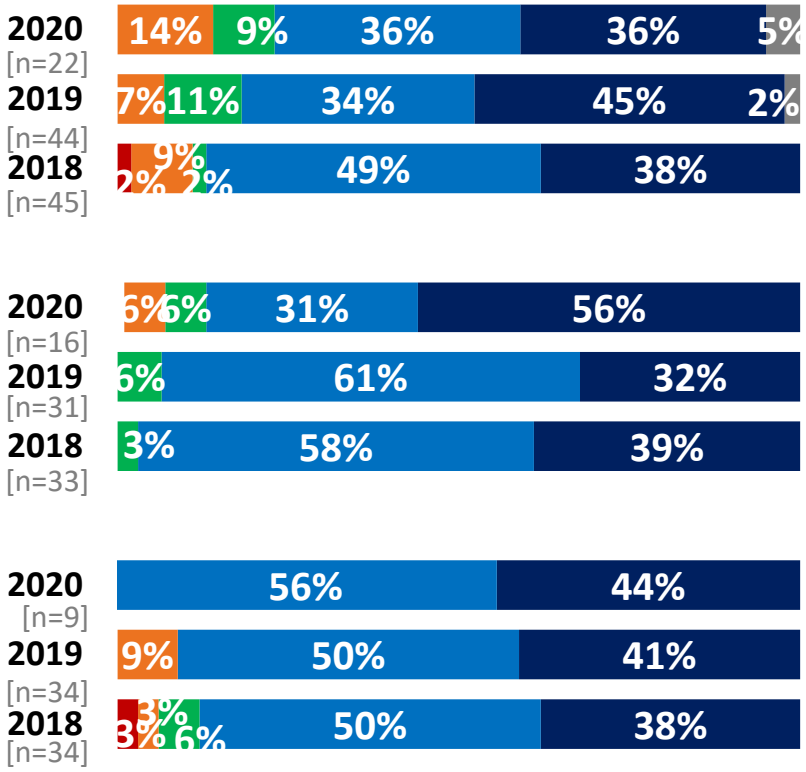


Key Insights

- Majority (83%) are satisfied with Hydro One, and intensity continues in an upward trend.
- Net satisfaction, after a slight dip in 2019, has dropped another eight points, but still remains high (+74).

Overall Satisfaction by Type: Highest satisfaction, overall, among End-Users (caution: very small sample size)

C2. Overall, how satisfied or dissatisfied are you with the service your organization receives from Hydro One?
[Asked of all respondents; 2020 LDC n=22, Gen n=16, EU n=9]



	Total Dissatisfied	Total Satisfied	Net Satisfaction
LDCs 2020 [n=22]	14%	73%	+59
LDCs 2019 [n=44]	7%	80%	+73
LDCs 2018 [n=45]	11%	87%	+76
Generators 2020 [n=16]	6%	88%	+81
Generators 2019 [n=31]	-	94%	+94
Generators 2018 [n=33]	-	97%	+97
End-Users 2020 [n=9]	0%	100%	+100
End-Users 2019 [n=34]	9%	91%	+82
End-Users 2018 [n=34]	6%	88%	+82

Don't know
Somewhat satisfied
Somewhat dissatisfied
Very satisfied
Neither satisfied nor dissatisfied
Very dissatisfied

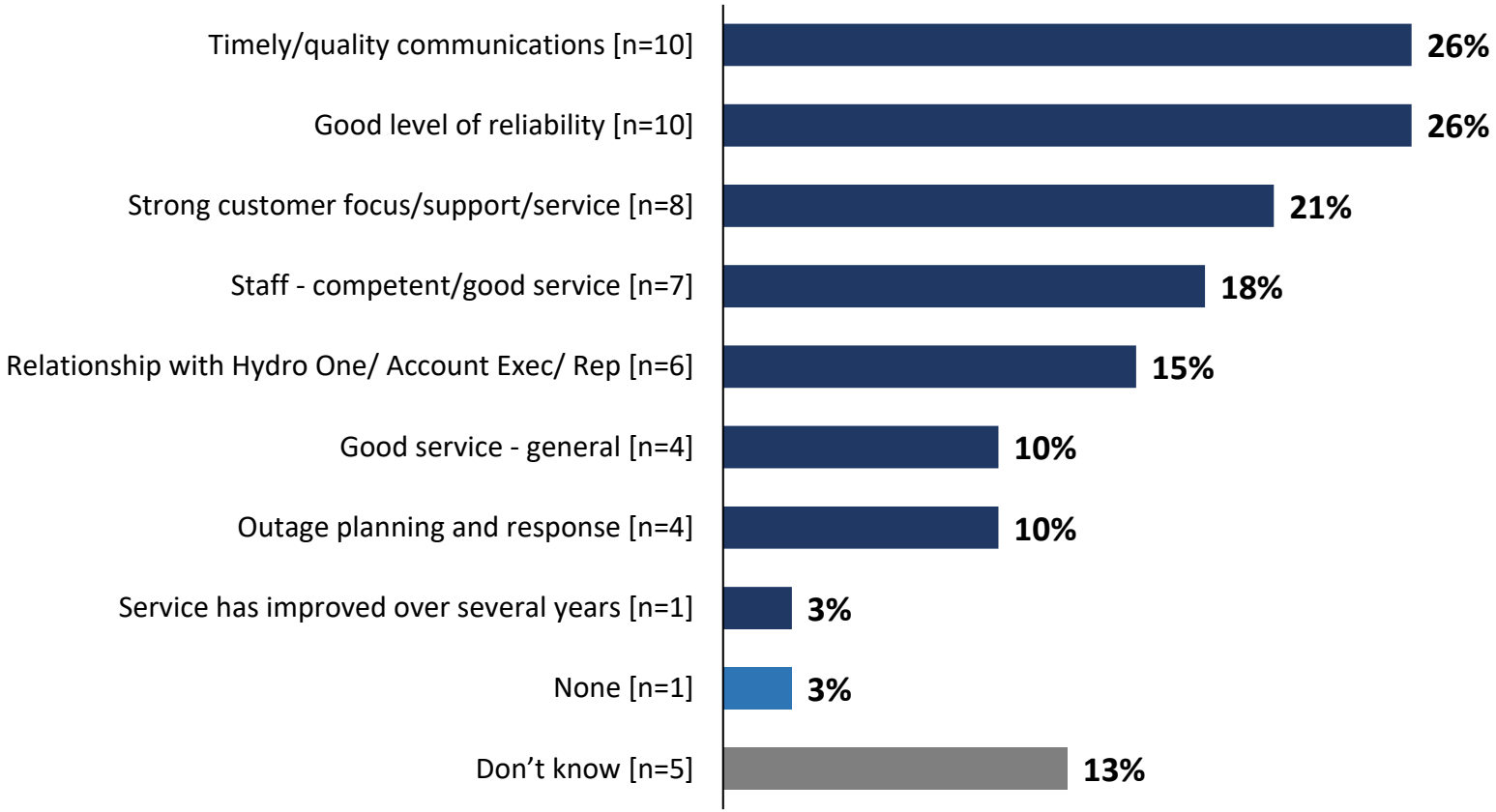
Key Insights

- Note: all results are directional and should be considered qualitative only.

Reasons for Satisfaction: Top reasons include timely and quality communications, reliability, and strong customer focus

C3. Is there any particular reason why you're satisfied with the service your organization receives from Hydro One?

[Asked of those that are somewhat or very satisfied, open-ended, n=39]



Key Insights

- The top three reasons listed for satisfaction with service include timely/quality communications (n=10), a good level of reliability (n=10), and strong customer support (n=8).

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Reasons for Satisfaction | Selection of Verbatim

Q **C3.** Is there any particular reason why you're satisfied with the service your organization receives from Hydro One?

[Asked of those that are somewhat or very satisfied, open-ended, n=39]

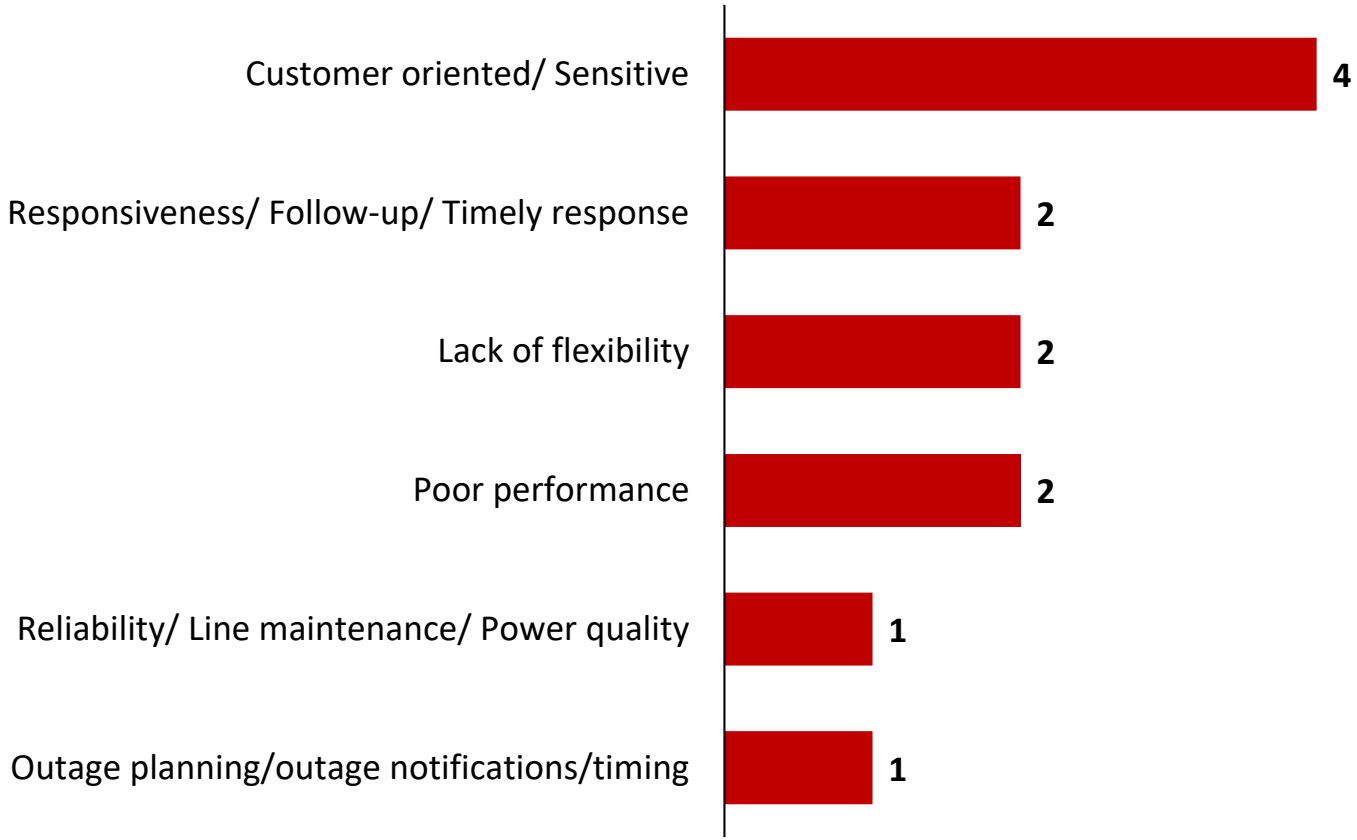
Verbatim
"We generally receive reliable service and we are notified of planned/impending interruptions in advance."
"Dependable service and easy to work regarding flexibility in outages."
"Hydro One deals for the most part with any of our concerns and requests in a timely manner. Easily contactable and responds in a timely manner."
"We meet three times per year with a structured meeting agenda to discuss current issues and future plans, and between meetings we have conference calls and e-mail notes back and forth as required to discuss and resolve issues collaboratively."
"Hydro One does a great job in communicating their maintenance and restoration plans."
"We are in regular contact with our AE and NMO. Responses to any issue or inquiry that we have are received promptly. From a technical perspective, Hydro One's supply to our distribution system has been extremely reliable."

Verbatim
"Collaboration is not always perfect in some regions. But generally it is very good compared to some other utilities."
"Easy access to contacting control room for emergencies or information in general; Hydro One account manager as single point of contact."
"Hydro One has been very responsive to needs relating to reliability, contingency planning and addition of new loads."
"Currently we are upgrading our transformer station and have been working directly with Hydro One during the process. Throughout the process the assistance we have received from the Hydro One team has been exceptional."
"Our account representative, John Blackburn, is always ready to support us and to point our staff in the right direction of the person they need to talk to resolve any issues. In addition our work with Hydro One on regional planning has been well coordinated and productive."
"Hydro One had their employees work with Bell employees to restore communication to our wind farm on a beautiful Sunday afternoon when everyone wanted to be somewhere else. I was very happy with their response and getting the Farm back online."

Reasons for Dissatisfaction: Very few are dissatisfied. Those who are, may attribute it to customer sensitivity and responsiveness

C4. Is there any particular reason why you're dissatisfied with the service your organization receives from Hydro One?

[Asked of those who were somewhat or very dissatisfied, open-ended, n=4]



NOTE: Multiple mentions were recorded in this open-ended question. As such, numbers may add up to more than n=7 .

Key Insights

- Due to the very small sample size, any insights on reasons for dissatisfaction are entirely qualitative in nature.

Verbatim

"As an embedded LDC customer to Hydro One we have different needs that the majority of Hydro One's large users. It has been very challenging to accomplish minor tasks such as simple single pole attachments on Hydro One poles for example."

"Dealing with Hydro One takes too long to get the permissions we need for our projects."

"Loss of supply remains single biggest issue."

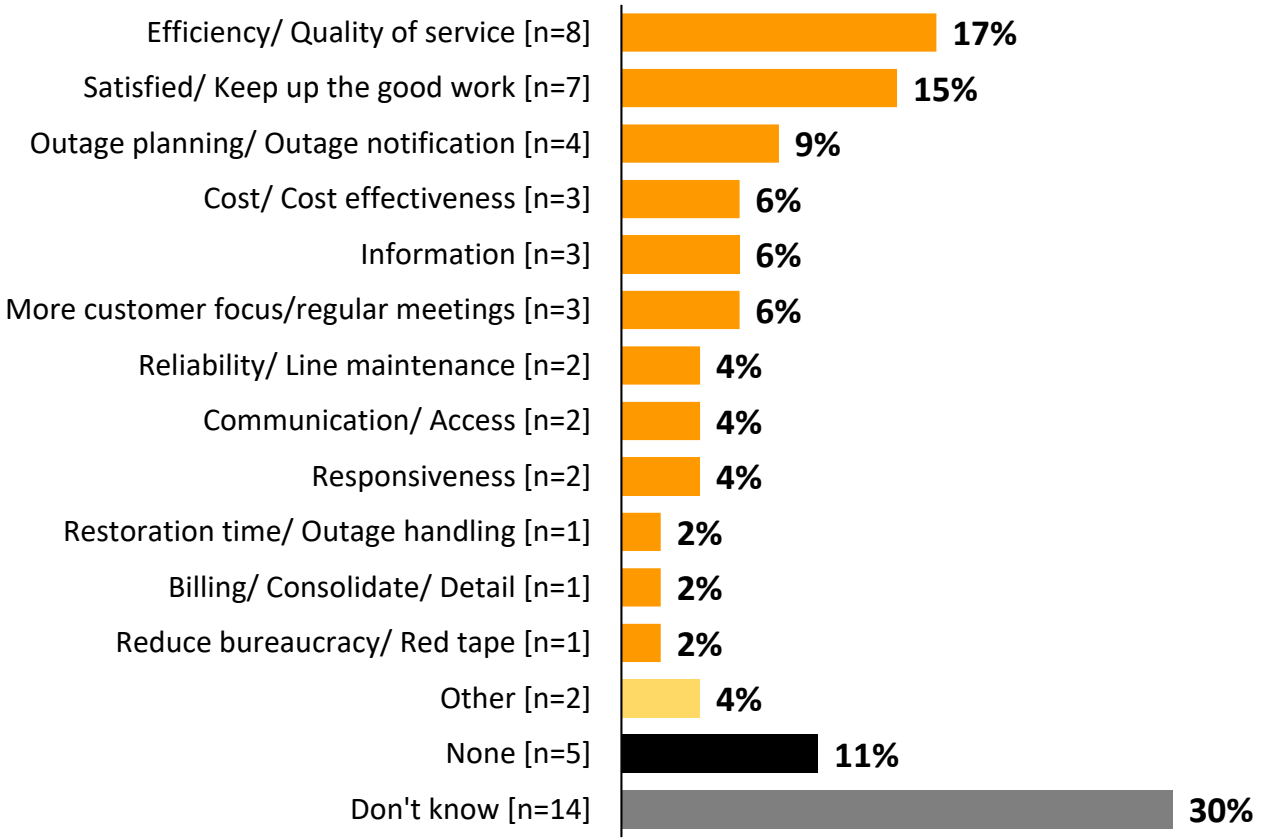
"Our Account Executive does an excellent job across the board - front end planning projects, coordinating, and supporting technical inquiries. It would be ideal if others within Hydro One lived up to the standards set by our AE. We typically find Hydro One slow to move on projects, difficult to coordinate outages with, and very rigid in project planning. Often we find DCR times to be far longer than it took us to produce the documents under review. Similarly, we've had trouble getting communications with COVER coordinators to be expedient with clear and consistent requirements."

Overall Areas of Improvement: 2-in-5 (40%) have nothing or don't know what to suggest; top mention is efficiency

Q

C5. Is there anything in particular that Hydro One can do to improve its services to your organization?

[Asked of all respondents, open-ended, n=47]



Key Insights

- A majority (55%) of LTX customers have nothing to suggest (11% say "none" and another 30% don't know), or they are satisfied (15%).
- "Efficiency/Quality of service" tops the list of specific suggestions at 17%, followed by "outage planning/notification" (9%).

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Overall Areas of Improvement | Selection of Verbatim

C5. Is there anything in particular that Hydro One can do to improve its services to your organization?

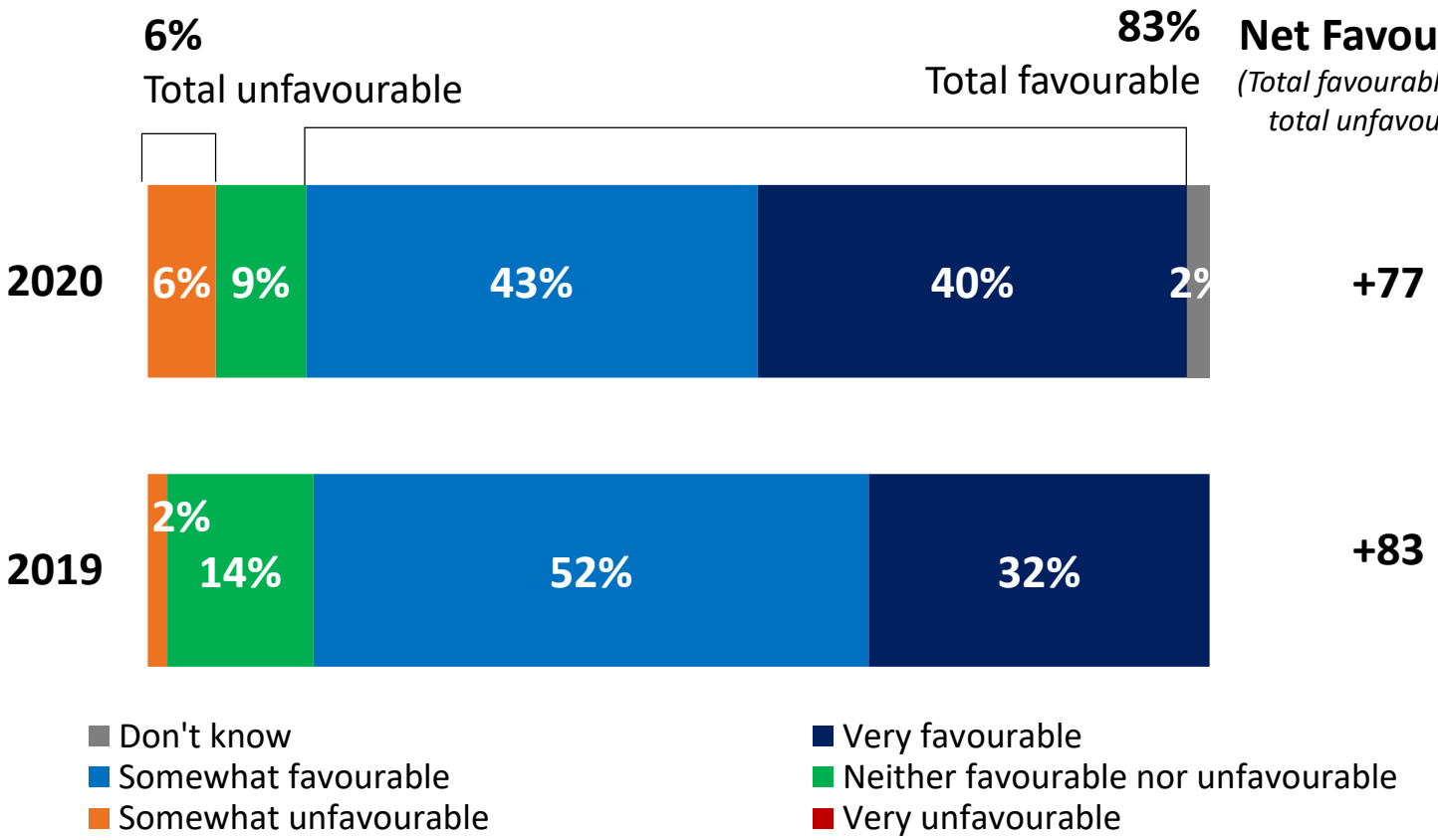
[Asked of all respondents, open-ended, n=47]

Verbatim
“Improve human performance by field staff and continue to advance asset management strategies with a sense of urgency.”
“Wait times from OGCC have increased and call backs when a message is left is rarely returned.”
“Hydro One needs to follow through with commitments made to customers around timelines for supply and capacity upgrades to an area. I find Hydro One has a lot of role turnover which tends to lead to area projects having to be re-initiated to a newly assigned reps to bring them up to speed which starts the whole area project prioritization process all over again, leading to years of delays.”
“Scheduling site meetings in a timely manner and overall operations communications would be appreciated.”
“Communicate outage specifics that require my involvement further in advance. The planners do a good job but when it gets close to the outage, sometimes the field staff have expectations that we were not made aware of. If my assistance is required for outage tasks and I only get a week's notice, I may not be able to assist.”
“Schedule outages at night, in winter or in fall/spring (in order of preference). As an owner of solar plants, our revenues are made during the day only.”

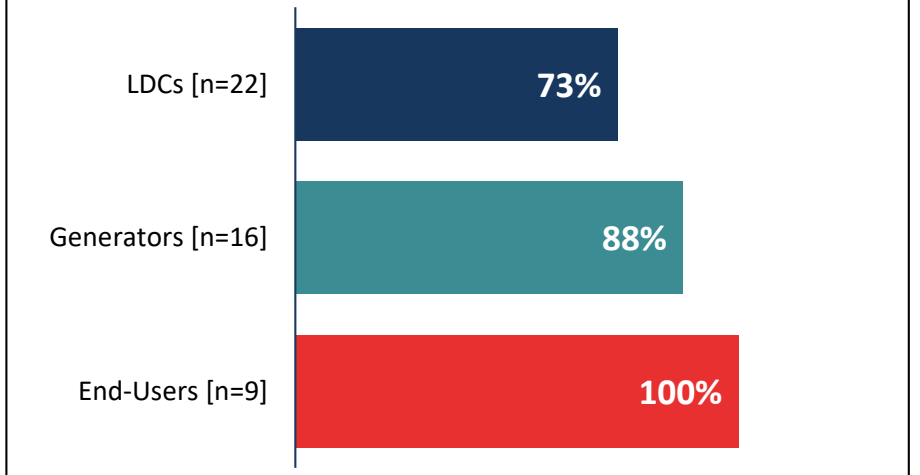
Verbatim
“Hydro One can lower the costs of its capital projects requiring capital contributions from customers. Hydro One is an expensive company to deal with. Hydro One can also be inflexible at times and not coordinated with its customers at other times.”
“Organizational agility - when engagement requires multiple internal stakeholders or divisions to coordinate and collaborate, response tends to be extremely slow.”
“Hydro One can increase project execution times, apply consistency with the COVER process, and increase DCR review times. Our existing AE is fantastic and has done excellent work with us. Please don't change our AE.”
“Continue to include us in outage planning processes. We find this valuable as it allows us to manage risks associated with loss of supply events that would impact our Customers.”
“In the context of relations, with high turnover in the account executive position, we rarely hear from our account exec, and when we do, they typically are unable to help, or simply don't have the experience to provide the input/help/answers we need.”

Overall Impression: More than 8-in-10 (83%) say they have a favourable impression, down slightly on net year-to-year

D6. Now, thinking about your impression of Hydro One more broadly, how would you describe your view of the company?
[Asked of all respondents, n=47]



Total Favourable ▶▶ By Customer Type



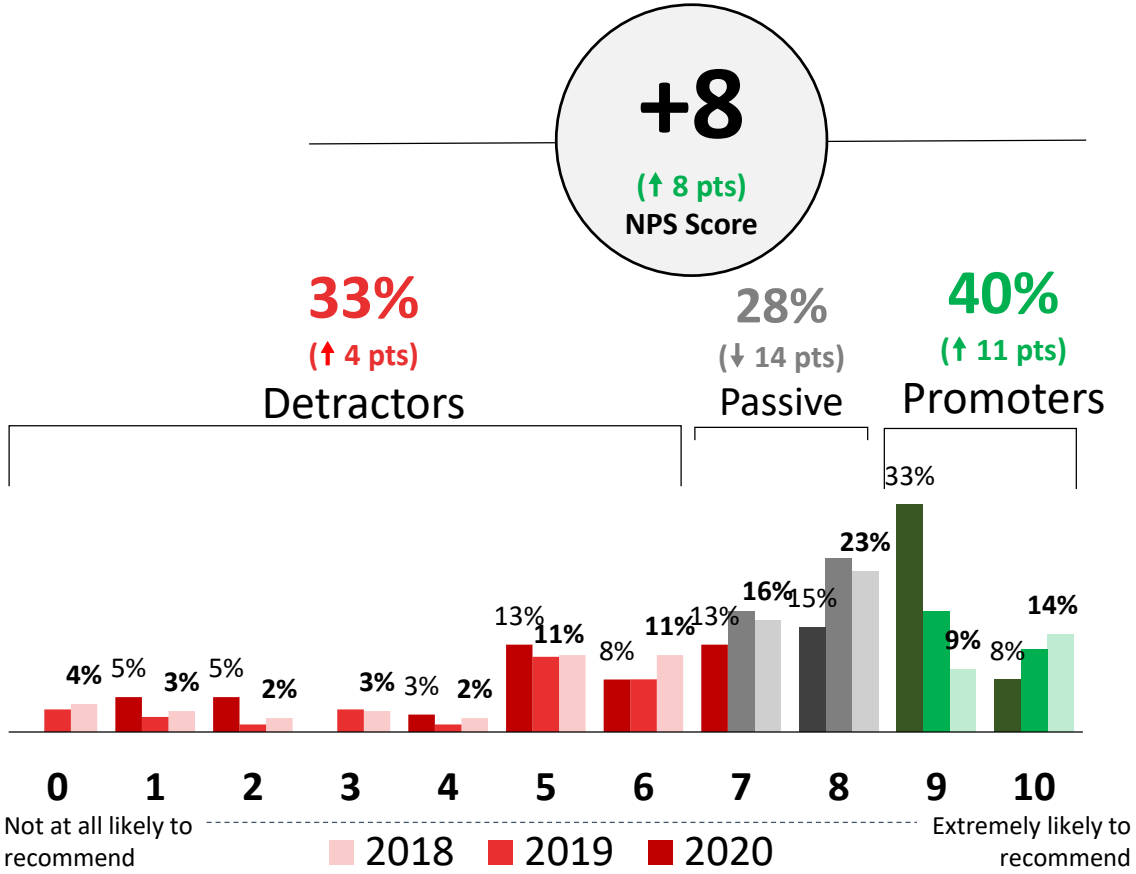
Key Insights

- A strong majority (83%) of LTX customers have a favourable impression of Hydro One. They are about as likely to have a *somewhat* favourable (43%) impression as a *very* favourable (40%) one.
- Net favourable has dipped six points (+83 to +77) since 2019.

Net Promoter Score: Overall NPS is +8, up eight points since 2019; 4-in-10 (40%) now would promote Hydro One to their peers

Q **H62.** If you had a choice between several possible providers of electricity, how likely would you be to recommend Hydro One to your colleagues and peers as the preferred electricity utility? Please use a scale from 0 to 10, where 0 means you would not be at all likely to recommend Hydro One to others and 10 means you would be extremely likely to recommend.

[Asked of all respondents, n=47]



	NPS	=	Promoters	-	Detractors		Passive
LDCs < Generators	-29	=	18%	-	47%		35%
Generators > LDC	+43	=	57%	-	14%		29%
End-Users	+22	=	56%	-	33%		11%

Key Insights

- NPS is positive (+8%) among LTX customers, with very few **strong** detractors (0-4).
- Among a small subsample, Generators are most likely to recommend Hydro One; LDCs least likely.

NOTE: New question in 2018. NPS scores run on a scale from -100 to +100. Response "Don't know" (15%) is excluded from the calculation of the NPS.

Drivers of CSAT outside of Hydro One's control

It is important to distinguish between what is within, and what is outside of Hydro One's influence or control when it comes to drivers of customer satisfaction.

Perceptions of electric companies often tend to move with general perceptions of ***provincial government management in the sector*** rather than in response to the local utility.

In addition, perceptions of utilities are also strongly correlated with **financial circumstances**. In tough times perception and preference can change because customers are struggling with their bills, not because of anything the company has, or has not, done.

Control questions help distributors distinguish between:

a) utility driven programs that impact CSAT; and

b) uncontrollable external drivers that impact CSAT.

When conducting **brand research** in the energy sector, INNOVATIVE often tests multiple environmental control to assess what role predispositions (customer values and beliefs – which can be difficult and costly to change) play in the formation of a utility's brand health and reputation.

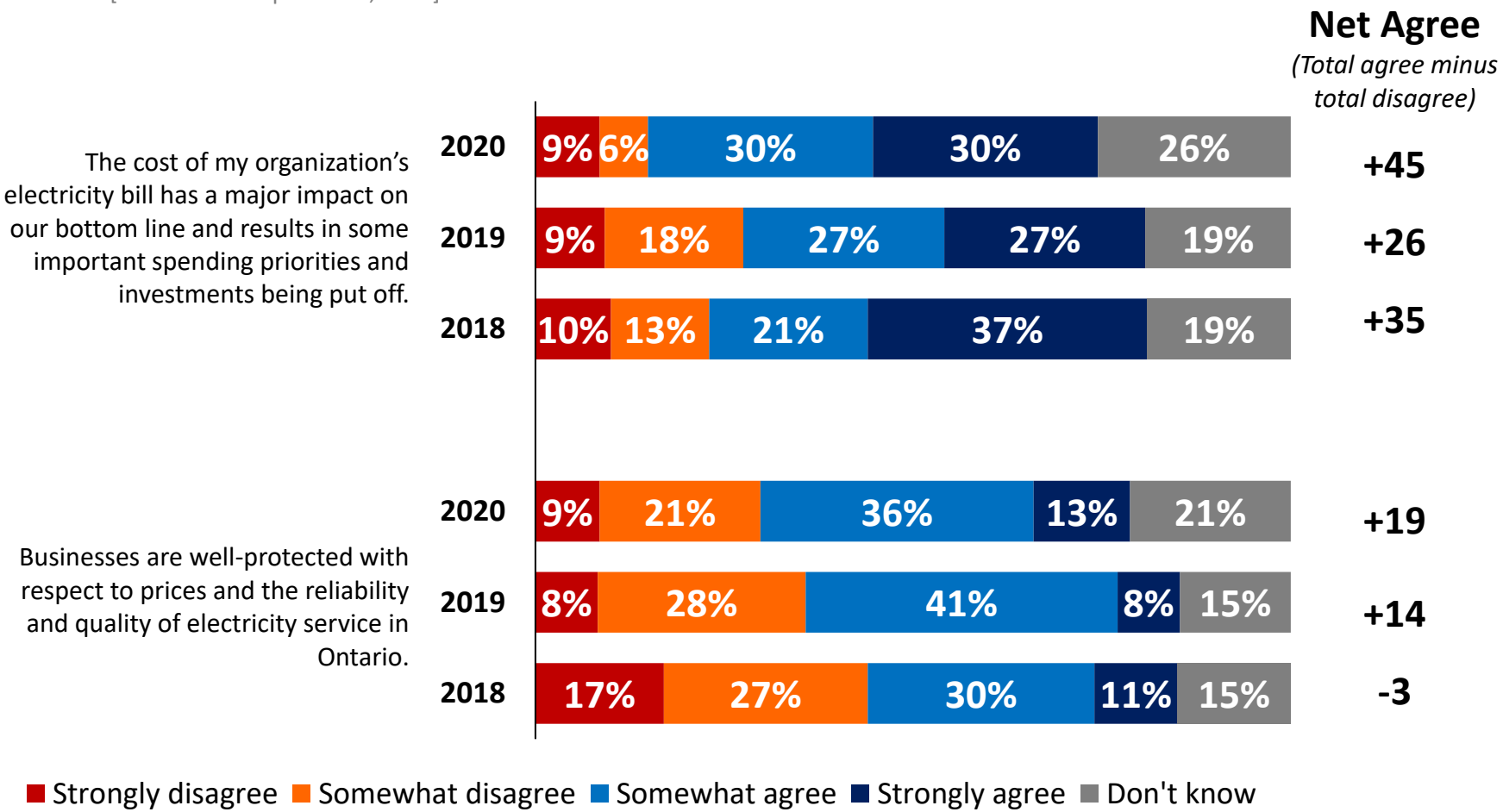
However, in **CSAT research**, we usually limit our environmental controls to two key questions to help capture external phenomena:

Government Management of the Electricity System:
Businesses are well-protected with respect to prices and the reliability and quality of electricity service in Ontario.

Financial Circumstances:
The cost of my organization's electricity bill has a major impact on our bottom line and results in some important spending priorities and investments being put off.

Environmental Controls: 6-in-10 (60%) agree their electricity bill is impacting their bottom line; half (49%) feel they are well-protected

H63 & H64. For each statement please tell me if you would strongly agree, somewhat agree, somewhat disagree or strongly disagree.
[Asked of all respondents, n=47]



Key Insights

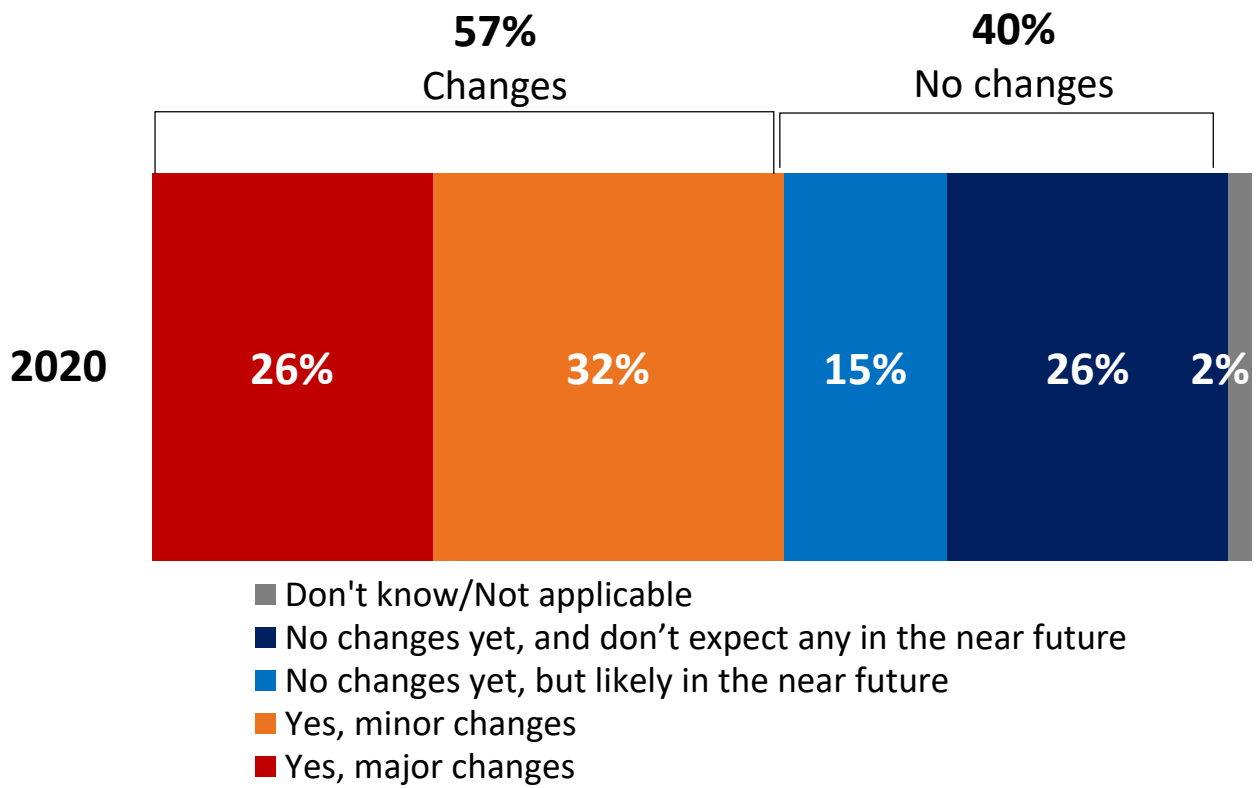
- Feeling that bill cost has impacted their organization's bottom line has increased 7 points for LTX customers.
- Compared to 2019, roughly the same number of customers agree that businesses are protected in terms of prices, reliability and quality of electricity service in Ontario. Disagreement (30%) has decreased six points in the last year.

COVID-19 in Focus

Electricity Needs: Most (57%) have experienced at least some changes to their organization that may affect electricity needs

Q The COVID-19 outbreak has affected many individuals and businesses across the province. Has your organization experienced any changes due to COVID-19 that affect your organization's electricity needs?

[asked of all respondents; n=47]

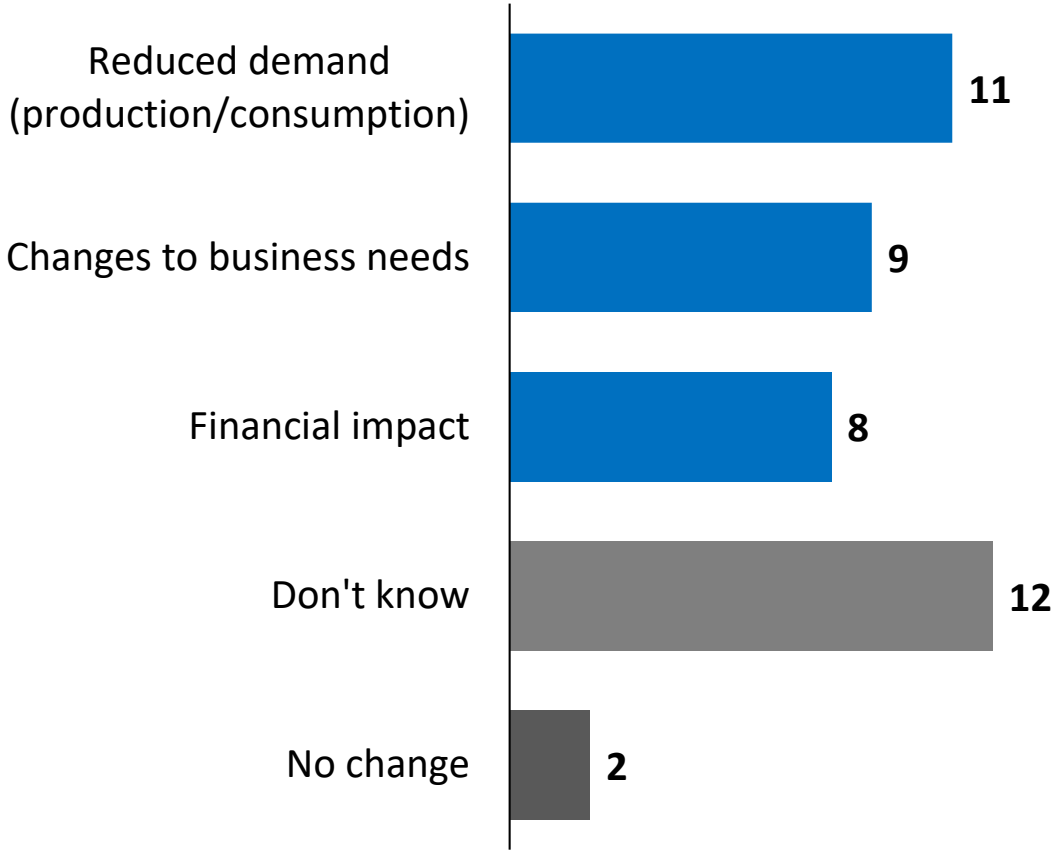


Key Insights

- A majority (57%) have experienced at least some minor changes to their organization that affects their electricity needs.
- 1-in-4 (26%) have seen major changes to their organization.
- 4-in-10 (40%) have experienced no changes yet.

How Have Needs Changed: Reduced demand for electricity mentioned as key change to electricity needs

Q Please describe how your organization's electricity needs have changed or are likely to change in the near future due to the COVID-19 outbreak.
[asked of all respondents who have experienced changes or think changes likely; open-ended, n=34]



Verbatim

"Collection of unpaid bills, too much relief from the government putting LDC at risk."

"Loss in revenue due to collection measures being put in place."

"No walk-in customer billing payments or billing issues. Half of the front office staff are working from home. The Company is spending much more time cleaning."

"Extra precautions and PPE required to meetings and work with outside organizations."

"Implementing separation of crews and re-scheduling work; implementing WFH & WFO COVID procedures."

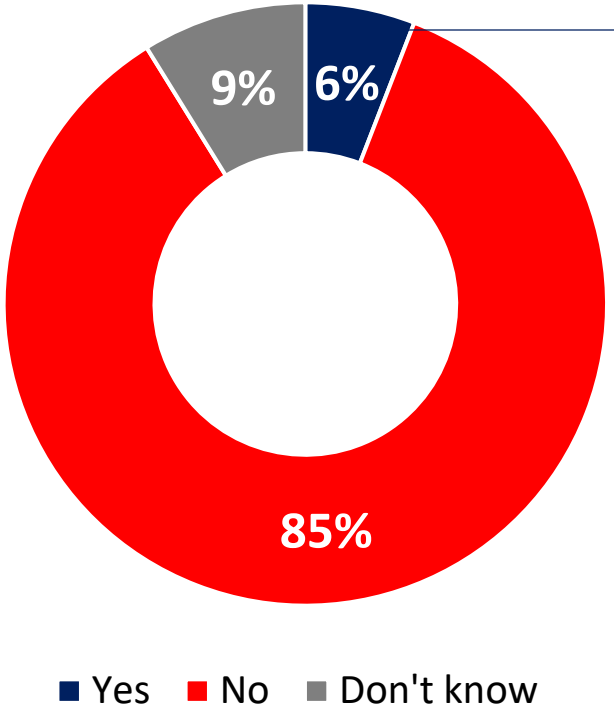
"Significant reduction in research activities has resulted in lower demand. In the future as things return to normal we anticipate an increase in demand due to ASHRAE recommendations for mechanical systems as well as 'research catch up'."

"As a LDC, our load has reduced due to closures of local businesses. It is unclear yet if there will be a long-term impact and those business will reopen."

"Demand down, revenue down (as it is linked to peak kW billing), expecting bankruptcies later in the year and LCDs will be left holding the bag for all charges (consumption, transmission, delivery)."

Hydro One Assistance: Only 6% of organizations have tried to get in touch with Hydro One to discuss their changing electricity needs

Q Have you tried to get in touch with Hydro One to discuss your organization's changed electricity needs?
[asked of all respondents who have experienced changes or think changes likely; n=34]



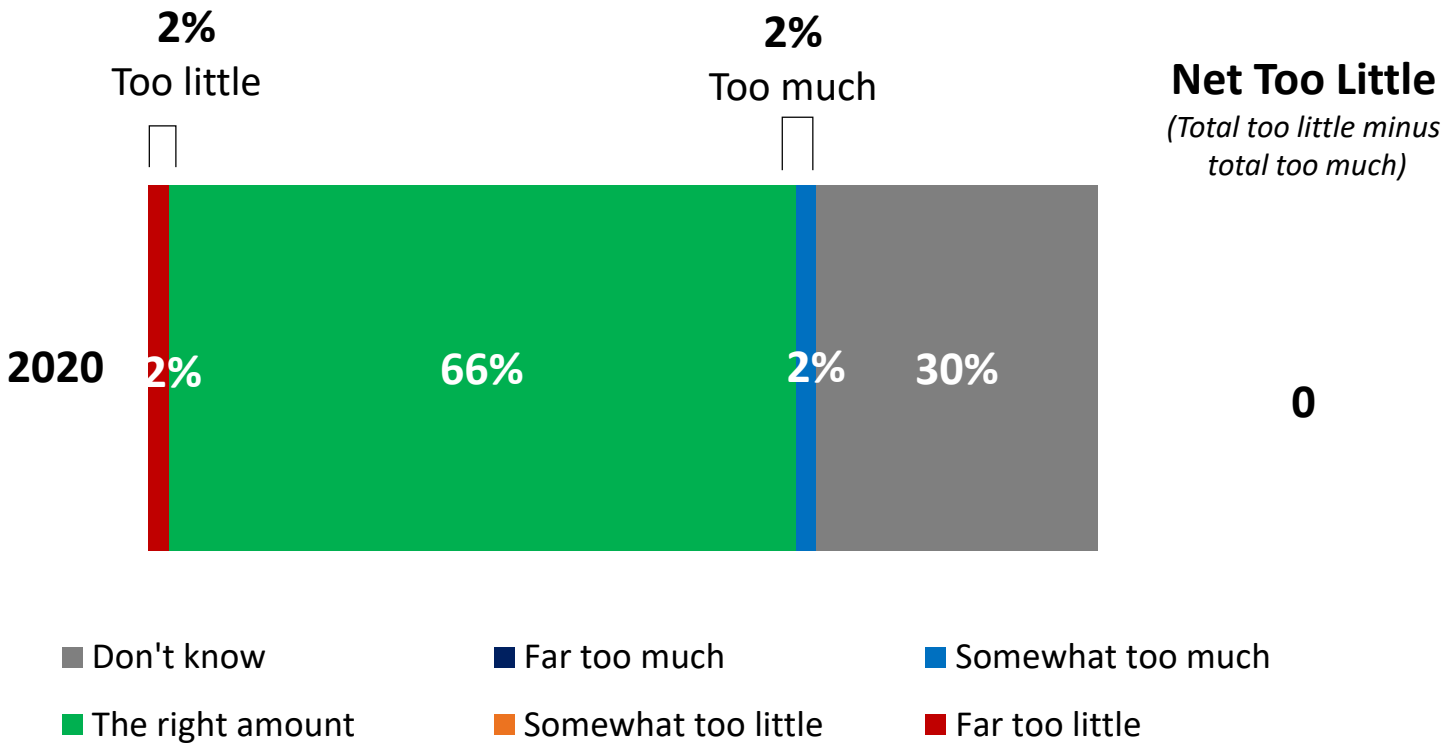
Q How satisfied or dissatisfied were you with the level of assistance that Hydro One provided in response to your request?
[asked of all who said "yes" to previous question; n=2]

Of the two customers who reached out to Hydro One, both were satisfied
(n=1: "very satisfied";
n=1 "somewhat satisfied").

Hydro One Relief: Most LTX customers think Hydro One has done the right amount to provide COVID-19 relief to customers

Q Would you say that in response to the COVID-19 outbreak so far Hydro One has done too much, too little, or the right amount to provide relief for customers like you?

[asked of all respondents; n=47]



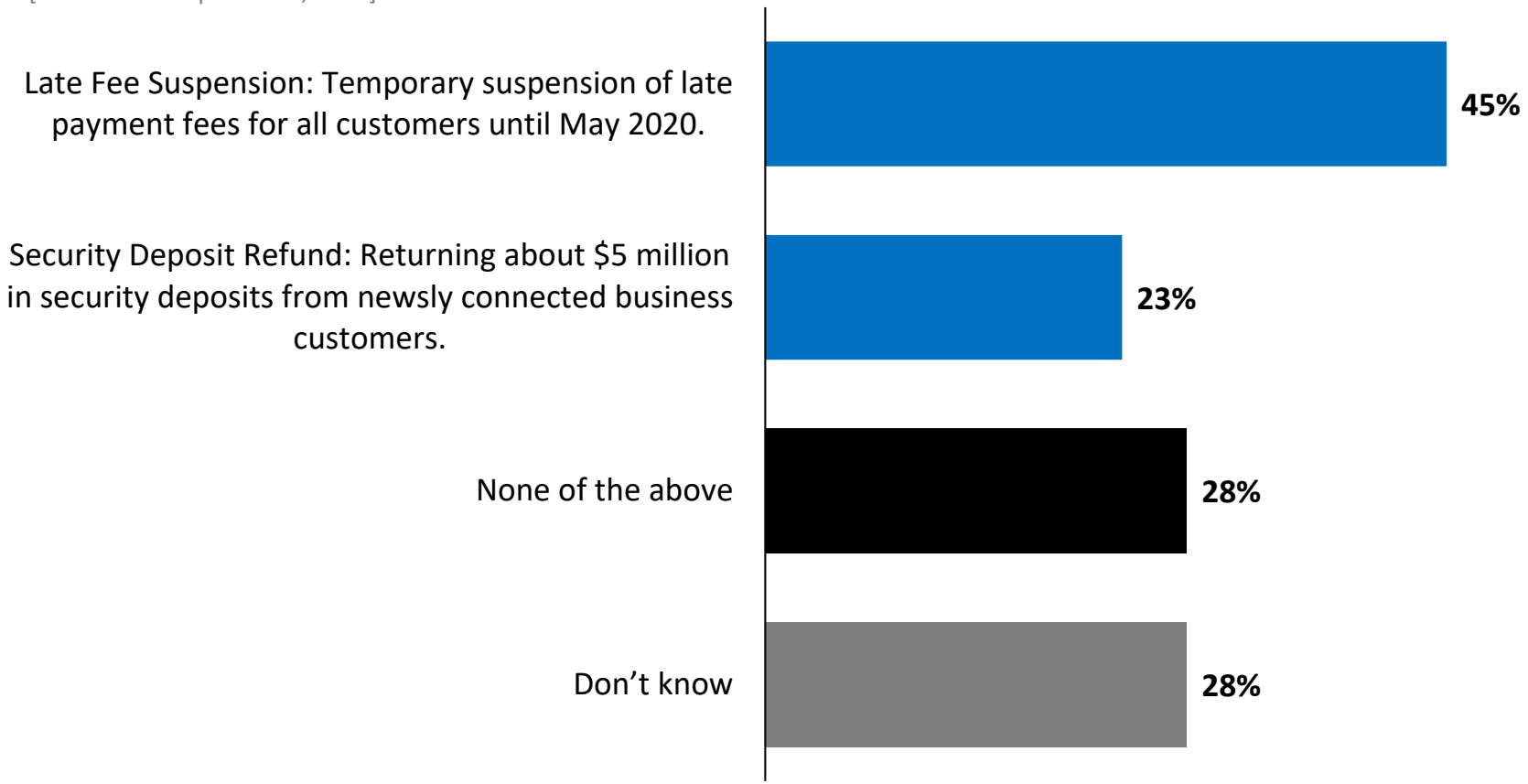
Key Insights

- 2-in-3 (66%) LTX customers think Hydro One has done the right amount when it comes to relief for customers due to the COVID-19 outbreak.
- 3-in-10 (30%) don't know how to respond.

Relief Programs: Nearly half (45%) of LTX respondents have heard of the late fee suspension, 1-in-4 (23%) recall the deposit refund

Q In response to the COVID-19 outbreak, Hydro One has relief programs in place to assist business customers during this pandemic. Before this survey, have you heard anything about the following programs? Please select all that apply.

[asked of all respondents; n=47]



Key Insights

- Almost half (45%) have heard about Hydro One's policy of suspending late fees until May 2020.
- About 1-in-4 (23%) have heard of Hydro One's return of around $5 million in security deposits from newly connected business customers.
- Nearly 3-in-10 (28%) have not heard of either of the policies.

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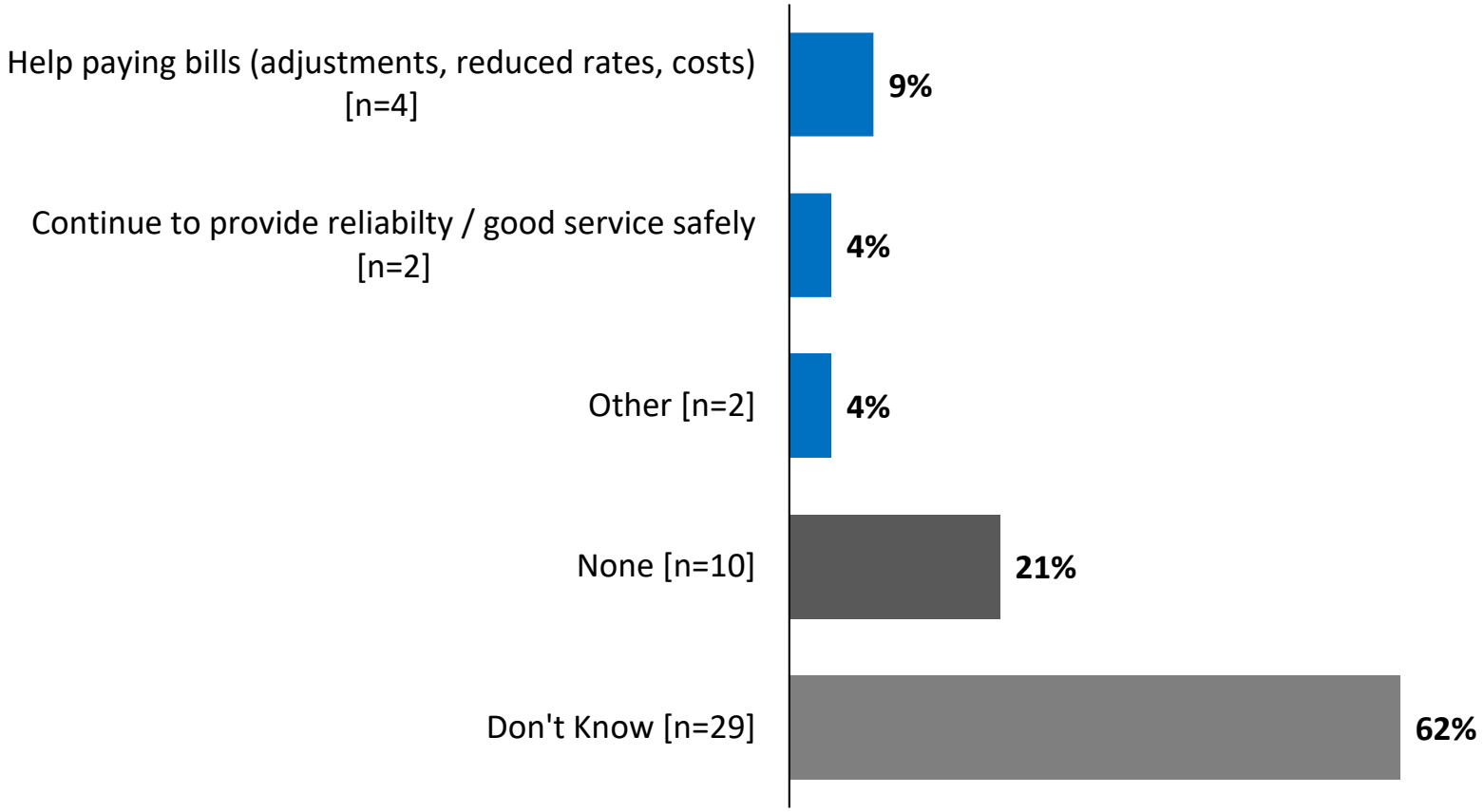
NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Further COVID-19 Support: A few suggest helping to pay bills, to continue reliable service; most don't have a response on how to help

Q Is there anything else that Hydro One could do to help customers like you during this pandemic?
[asked of all respondents; n=47]



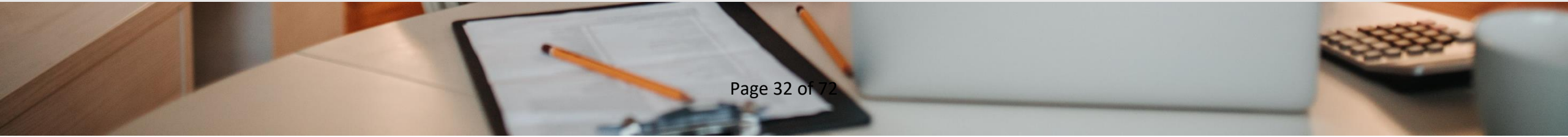
Key Insights

- Four LTX customers suggested Hydro One could further help them pay their organization's bills.
- The vast majority of LTX customers surveyed either don't know (62%) or have no suggestions (21%).

Verbatim

"Ask the Minister of Energy to extend the current TOU until May 31st."
"For bankrupt customers of the LDC, provide relief to the LDC in proportion to the money that the LDCs is not able to recover from the bankruptcy, OR lobby the OEB to remove disconnection bans from commercial customers."
"Keep your service people safe and available."
"Provide the same relief on billing transmission charges to distribution utilities that those utilities are required to provide to their customers."
"Reduce advertisement spend on COVID response."

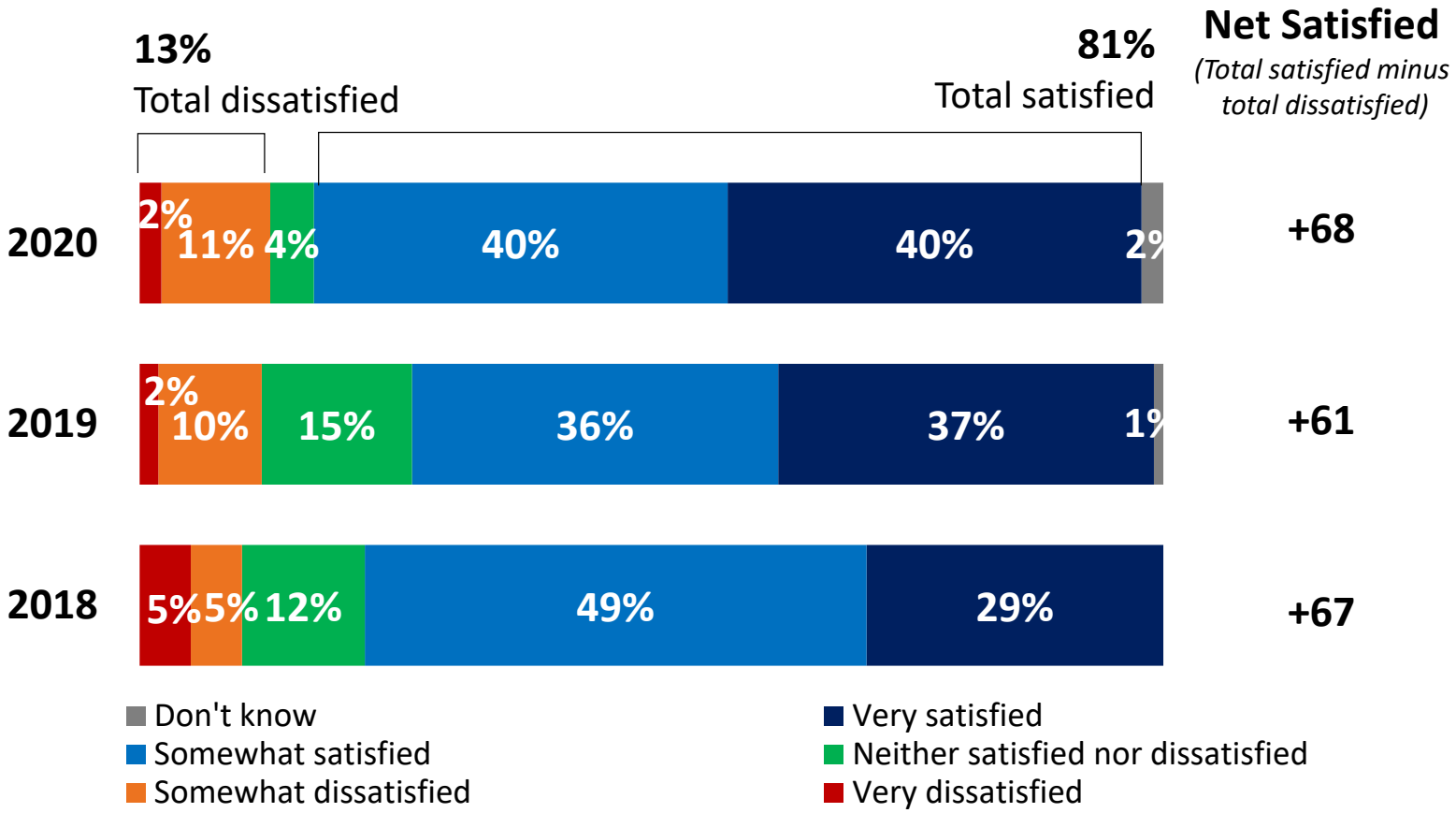
Appendix A: Detailed Results



Customer Service & Brand

Ease of Doing Business: 8-in-10 (81%) are satisfied with the ease of doing business; net satisfaction up 7 points

Q How satisfied or dissatisfied are you with the following aspects of Hydro One?
D7. Ease of doing business with Hydro One
[Asked of all respondents, n=47]

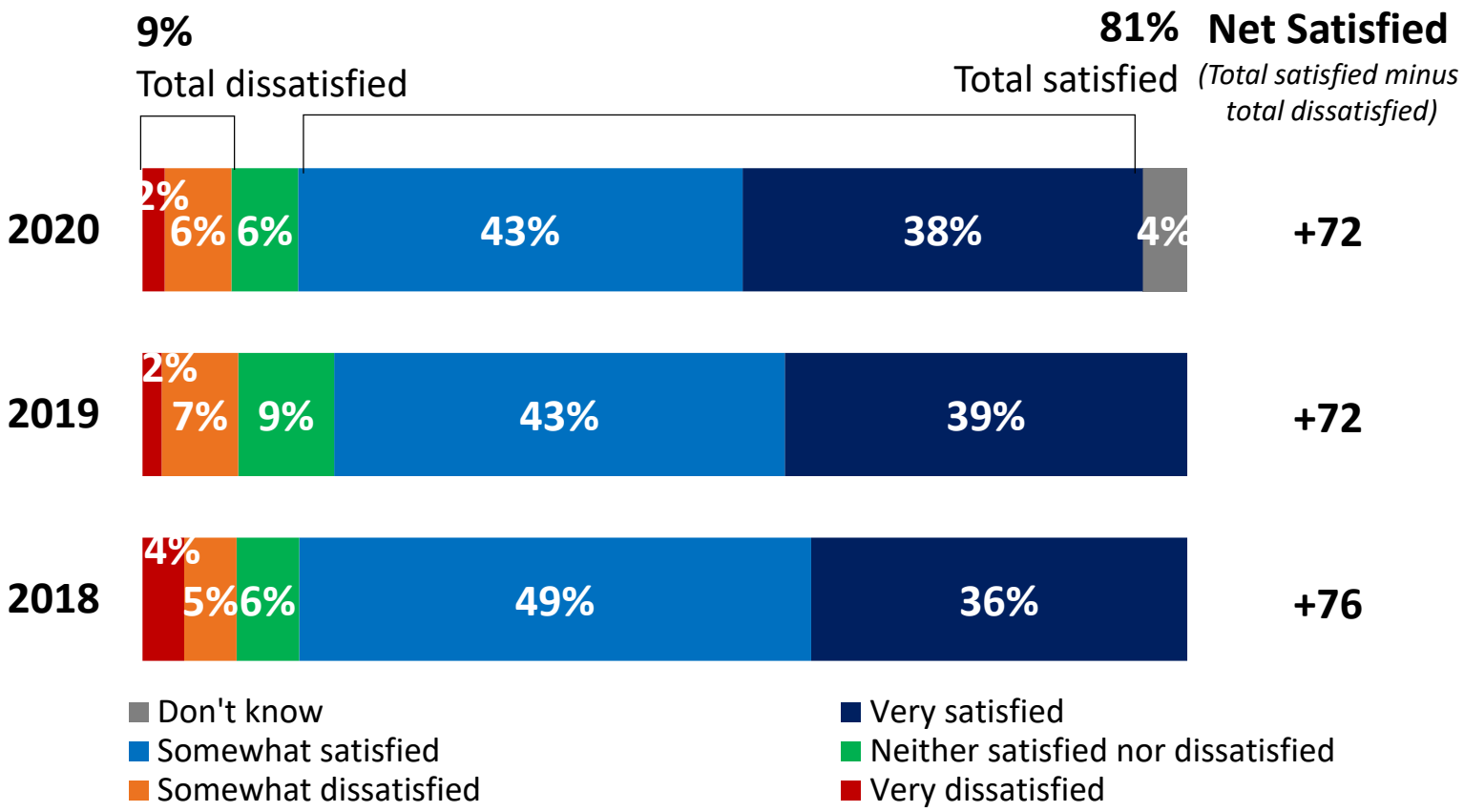


Key Insights

- Most (81%) LTX customers are satisfied with the ease of doing business with Hydro One, and the intensity on this metric continues to increase (albeit marginally over last year).
- Dissatisfaction remains steady, but the increase in satisfaction results in a 7 point increase in net satisfaction.

Understanding Business Needs: Majority (81%) of LTX customers are satisfied with Hydro One's understanding of their business needs

How satisfied or dissatisfied are you with the following aspects of Hydro One?
D9. Hydro One's understanding of your business needs
[Asked of all respondents, n=47]

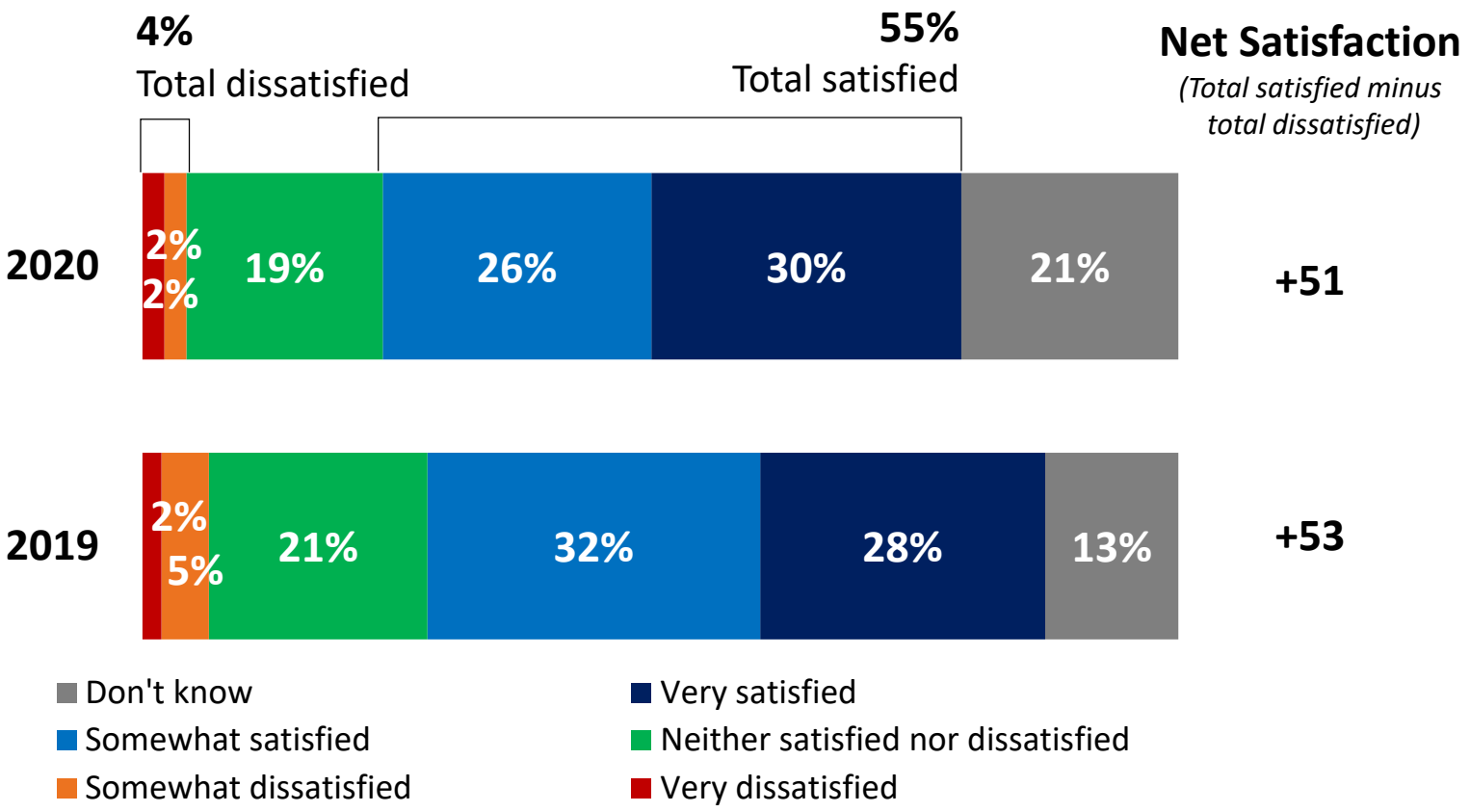


Key Insights

- Satisfaction is divided fairly evenly between those *somewhat* satisfied (43%) that Hydro One understands their business needs, and *very* satisfied (38%). Net satisfaction is steady since 2019.

Impact on Local Community: A majority (55%) are satisfied with Hydro One's impact on their local community

Q How satisfied or dissatisfied are you with the following aspects of Hydro One?
D10. Hydro One's impact on your local community.
[Asked of all respondents, n=47]

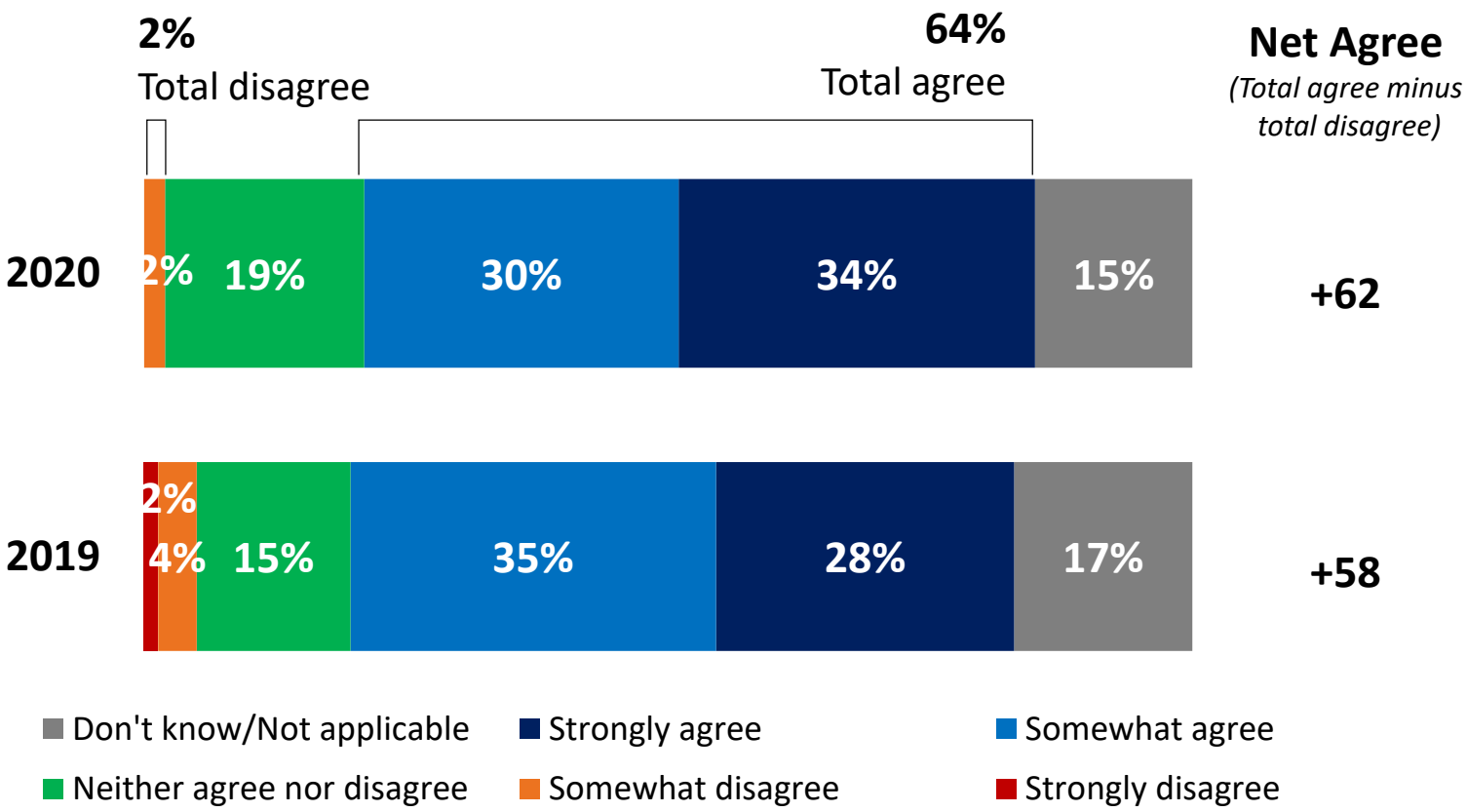


Key Insights

- A majority (55%) of LTX customers are satisfied with Hydro One's impact on their local community.
- Four-in-ten either "don't know" (21%) or neutral (19%), leaving an opportunity for gains here by shifting customers from ambivalent or unsure to agreement.

Top Level Management: Two-thirds (64%) agree that Hydro One has responsible and competent top-level management

Please indicate if you agree or disagree with the following statements.
D13. Hydro One has responsible and competent top-level management.
[Asked of all respondents, n=47]

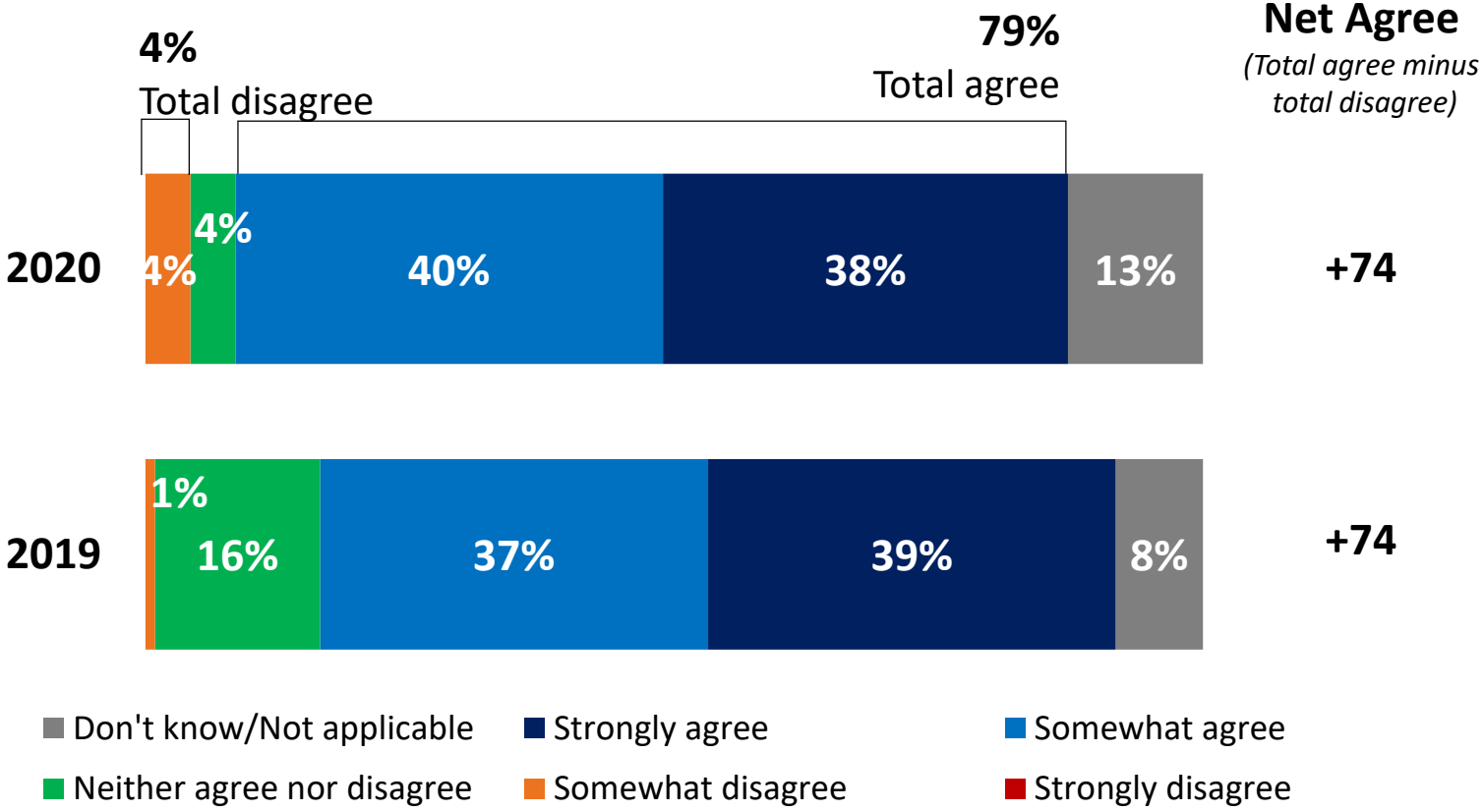


Key Insights

- Most (64%) agree that Hydro One has responsible and competent top-level management (and there has been a marginal gain in intensity), but more than a third are either neutral or say they don't know.
- This presents an opportunity to shift LTX customers from ambivalence to agreement.
- A decrease in the proportion who *disagree* results in a marginal improvement on net agree.

Work Crews: 4-in-5 (79%) LTX customers agree that Hydro One's work crews do an excellent job

Q Please indicate if you agree or disagree with the following statements.
D14. Hydro One's work crews do an excellent job.
[Asked of all respondents, n=47]



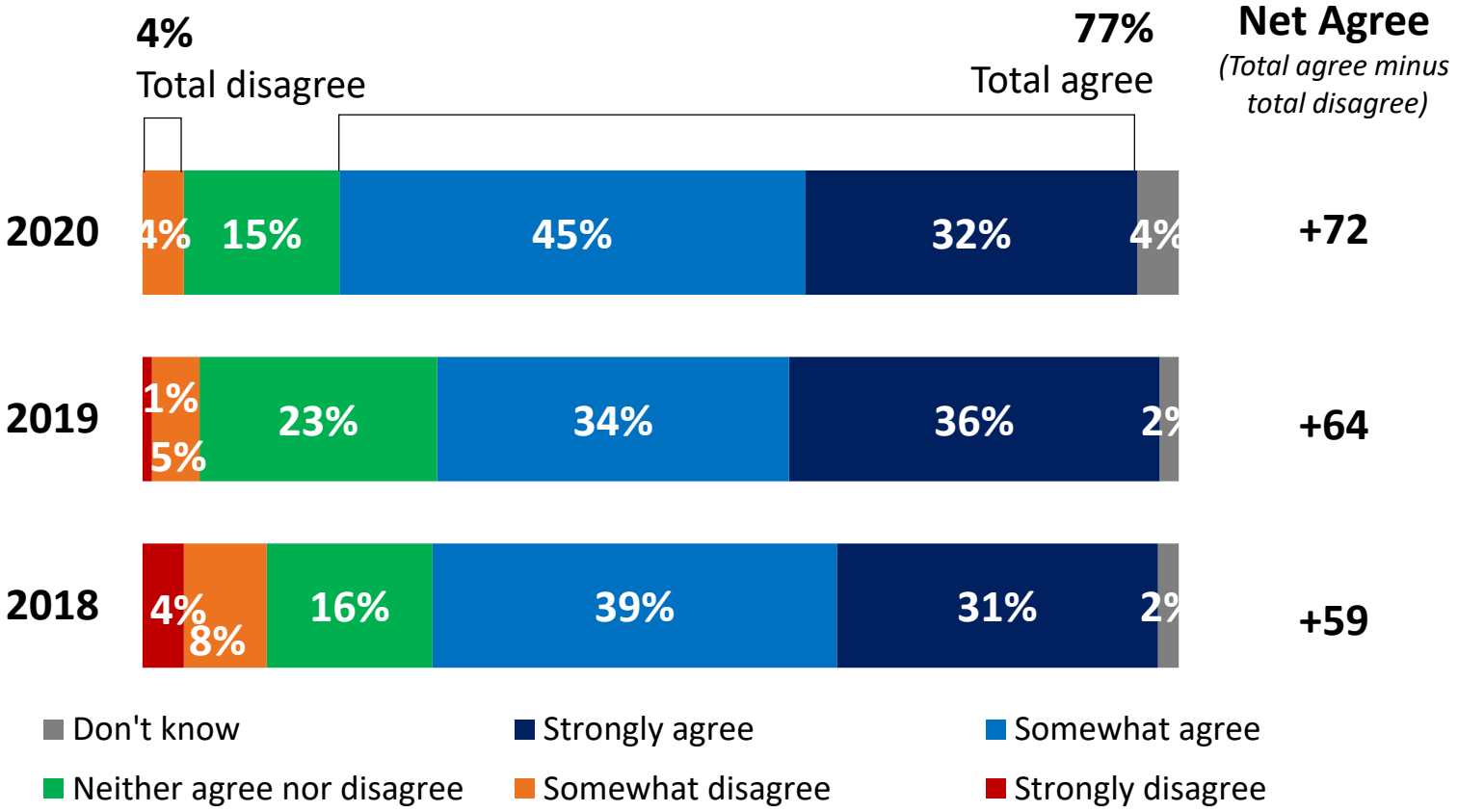
Key Insights

- About 4-in-5 (79%) LTX customers agree that Hydro One's work crews do an excellent job. They are as likely to *strongly* agree (38%) as they are to only *somewhat* agree (40%).

NOTE: 2019 differences between customer type that are statistically significant at a 95% confidence interval are indicated

Trusted Business Partner: Three-quarters (77%) of LTX customers agree that Hydro One is a trusted business partner

Please indicate if you agree or disagree with the following statements.
D15. Hydro One is more than an electricity utility, it is a trusted business partner to my organization.
[Asked of all respondents, n=47]



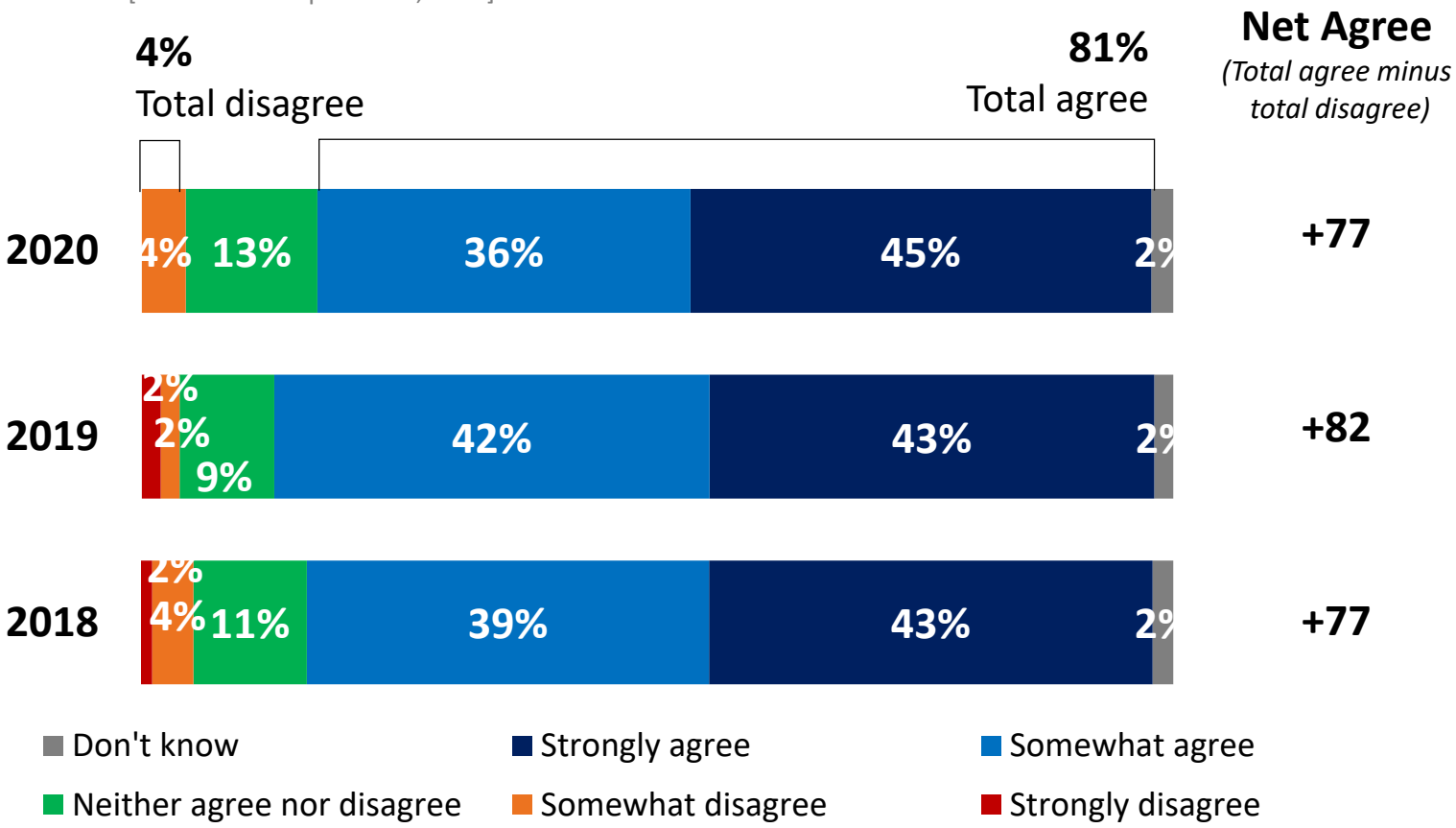
Key Insights

- Three-quarters (77%) of LTX customers view Hydro One as a trusted business partner to their organization.
- Gains over last year in the proportion who *somewhat* agree lead to an eight point gain on net agree.

Quality Advice and Guidance: 81% of LTX customers say Hydro One staff are providing quality advice and guidance

Q

Please indicate if you agree or disagree with the following statements.
D17. Hydro One staff provide my organization with quality advice and guidance when I have questions about my service.
[Asked of all respondents, n=47]

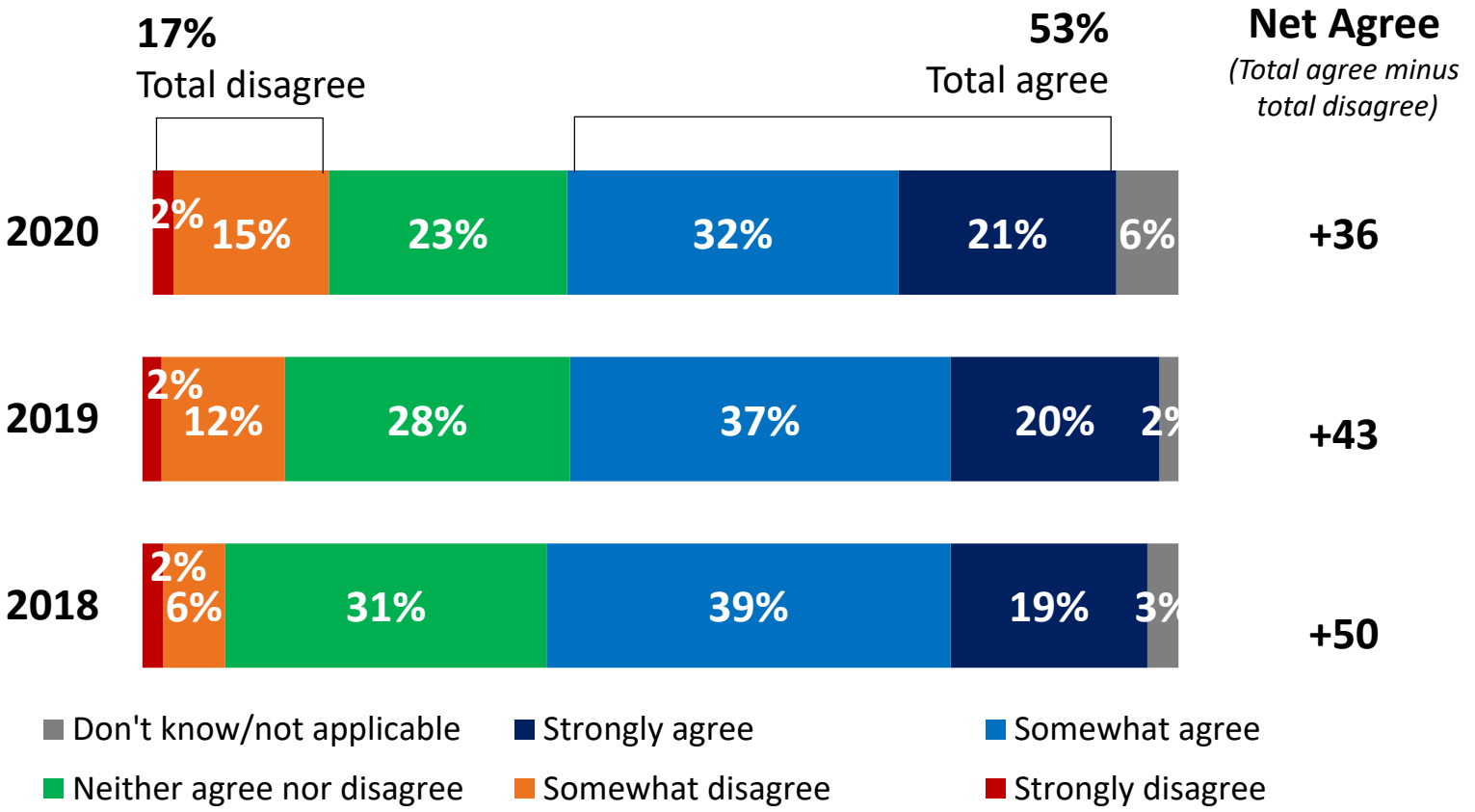


Key Insights

- A strong majority (81%) of LTX customers agree that Hydro One staff provides their organization with quality advice and guidance. They are more likely to *strongly* agree (45%) than *somewhat* agree (36%). Net agreement is down 5 points from last year.

Value for Money: A slim majority (53%) agree that Hydro One provides good value for money

Q Please indicate if you agree or disagree with the following statements.
D18. Hydro One provides my organization with good value for money.
[Asked of all respondents, n=47]

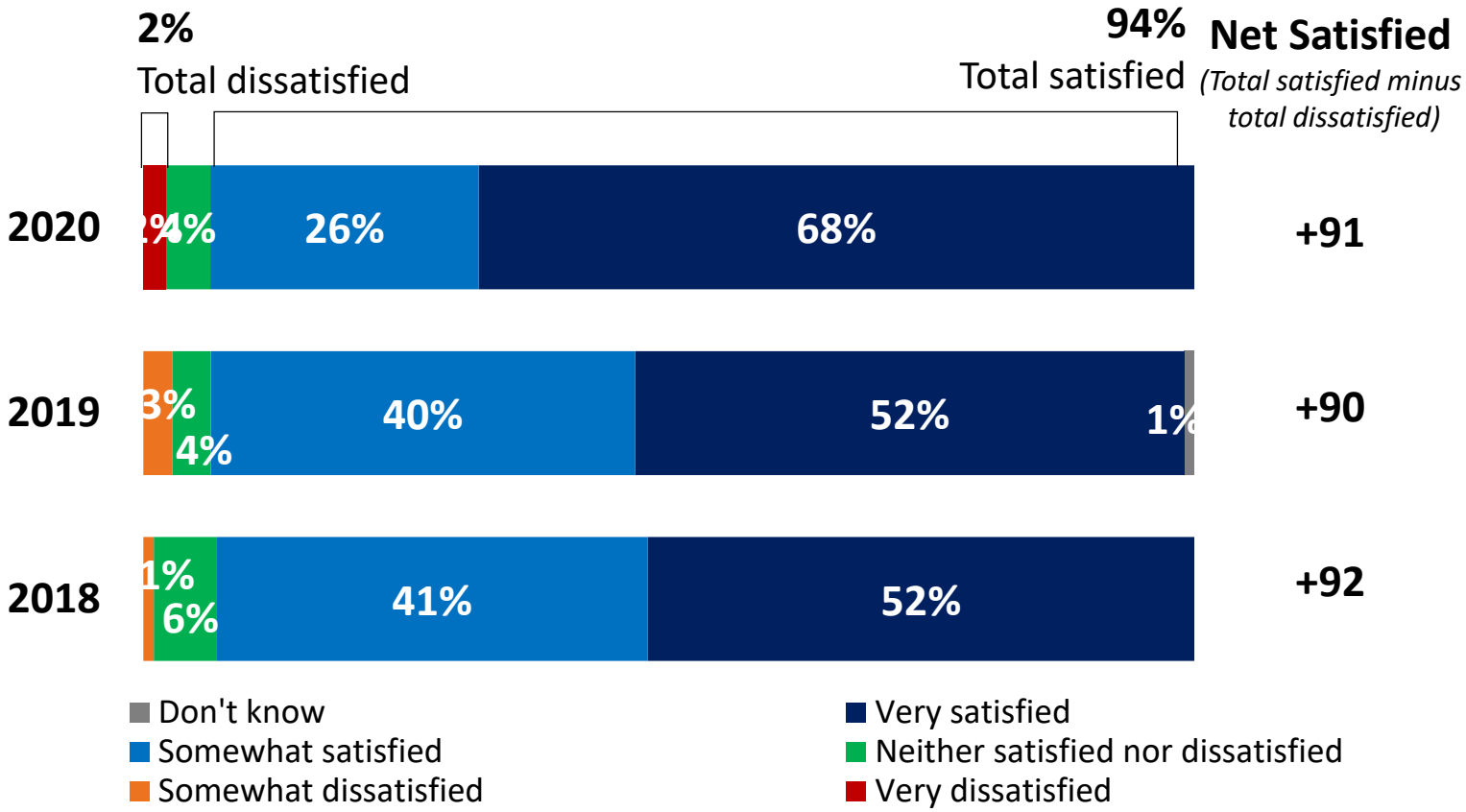


Key Insights

- LTX customers are increasingly less ambivalent on this metric, going from 31% two years ago to 23% in 2020.
- *Disagreement* is trending up, while *agreement* is trending down, resulting in a decrease in the level of net agreement.

Overall Satisfaction, Customer Service: Almost all (94%) are satisfied with customer service, with intensity increased year-to-year

Q **F30.** Overall, how satisfied or dissatisfied are you with the **customer service** provided to your organization by Hydro One?
[Asked of all respondents, n=47]

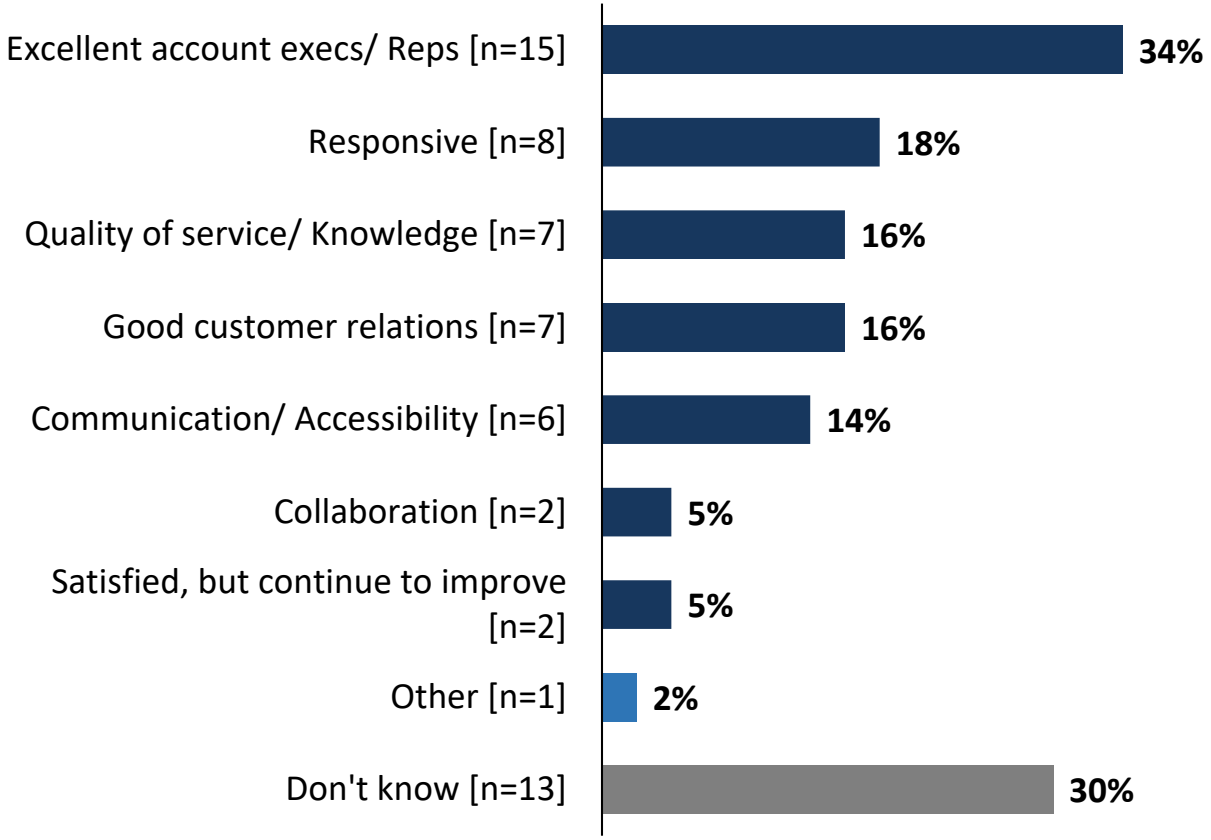


Key Insights

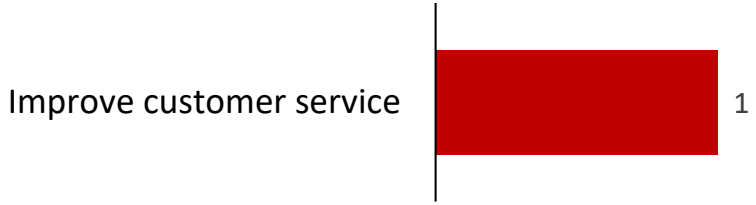
- Nearly all (94%) LTX customers are satisfied with Hydro One's customer service; 2-in-3 (68%) say they are *very* satisfied, and another 1-in-4 (26%) are *somewhat* satisfied.
- While net satisfaction is steady since 2019, intensity of satisfaction has increased markedly.
- Most LDCs (86%) and all Generators and End-Users customers are satisfied with their level of service.

Reasons for Satisfaction and Dissatisfaction: Excellent KAEs and responsiveness are the primary reasons cited by satisfied customers

Q **F31.** Is there any particular reason why you're **satisfied** with the customer service provided by Hydro One?
[Asked of those that are somewhat or very satisfied, open-ended, n=44]



Q **F32.** Is there any particular reason why you're **dissatisfied** with the customer service provided by Hydro One?
[Asked of those that are somewhat or very dissatisfied, open-ended, n=1]



Key Insights

- "Excellent account reps" (34%) and "responsiveness" (18%) are top mentions for reasons that customers are satisfied with their customer service from Hydro One.
- 3-in-10 (30%) don't have a reason why they are satisfied.

NOTE: Multiple mentions were recorded in these open-ended questions. As such, percentages may add up to over 100%.

Reasons for Satisfaction/Dissatisfaction | Selection of Verbatim

F31. Is there any particular reason why you're **satisfied** with the customer service provided by Hydro One?

[Asked of those that are somewhat or very satisfied, open-ended, n=44]

Verbatim
"Anytime that we have a question we receive a prompt reply. We are kept updated with all maintenance that is happening on the system as well prior to COVID-19 we were regularly scheduled to meet with an information session and updated on the transmission system."
"In 2019 we successfully discussed and resolved a significant issue collaboratively, regarding a leak of SF6 Gas from a large switchyard circuit breaker, to the satisfaction of our OPG Leadership Team."
"Our account manager is always available and follows through with any issues."
"We receive prompt answers from customer service when called."
"Our Account Executive Jayde keeps in constant communication with me and key members of my team."
"Our account representative is exceptional, and a makes a point to check in with staff and is very helpful in connecting us with the right people at Hydro One. Hydro One staff are continually changing positions and it is helpful to have a contact that can make that connection and help our LDC staff navigate the Hydro One organizational structure."
"Responsive to all inquiries and concerns. Willing to focus on identifying options and finding solutions."

F32. Is there any particular reason why you're **dissatisfied** with the customer service provided by Hydro One?

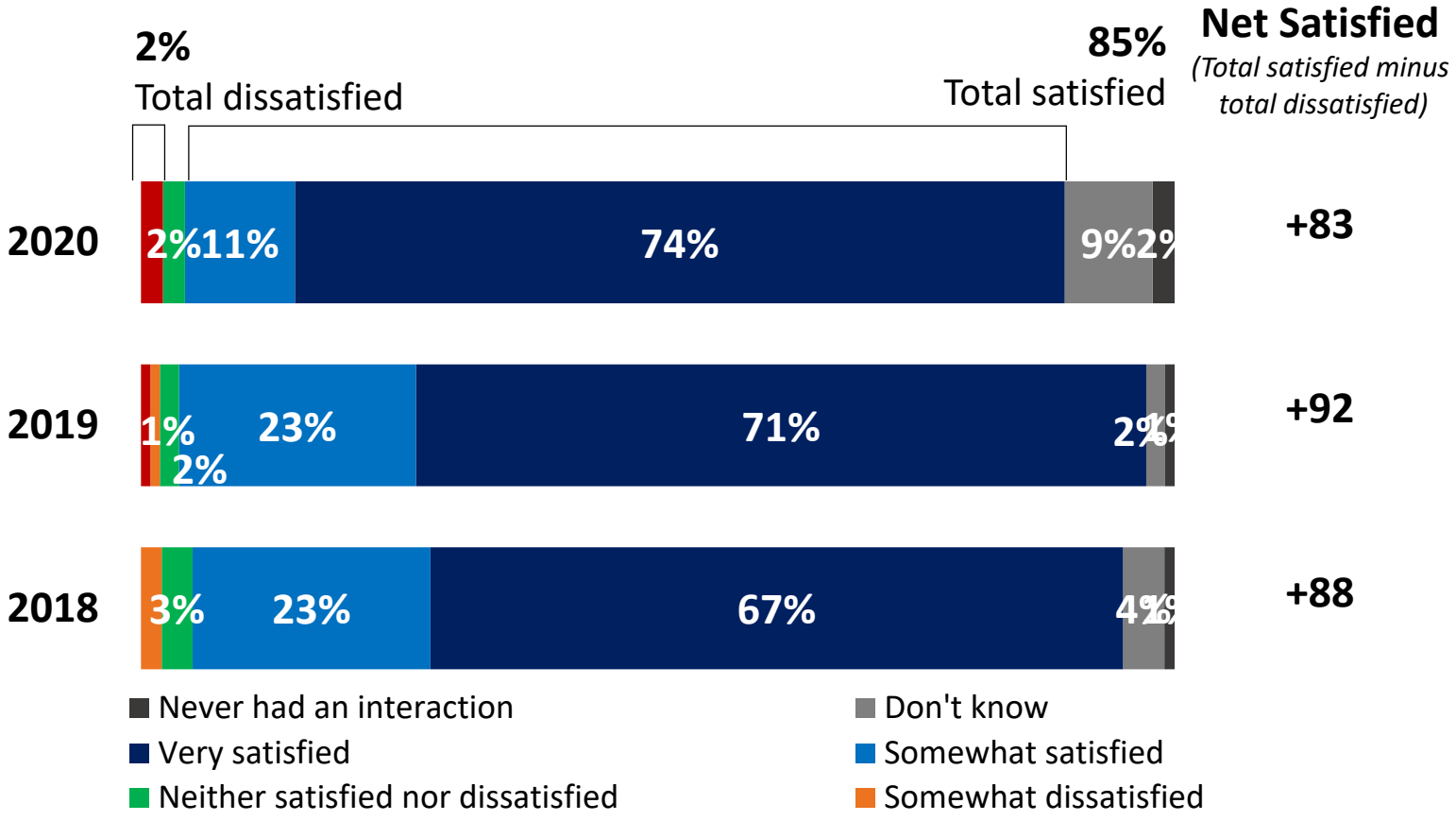
[Asked of those that are somewhat or very dissatisfied, open-ended, n=1]

Verbatim
"As previously stated, high turnover creates a number of issues. There is never contact from Hydro One to LDC, it is always LDC to Hydro One. Experience is lacking."

Satisfaction with Key Account Executive: Solid (85%) and intense (71% *very* satisfied) satisfaction with KAE, down slightly year-to-year

F34. How satisfied or dissatisfied are you with the service you receive from your Hydro One Key Account Executive?

[Asked of all respondents, n=47]

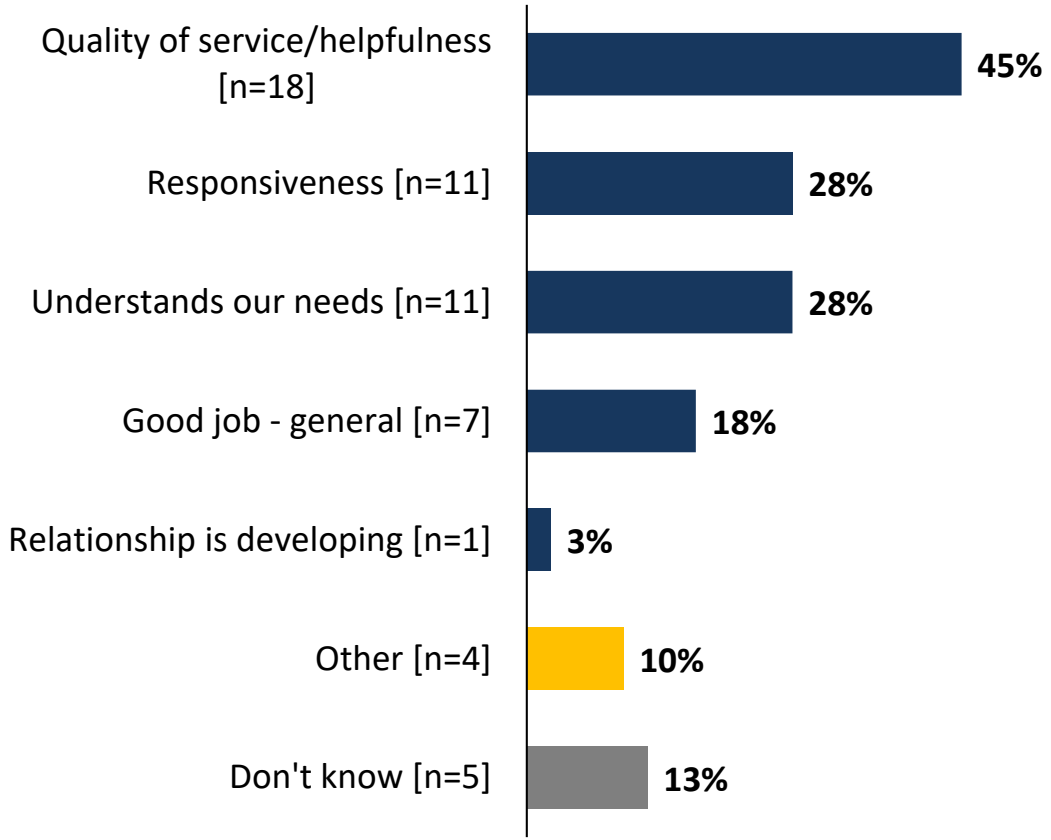


Key Insights

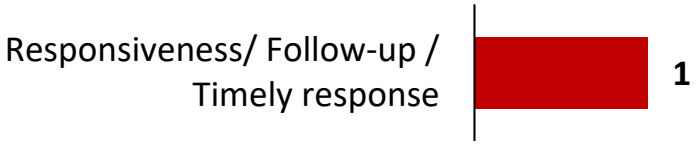
- Not only is satisfaction with the service from Key Account Executives solid (85%), it is also intense (74% *very* satisfied).
- Overall satisfaction has dipped slightly year to year.
- The intensity of satisfaction here is higher than it is for any other metric in the survey.

Reasons for Satisfaction and Dissatisfaction: Satisfaction with KAEs is primarily due to the 'quality of service' (45%)

Q **F35.** Is there any particular reason why you're **satisfied** with your Hydro One **Key Account Executive**?
[Asked of those that are somewhat or very satisfied, open-ended, n=40]



Q **F36.** Is there any particular reason why you're **dissatisfied** with your Hydro One **Key Account Executive**?
[Asked of those that are somewhat or very dissatisfied, open-ended, n=1]



Key Insights

- A plurality of LTX customers who are satisfied with their KAE attribute it to "quality of service" (45%), followed by "responsiveness" (28%) and "understands our needs" (28%).

NOTE: Multiple mentions were recorded in these open-ended questions. As such, percentages may add up to over 100%.

Reasons for Satisfaction/Dissatisfaction | Selection of Verbatim

F35. Is there any particular reason why you're **satisfied** with your Hydro One **Key Account Executive**?

[Asked of those that are somewhat or very satisfied, open-ended, n=40]

Verbatim
"All of the interactions we have with Hydro One have been in the spirit of cooperation. None of us are perfect, but it is nice to work with people who are understanding of your circumstance."
"He is knowledgeable about the processes for getting maintenance & upgrade work completed and can get me connected with the correct technical people as required. He's great at keeping track of the work going on and following up as required to ensure everything is satisfactory."
"He is upfront in contacting us when our input is required and provides regular updates."
"Our account rep is very good to document discussions and follow up."
"I feel they genuinely care about our companies' and mutual success."
"She is proactive and do what it takes to understand our situation."
"Shevy Wynter, our AE, has a very strong technical background, regulatory knowledge, and understands how HONI the company works. He wields this knowledge to advocate on our behalf internally and support the work we do together. This has made a tremendous difference for us to execute projects together and we've noticed a marked change in the pace of work with Shevy."
"We find Hydro One Leadership to be very interested in & responsive to the needs of our OPG Organization, we are getting the support we ask for, when we ask for it."

F36. Is there any particular reason why you're **dissatisfied** with your Hydro One **Key Account Executive**?

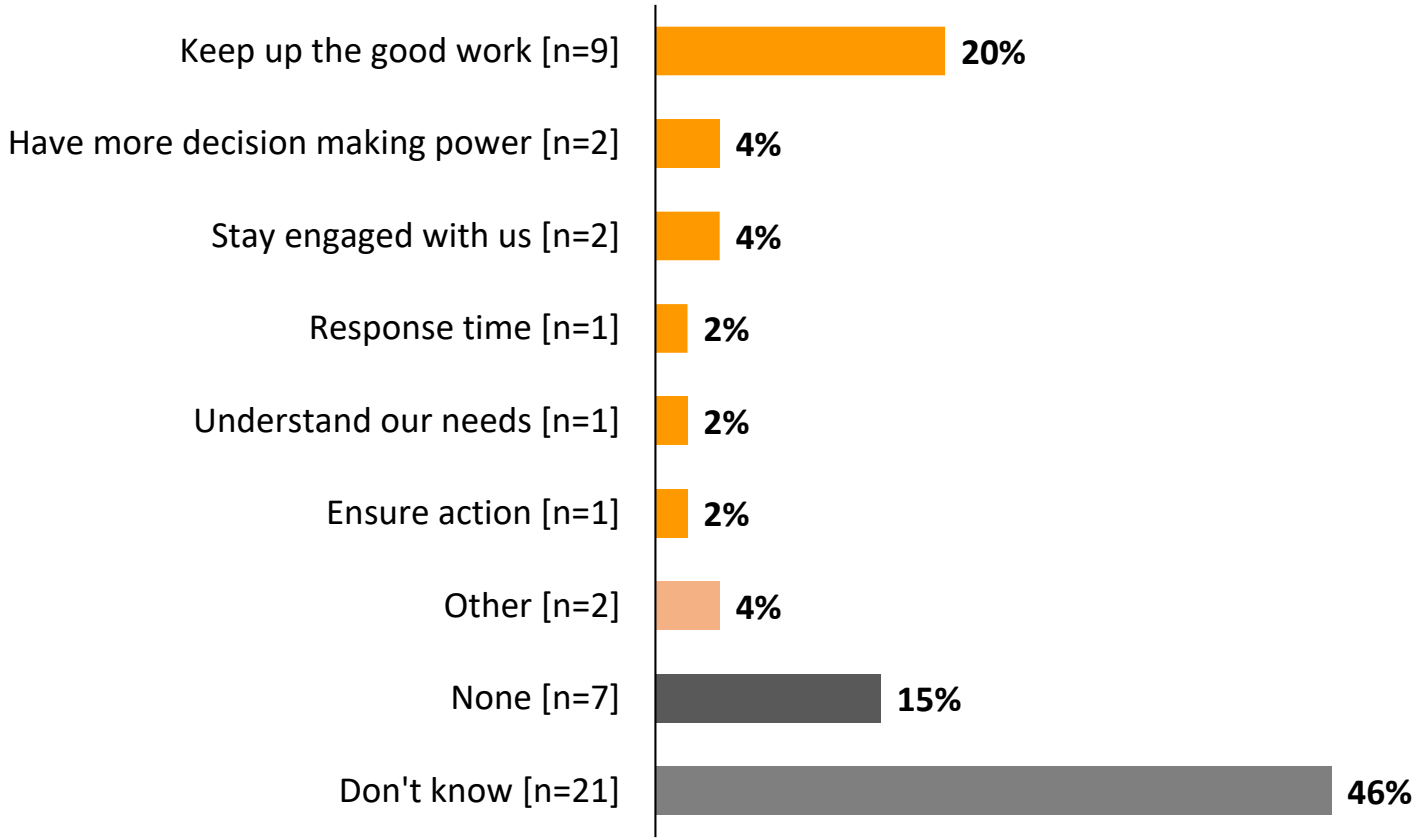
[Asked of those that are somewhat or very dissatisfied, open-ended, n=1]

Verbatim
"No interaction initiated from Hydro One in the last 3 years from Key Account Executive. Too much turnover, very little knowledge when there is interaction. No confidence in answers."

Areas of Improvement | KAEs: 6-in-10 (61%) say nothing or don't know, 20% say keep up the good work, suggesting no major weaknesses

Q **F37.** What, if anything, can your **Key Account Executive** do to better serve you and your organization?

[Asked of all respondents who have had an interaction with their Key Account Executive, open-ended, n=46]



Key Insights

- 8-in-10 responses to an invitation to provide feedback on how KAEs can improve their service reflect how highly satisfied LTX customers are on this metric:
  - 46% "don't know"
  - 15% "nothing"
  - 20% "keep up the good work"
- "Have more decision-making power" and "Stay engaged with us" (4% each) are the top mentioned areas of improvement.

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Areas of Improvement | KAEs Verbatim

Q

F37. What, if anything, can your **Key Account Executive** do to better serve you and your organization?

[Asked of all respondents who have had an interaction with their Key Account Executive, open-ended, n=46]

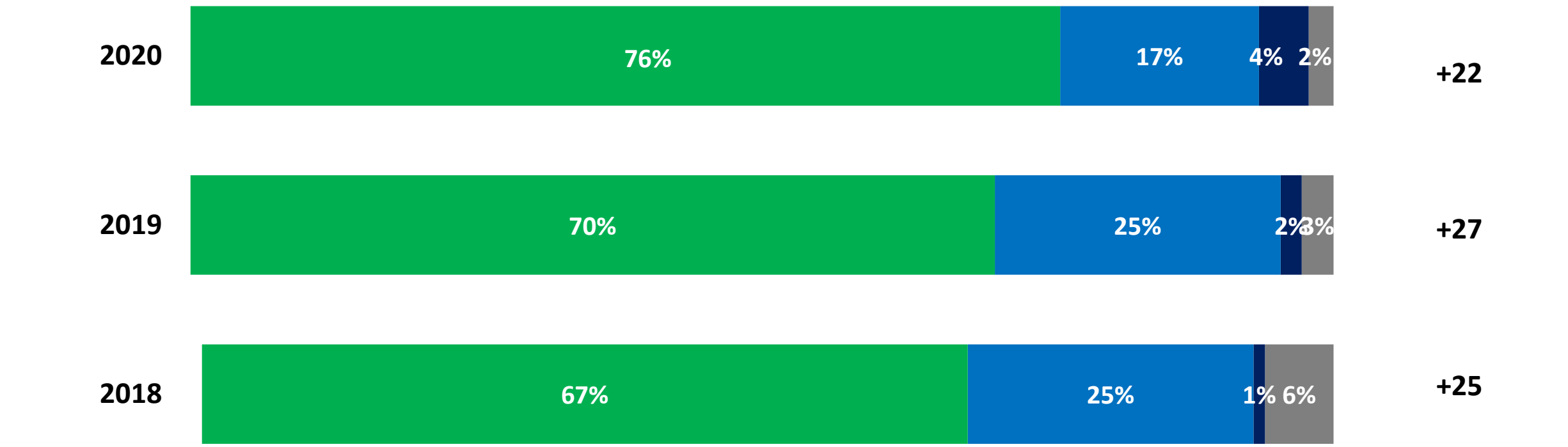
Verbatim
“Be more active in expediting our equipment replacement/upgrading process.”
“Come see us at least once a year, check in quarterly. Ensure they have enough experience before entering the role.”
“Continue to challenge timeliness of investigations.”
“Do more to see things from our perspective and not always try to make excuses for Hydro One.”
“Never become complacent with a good relationship and good collaboration, and continue to be highly responsive to inquiries and requests from OPG.”
“Our AE should stay put and not take another role. Or, Hydro One could keep our accounts with the AE so long as he's available.”
“Perhaps a few more planned meetings - just to stay in touch and informed about each other's plans.”
“Satisfied with current process.”
“Hydro One should allow Key Account Executives more freedom to drive decision making.”
“Have more say in planned outages.”

Level of Engagement: 3-in-4 (76%) are happy with the current level of engagement with their KAE, 17% want more

Q

F38. Would you like more or less engagement with your Hydro One **Key Account Executive**?

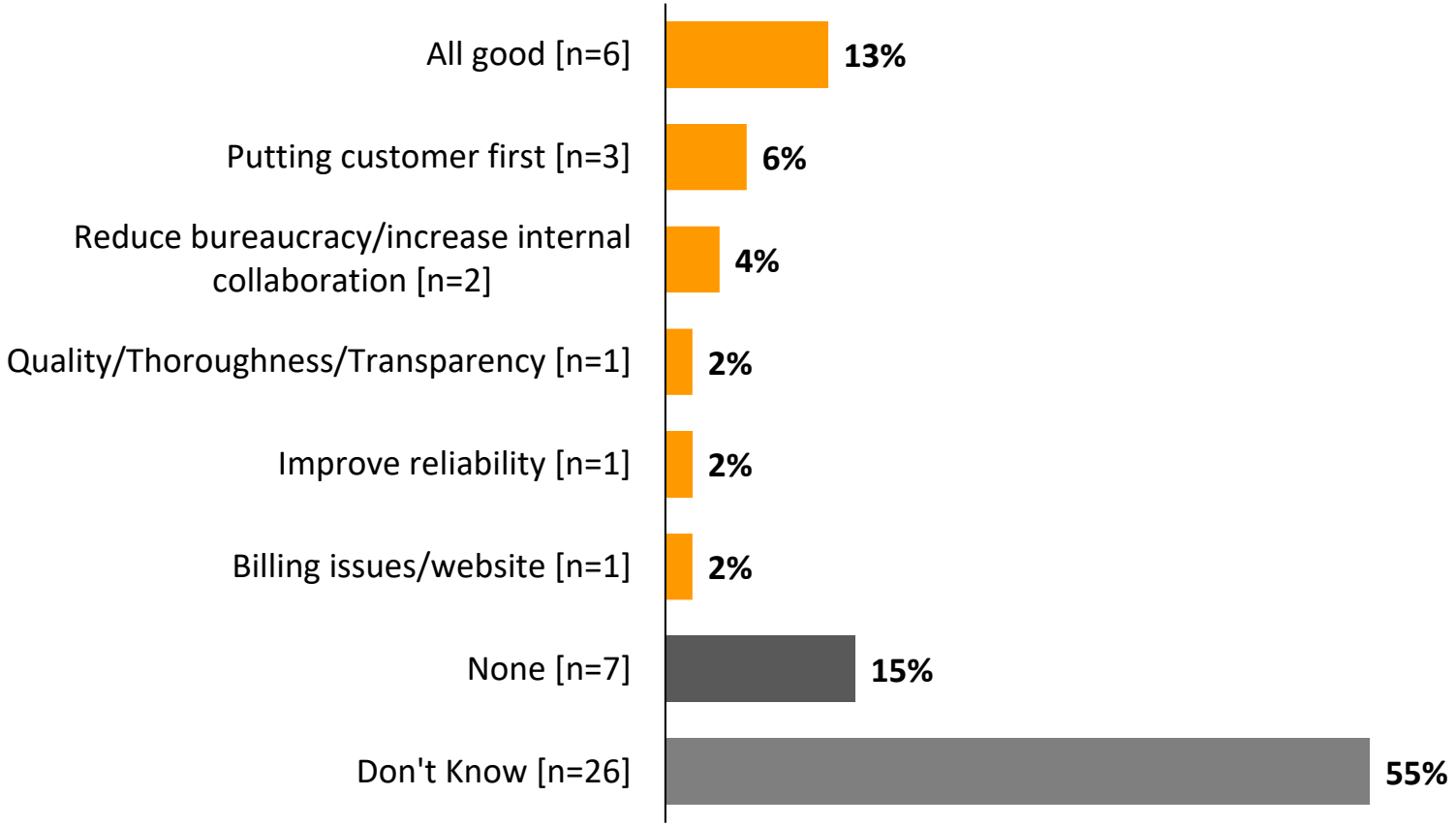
[Asked of all respondents who have had an interaction with their Key Account Executive, n=46]



Areas of Improvement | Customer Service: Only a few have specific suggestions for how Hydro One could improve their customer service

F43. Is there anything in particular that Hydro One can do to improve your organization's customer service experience?

[Asked of all respondents, n=47]



Key Insights

- "Putting customer first" (6%) and "reduce bureaucracy" (4%) are top suggestions for improvement.
- Majority (55%) of LTX customers "don't know" how Hydro One could improve customer service. Another 28% don't have anything to suggest (15%) or say it's "all good" (13%).
- Lack of ready suggestions for improvement is a reflection of high satisfaction with customer service and confirms that there are no obvious issues.

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Areas of Improvement | Customer Service Verbatim

Q **F43.** Is there anything in particular that Hydro One can do to improve your organization's customer service experience?

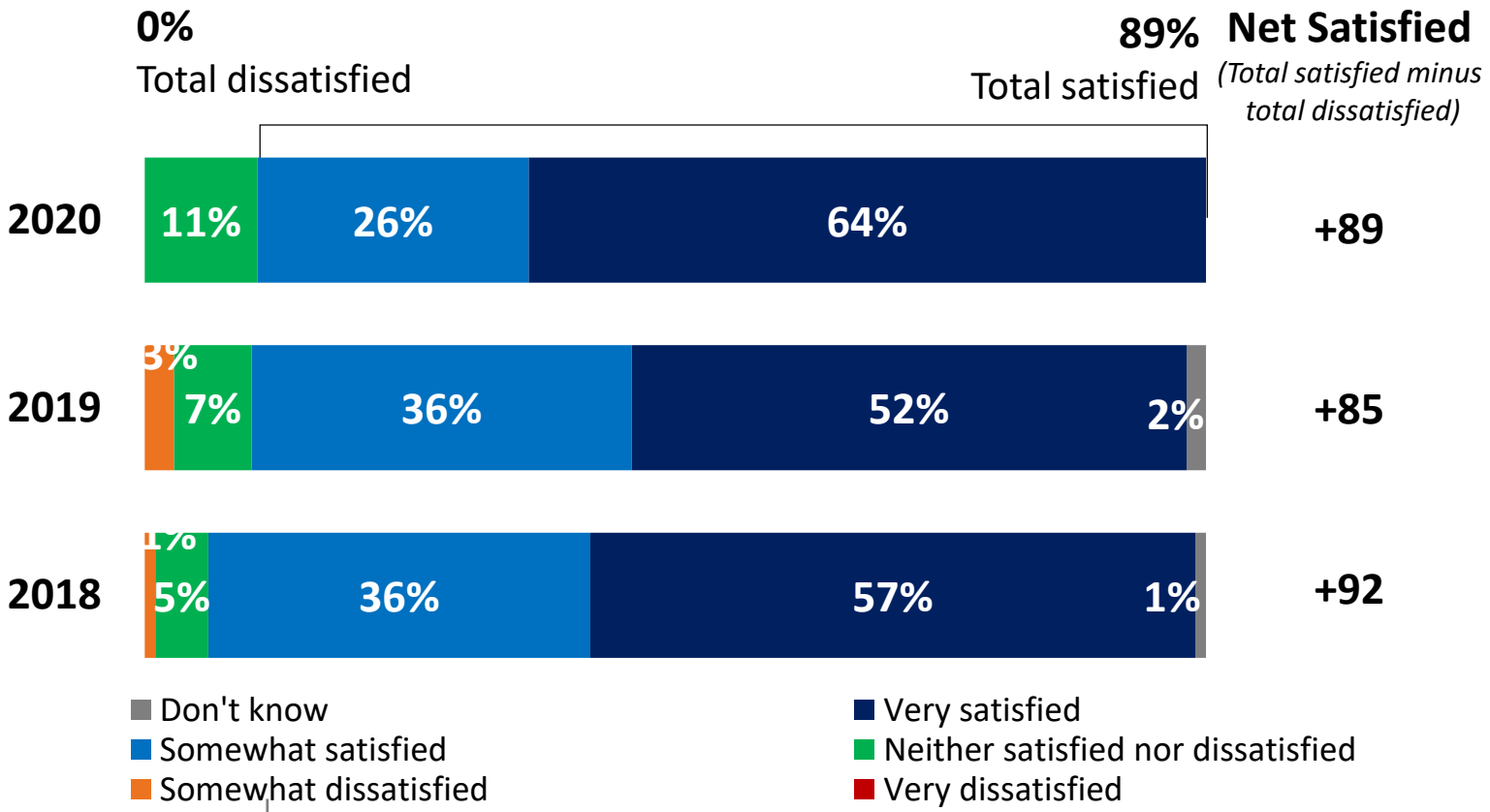
[Asked of all respondents, n=47]

Verbatim
"Fix the billing invoice website, it is terrible!"
"Follow through on commitments on scheduled projects to improve capacity and supply."
"Generally excellent customer service. Our organization has many touchpoints with Hydro One so its never perfect."
"Improve internal organizational agility to improve expediency of decision making and turn-around time."
"Much of the rest of the organization still needs to learn what customer service means."
"The pace of project execution should increase including the timing for DCRs."
"We would like Hydro One do their planned outages in a way that all the customers are satisfied with their decision."
"From an operations perspective, our customer service is satisfactory, nothing in particular."

Communication: 9-in-10 (89%) are satisfied with Hydro One's communication; net satisfaction up four points year-to-year

F44. Thinking about your organization's interactions with Hydro One over the **past year** -- either via email, over the telephone, or with in-person meetings – how satisfied or dissatisfied are you with the way Hydro One communicates with you and your organization?

[Asked of all respondents, n=47]

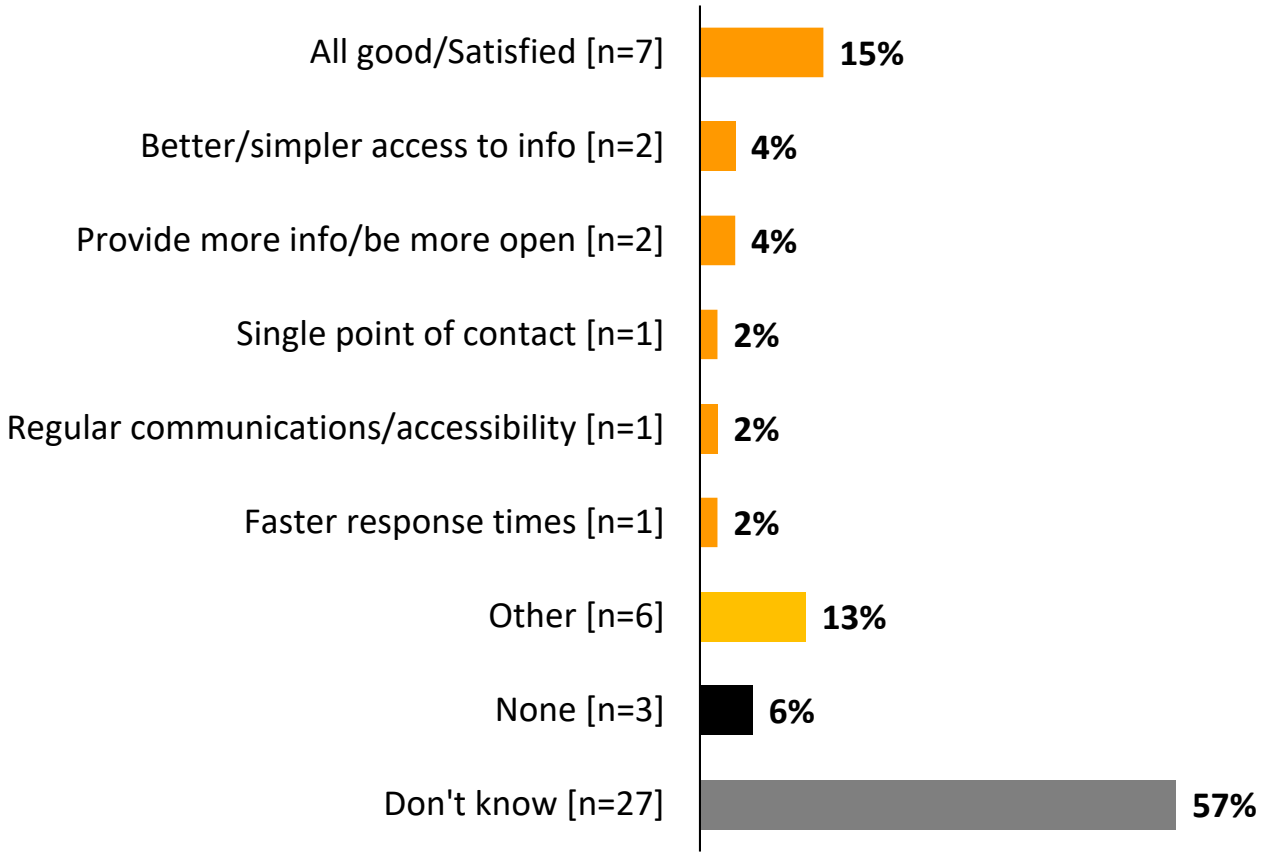


Key Insights

- Similar to overall customer service, satisfaction with communication among LTX customers is solid; 2-in-3 (64%) say they are *very* satisfied, and another quarter (26%) are *somewhat* satisfied.
- Intensity of satisfaction has increased year-to-year

Areas of Improvement | Communication: Majority have no suggestions for how Hydro One could improve their communications

Q **F45.** Is there anything in particular that Hydro One can do to improve the way it communicates with your organization?
[Asked of all respondents, open-ended, n=47]



Key Insights

- Nearly 6-in-10 (57%) LTX customers "don't know" how Hydro One can improve the way it communicates with them. Another 6% say nothing and 15% say it's "all good".
- The responses suggest customers want Hydro One to keep doing what they are doing.

Verbatim

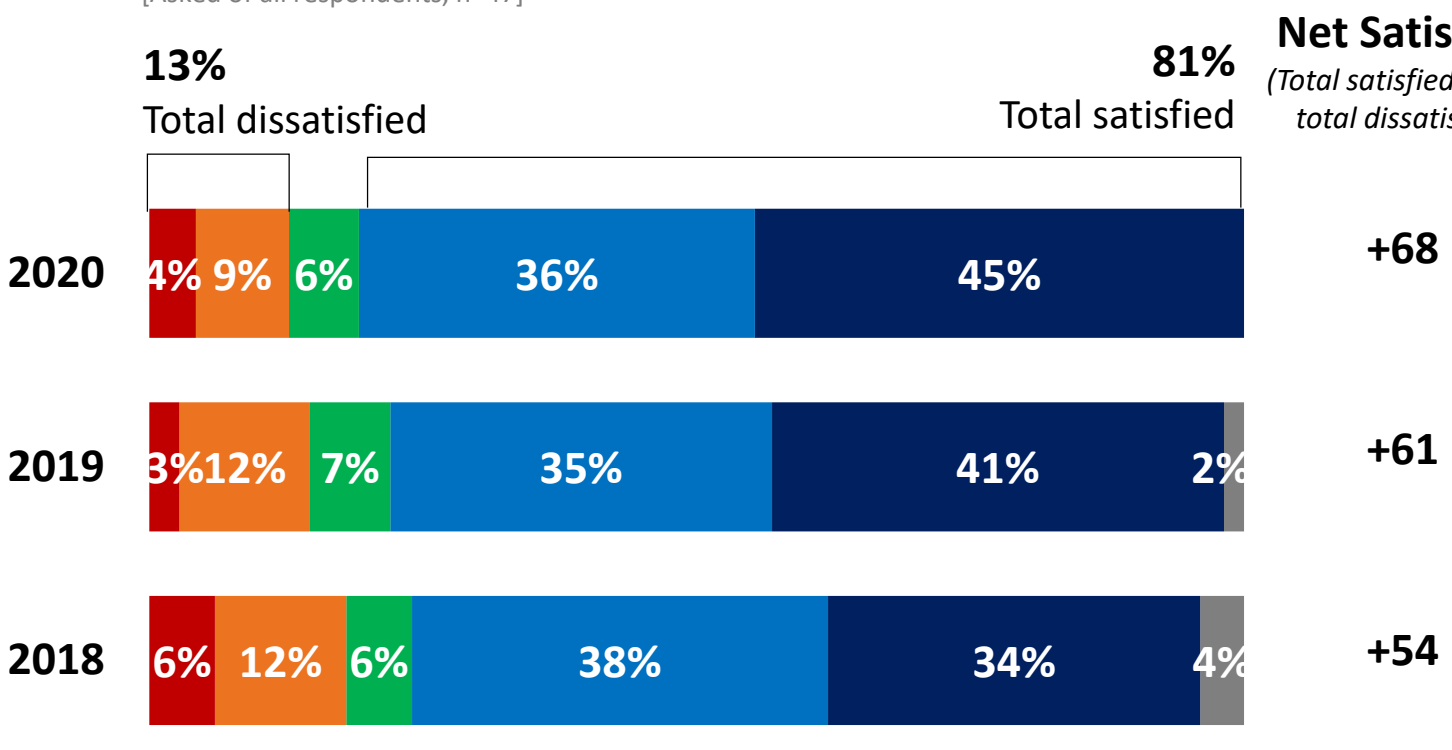
"Both parties would benefit from more open communications between Distribution Area staff - field personnel."
"Hydro One staff are doing great, we would like to keep this spirit up."
"Just the monthly consumption data are due for our reports on the 4th of every month. We seldom have them on the 4th."
"Sometimes we have to wait for responses from the Planning department. Maybe provide the same type of a portal as IESO has. Better feedback about milestones on generator CIAs ex. provide confirmation that you've received the application, where in the queue it is, provide the name of the person assigned to do the CIA, etc."
"We are satisfied with the quality of communications and an additional meeting to update each other on plans would be appreciated."

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.
Refused (3%) not shown.

Reliability

Reliability of Electricity Service: 8-in-10 (81%) LTX customers are satisfied with the reliability of their electricity service

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E20. The reliability of your electricity service (as judged by the number of unplanned power outages your organization experiences).
[Asked of all respondents, n=47]

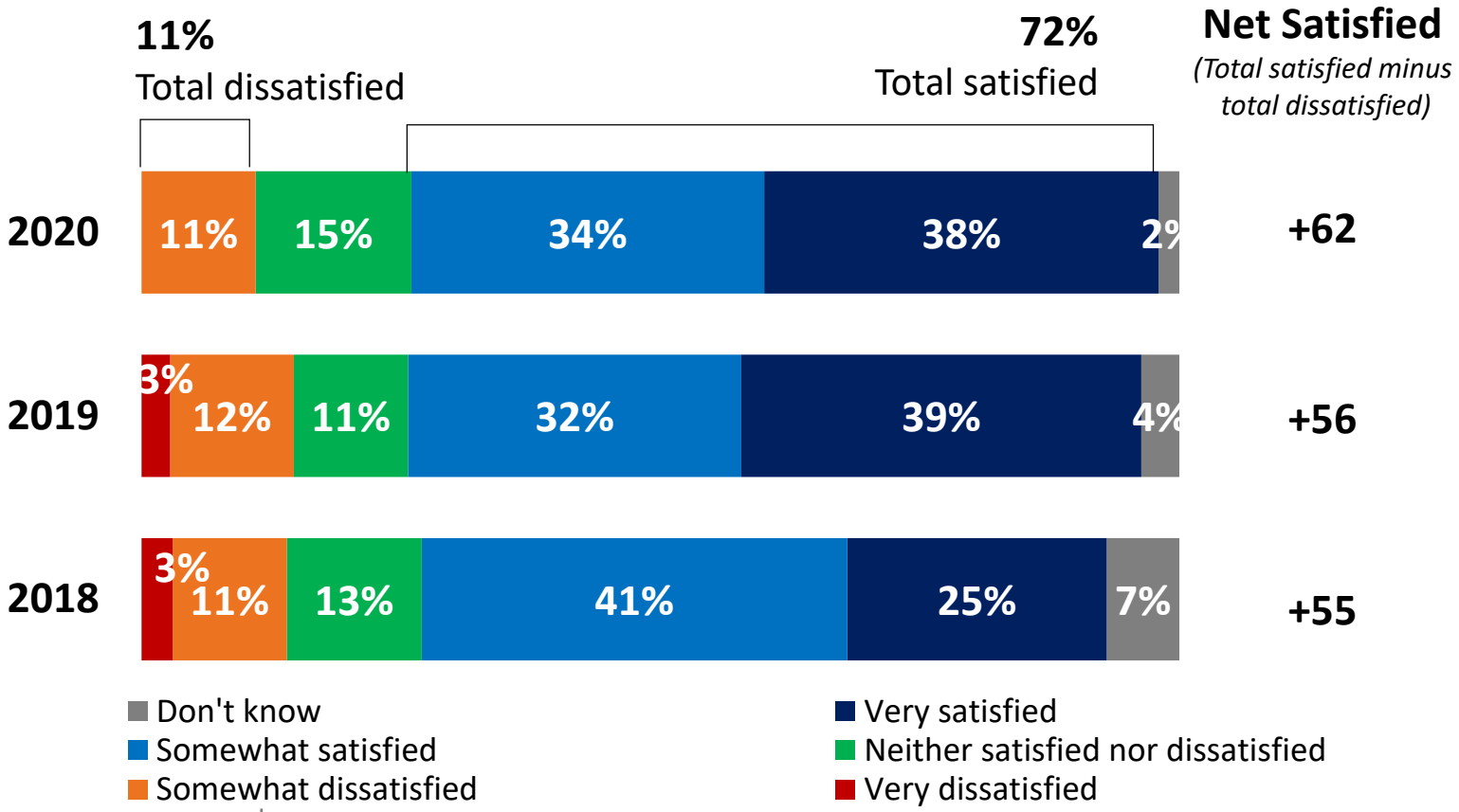


Key Insights

- 8-in-10 (81%) say they are satisfied with their electricity service, and intensity has increased 14 points since 2018, from 34% '*very* satisfied' to 45% in 2020.

Time to Restore Power: At 72%, total satisfaction with the time it takes to restore power remains steady

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
D21. The amount of time it takes to restore power when unplanned power outages occur.
[Asked of all respondents, n=47]

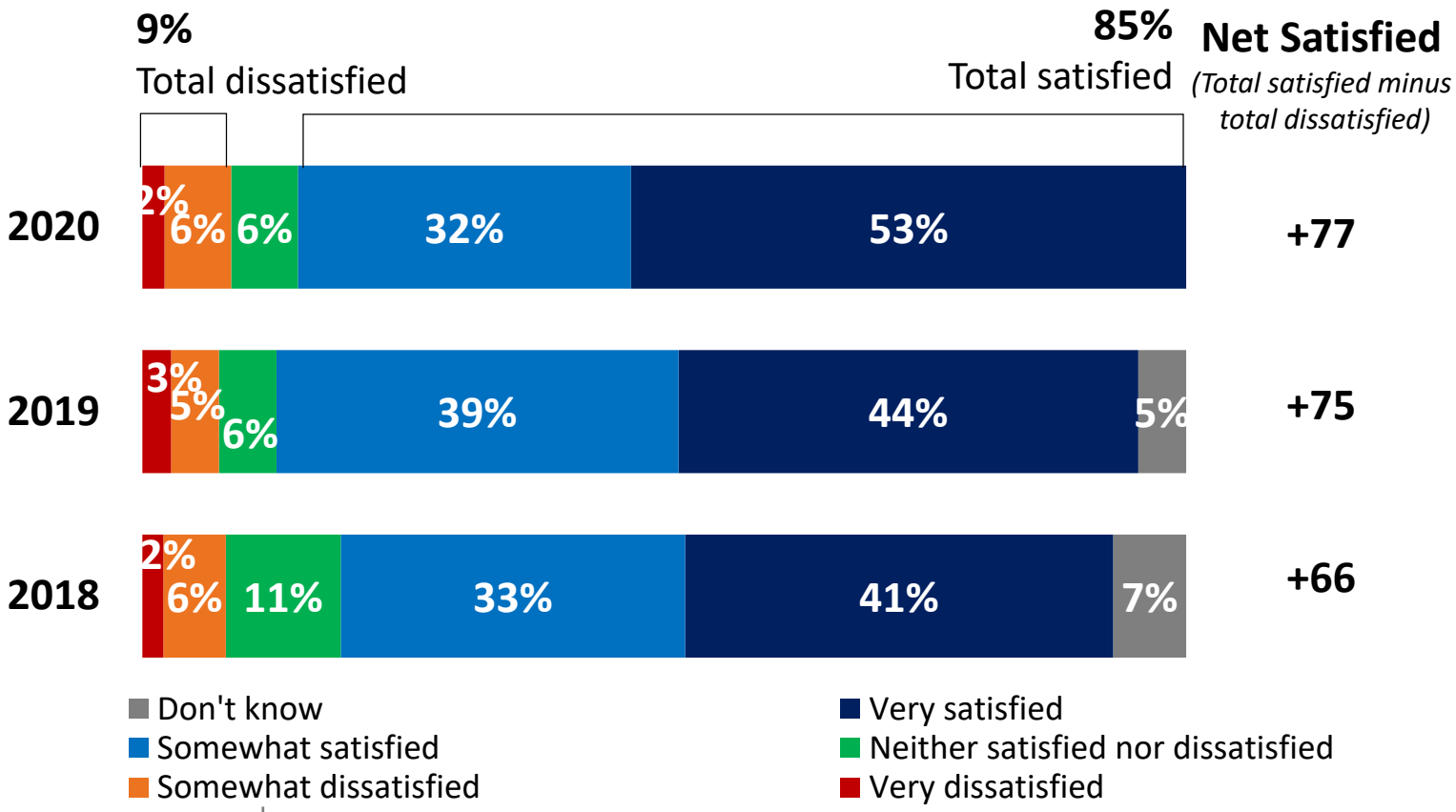


Key Insights

- 7-in-10 (72%) are satisfied with the the time it takes to restore power after an unplanned outage.
- No LTX customers are *very dissatisfied* on this measure in 2020, resulting in a marginal increase in net satisfaction.

Quality of Power: More than 8-in-10 (85%) LTX customers are satisfied with the quality of the power delivered to their organization

Q For each statement, please indicate your level of satisfaction of dissatisfaction.
E22. The quality of power delivered to your organization (as judged by the absence of voltage fluctuations that may affect your organization's facilities and equipment).
[Asked of all respondents, n=47]

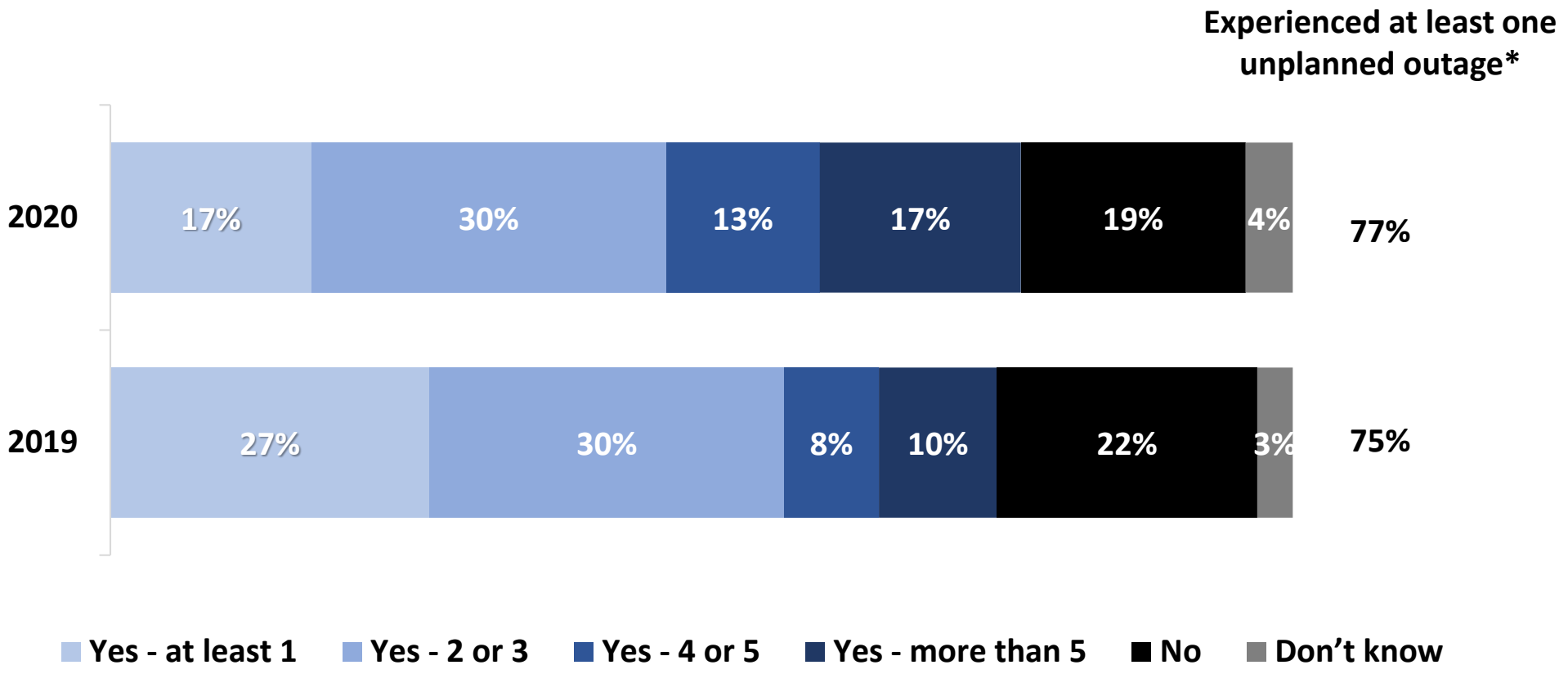


Key Insights

- Over 8-in-10 (85%) LTX customers are satisfied with the quality of the power delivered to their organization, up 11 points from 2018.
- The level of intensity has improved with a 7 point gain in the proportion who are *very* satisfied.

Experience with Unplanned Outages: LTX customers are experiencing slightly higher numbers of unplanned outages than they did last year

Q **E23.** In the past year, has your organization experienced any **unplanned power outages** with Hydro One?
[Asked of all respondents, n=47]

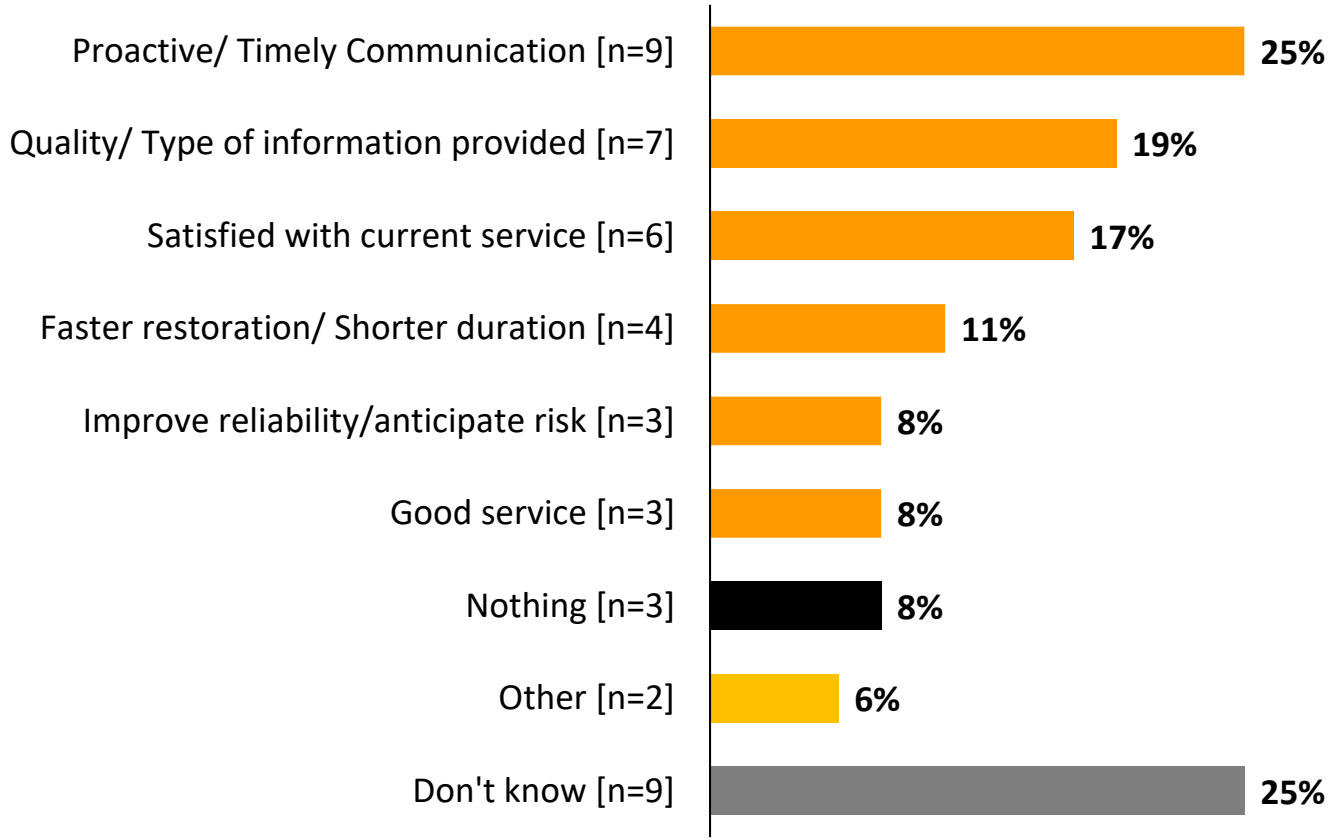


Note: * In 2018, **73%** had experienced an unplanned outage (only "yes" or "no" response options were provided)

Areas of Improvement | Unplanned Outages: Timely communication and quality information are the main suggestions for improvement

Q **E26.** Is there anything in particular Hydro One can do to improve your organization's experience during unplanned outages?

[Asked of those who could recall experiencing an unplanned outage in the past year, open-ended, n=36]



Key Insights

- Some (25%) LTX customers feel Hydro One can improve on "proactive/timely communication" during unplanned outages, while others (19%) cite "quality/type of information provided".
- Others (17%) are satisfied with the current service, and an additional 8% say there is nothing to improve.
- One-in-four (25%) don't know what Hydro One could do to improve.

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Areas of Improvement | Unplanned Outages Verbatim

Q

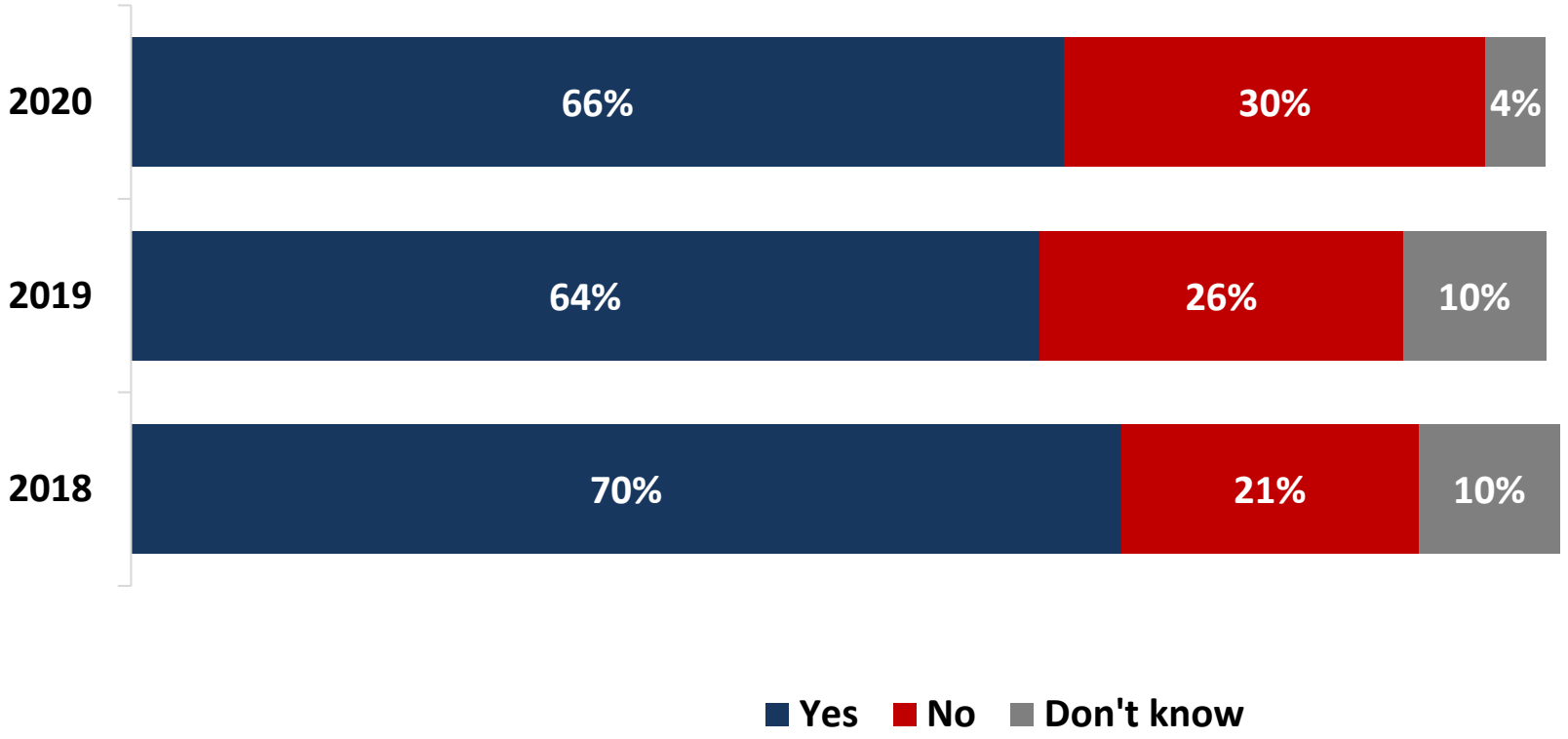
E26. Is there anything in particular Hydro One can do to improve your organization's experience during unplanned outages?

[Asked of those who could recall experiencing an unplanned outage in the past year, open-ended, n=36]

Verbatim
"As always - time to restoration communication to our staff is important."
"Be more reliable with estimating when power will be restored."
"Better information as to the root cause of the failure and the steps being undertaken to keep the problem from reoccurring."
"Challenge timeliness of follow up investigations."
"In the absence of ETR, high-level communication of what problems have been found, confirmation that crews have been dispatched, etc. would be helpful. Even without an ETR, we've found that our own LDC customer satisfaction increases even by just confirming that we're aware of a situation and providing high-level description of response efforts."
"Hydro One could move more quickly to open station breakers when they lose a station. If they do that almost immediately, we can re-route power on the distribution system to restore customers. An early call to our Operators will also help inform them of the issue and the need for our Operators to act."
"Not in most cases. It's usually weather related or equipment failure that gets repaired as quickly as possible. In some cases we could use more assistance in identifying voltage swings to assist with our investigation."
"Work more cooperatively with neighboring utilities early on. If crew availability is limited to widespread outages, utilities should leverage staff collectively better earlier on to restore power to local areas. I recognize this has some union implication perhaps legislation could help in this area."
"We have discussed this issue during regional planning activities, and progress is being made to install infrastructure at our distribution station to be able to reduce downtime from 8hrs per outage in our Kenora service area."

Experience with Planned Outages: 2-in-3 (66%) recall experiencing a *planned* power outage, mostly steady year-to-year

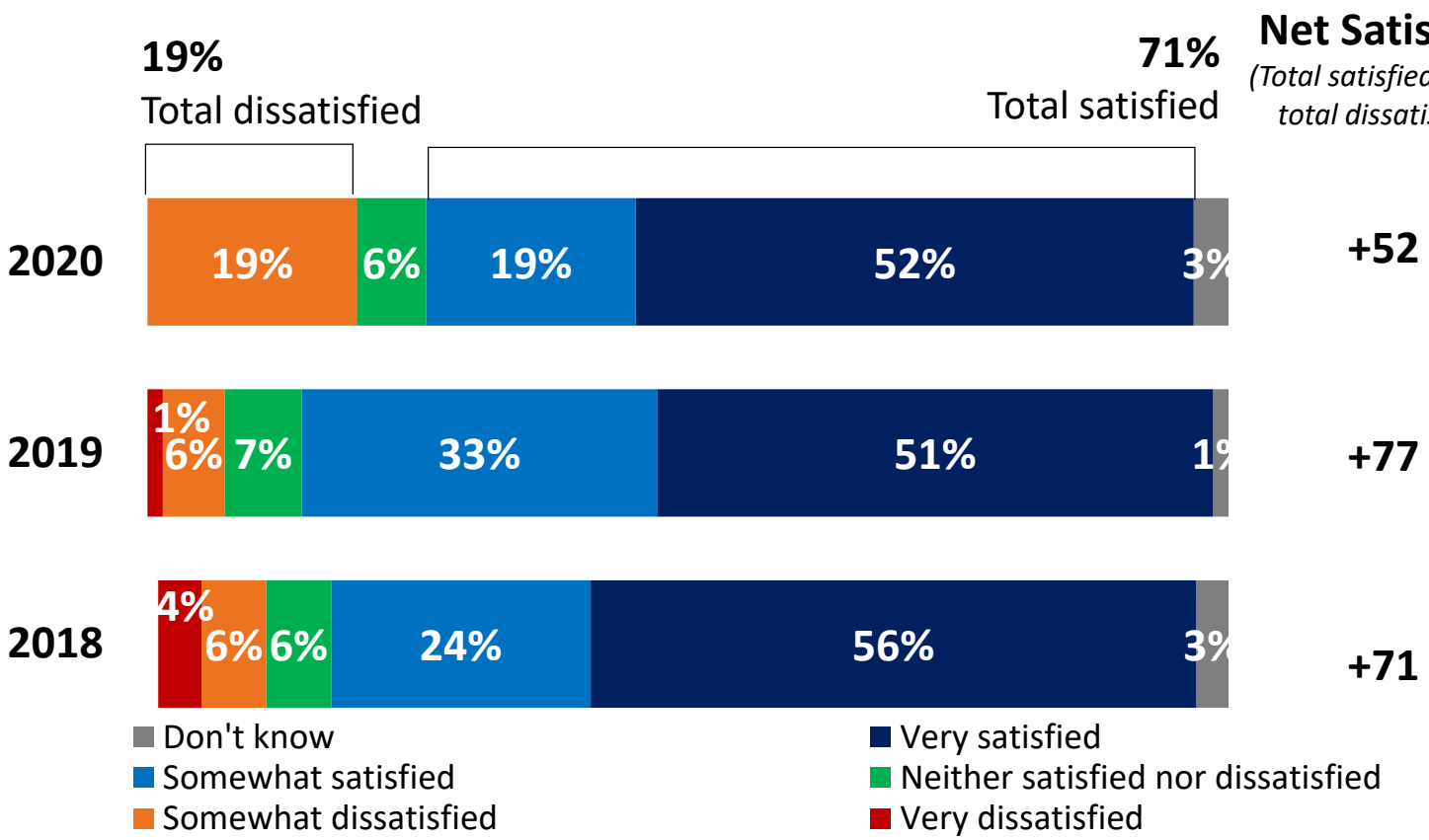
Q **E27.** In the past year, has your organization experienced any **planned power outages (or loss of supply)** with Hydro One?
[Asked of all respondents, n=47]



Satisfaction with Planned Outages: Among those who recall a planned outage, 7-in-10 (71%) report they are satisfied

E28. Generally, how satisfied or dissatisfied are you with the way your **planned power outages** are managed by Hydro One?

[Asked of those who could recall experiencing a planned outage in the past year, n=31]



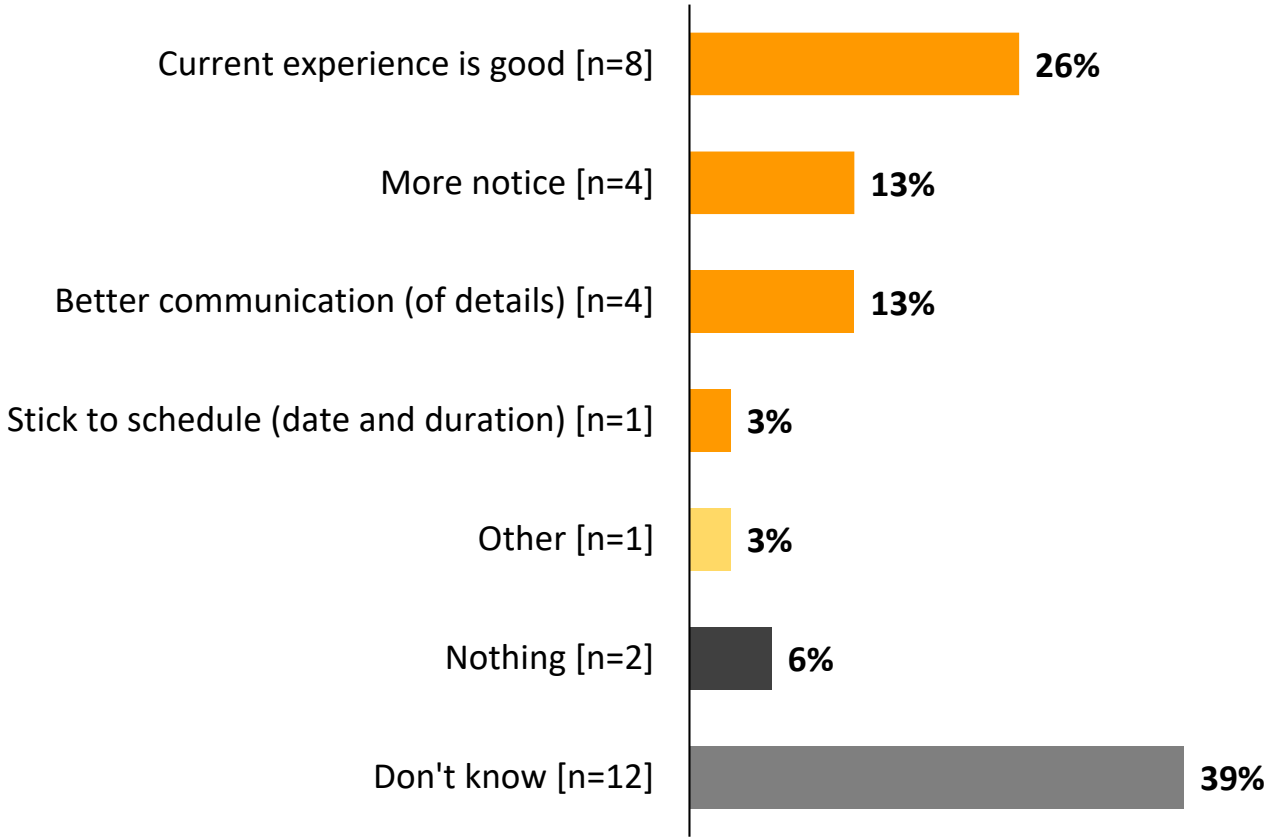
Key Insights

- LTX customers who have experienced a planned outage are satisfied (71% total satisfaction) with great intensity (52% "*very* satisfied").
- However, a decrease in satisfaction paired with an increase in dissatisfaction results in a net satisfaction score that is 25 points lower than last year.

Areas of Improvement | Planned Outages: Top specific mentions reference ‘more notice’ (13%), ‘better details communication’ (13%)

Q **E29.** Is there anything in particular Hydro One can do to improve your organization’s experience during planned outages?

[Asked of those who could recall experiencing a planned outage in the past year, open-ended, n=31]



Key Insights

- A majority of LTX customers who have experienced a planned outage don’t have any particular suggestions for improving Hydro One’s service:
  - 39% “don’t know”
  - 6% “nothing”
  - 26% “current experience is good”
- Specific mentions of improvement are about providing more notice (13%), better communication of the details (13%), and “sticking to a schedule” (3%).

NOTE: Multiple mentions were recorded in this open-ended question. As such, percentages may add up to over 100%.

Areas of Improvement | Planned Outages Verbatim

E29. Is there anything in particular Hydro One can do to improve your organization's experience during planned outages?

[Asked of those who could recall experiencing a planned outage in the past year, open-ended, n=31]

Verbatim
"Again, be more reliable when estimating time to restore power."
"Continued communication with our system control center will ensure that our staff can plan their work appropriately."
"Generally our experience is fine with ample notice. As previously noted, more advanced notice would be better for some of the work which appears to be more guided by field staff so we can plan for assistance and/or budget for it."
"I requested phone calls to confirm the line was restored after the planned outage. but I never heard the call from Hydro One."
"On the distribution side, we've found Hydro One does not provide a lot of notice about line outages that affect us. On the transmission side, we've found Hydro One to be proactive with outage notification and coordination."
"Plan with us (solar energy plants) inform us well ahead of outages"
"Poor timing on restart. Actual restart was hours after the planned restart. We paid a premium for overtime waiting for the call to restart at our end."
"We need to be careful in regards to double peak billing for transmission and low voltage charges when Hydro One has outages."
"When we requested Hydro One to restore the power we waited for 2 hours to find out that the power was already on, with no notification to us."

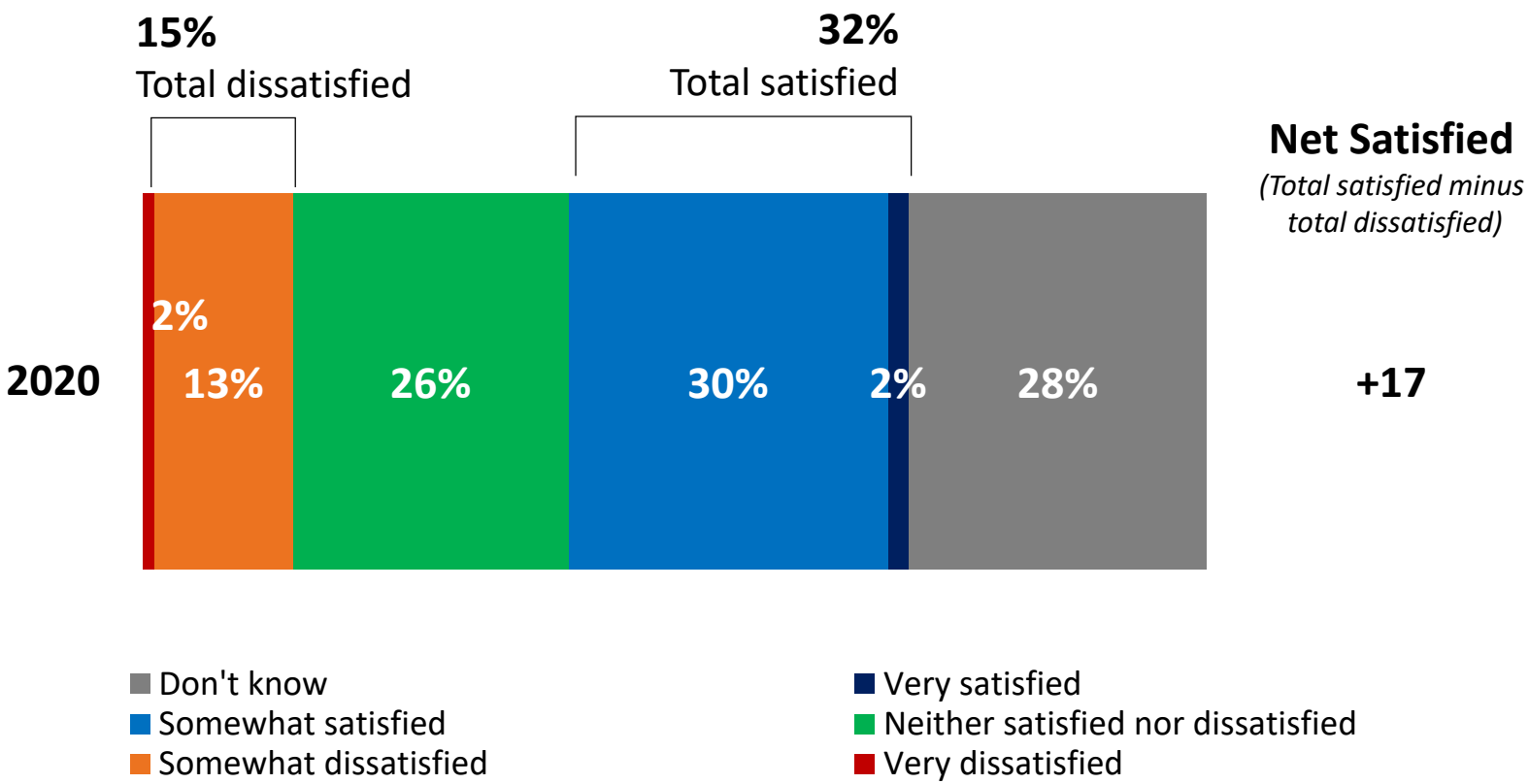
Rates & Additional Services

INNOVATIVE RESEARCH GROUP

Satisfaction with Rates: One-third (32%) of LTX customers are satisfied with the rates charged for electricity transmission

H48. Now, please think about the electricity bills your organization receives from Hydro One. How satisfied or dissatisfied are you overall with the rates charged for electricity transmission?

[Asked of all respondents, n=47]

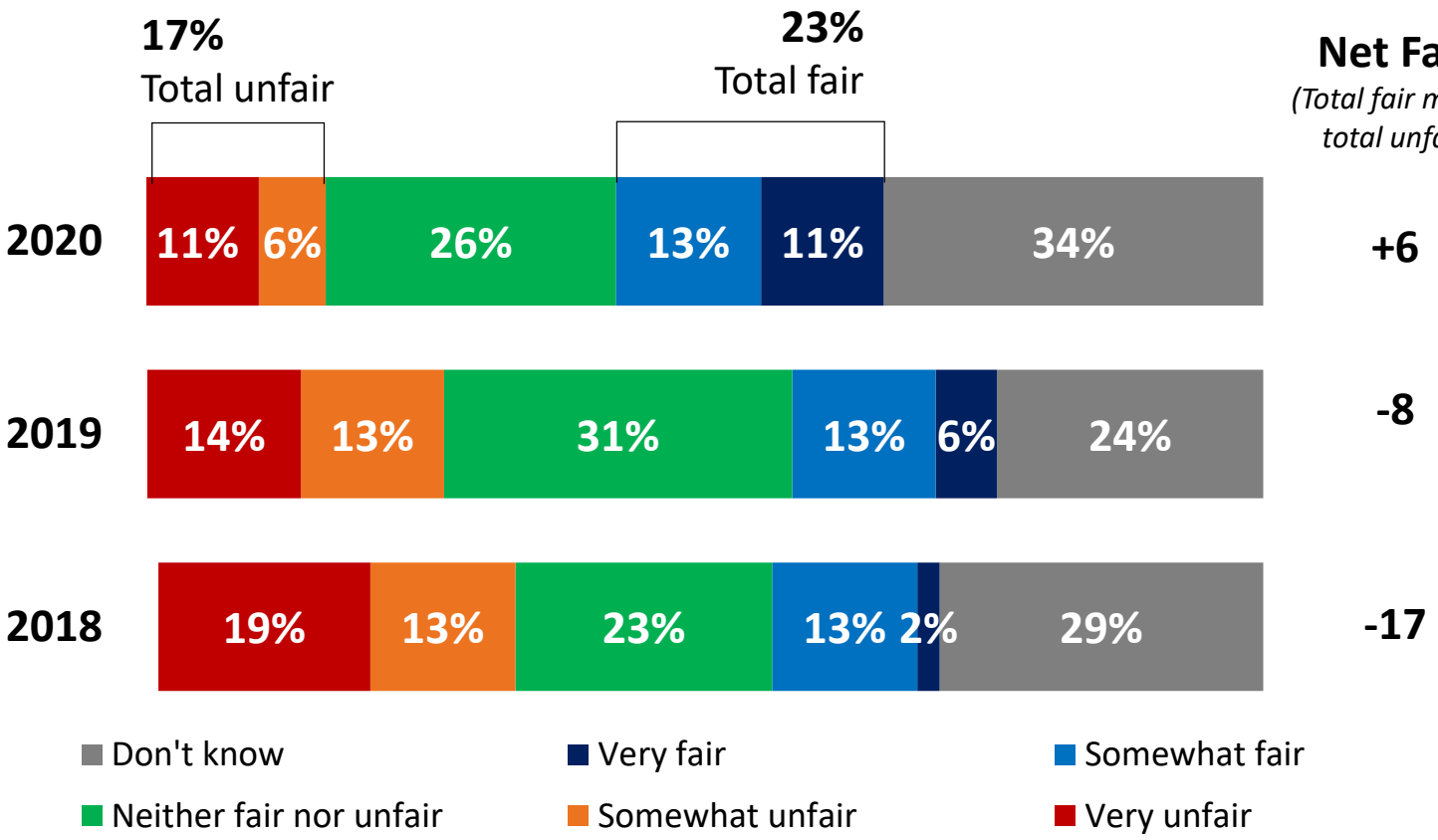


Key Insights

- While a third (32%) of LTX customers are satisfied with electricity transmission rates, the majority either "*don't know*" (28%) or have a neutral opinion (26%).
- *Satisfaction* is higher than *dissatisfaction*, resulting in a net satisfaction level of +17.

Fairness of the Global Adjustment: For the first time since tracking began, more feel the GA is fair (23%) than unfair (17%)

Q **G58.** How fair do you think the following charges on your bill are?
The Global Adjustment (GA)
[Asked of all respondents, n=47]

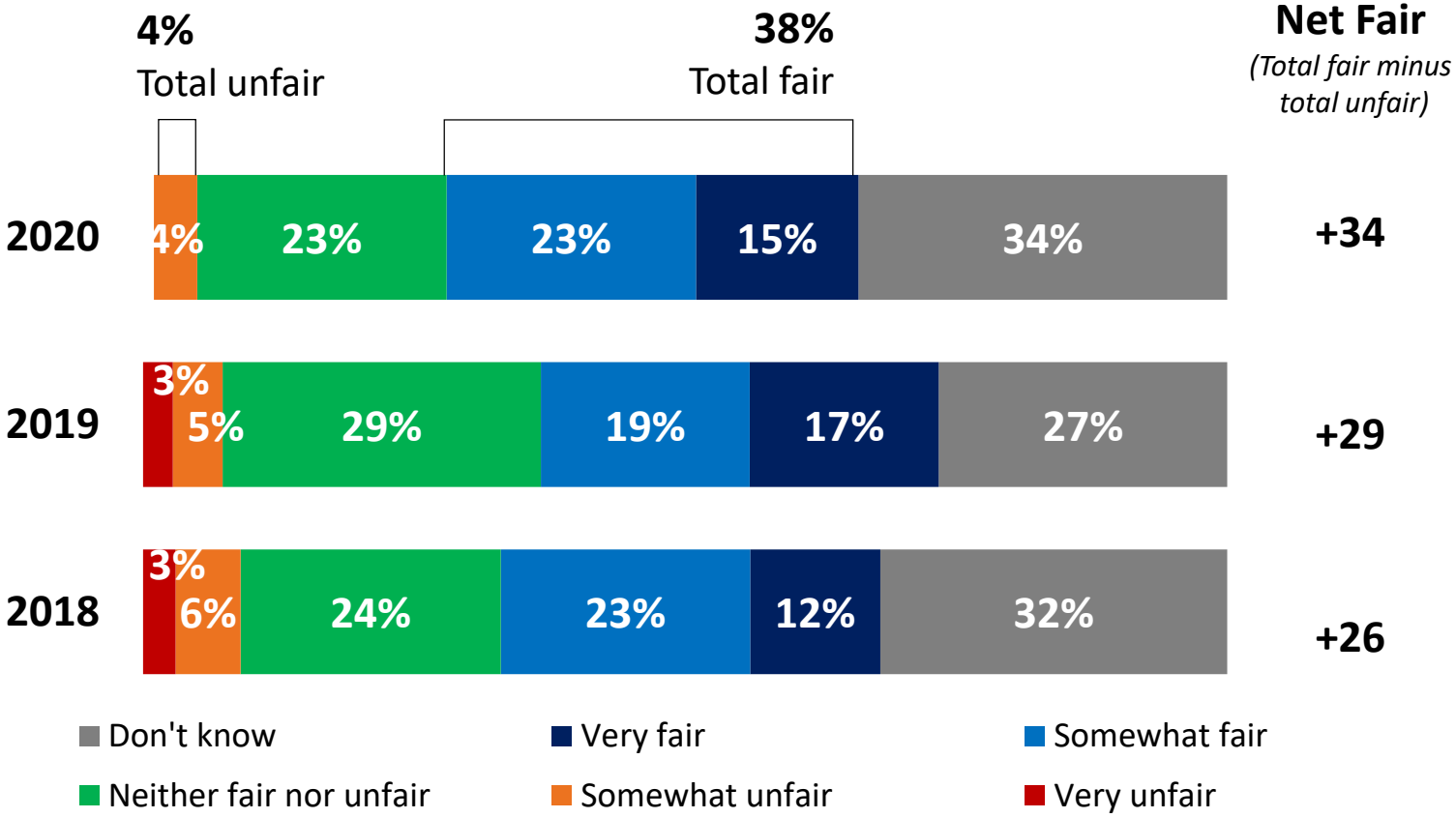


Key Insights

- While most either *don't know* (34%) or don't have an opinion (26%), for the first time since tracking began, more LTX customers deem the GA to be *fair* (23%) than *unfair* (17%), resulting in a positive net fair score of +6.

Fairness of the HOEP: Almost four-in-ten (38%) consider the HOEP to be a fair charge

G59. How fair do you think the following charges on your bill are?
The Hourly Ontario Energy Price (HOEP)
[Asked of all respondents, n=47]



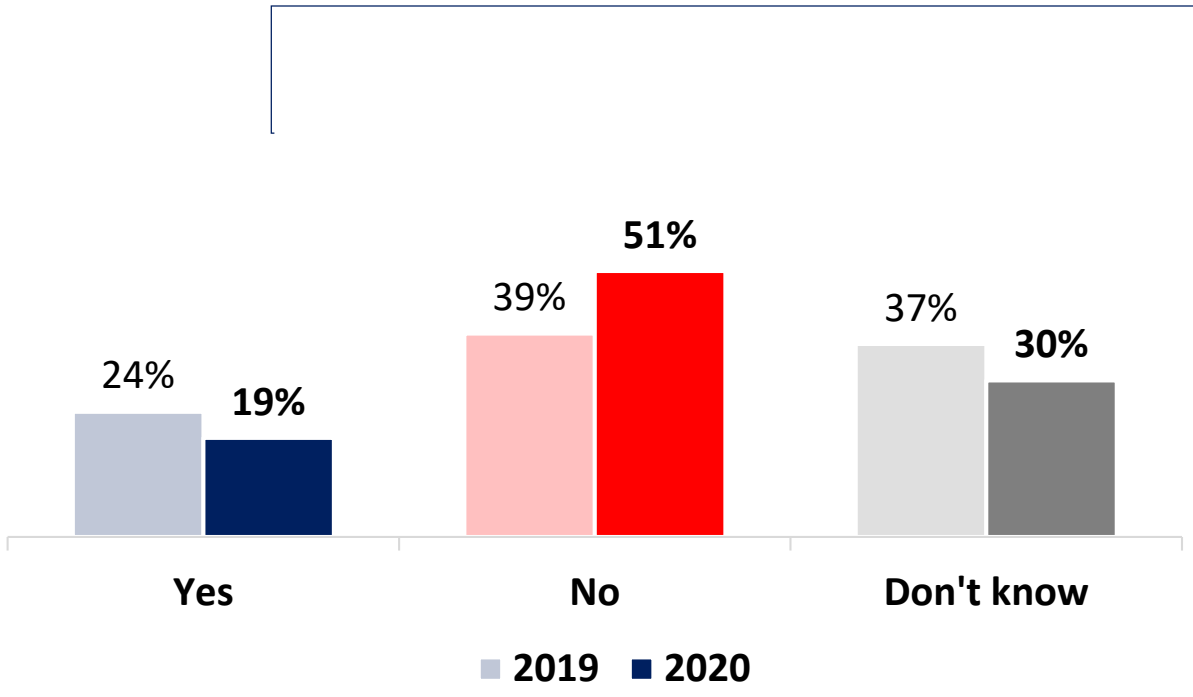
Key Insights

- Most LTX customers don't have an opinion or are ambivalent about the Hourly Ontario Energy Price, but those who do have an opinion are more likely to deem it *fair* (38%) than *unfair* (4%).

Additional Services: 1-in-5 (19%) LTX customers would look to Hydro One for additional services

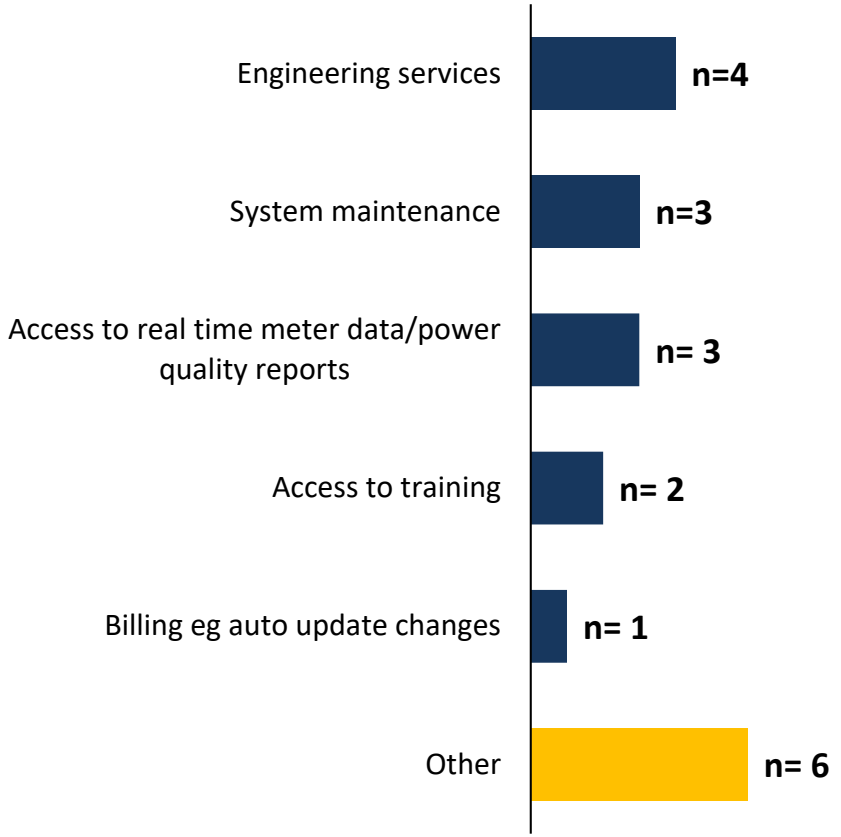
H60. Are there any additional services that you would look to Hydro One to provide and would be willing to pay for, or perhaps services that are currently offered by Hydro One that could be done differently to better fit your organization's needs?

[Asked of all respondents, n=47]



H61. Please describe what new services you would like, or how you would like existing services to be changed?*

[Asked of all who said "yes" to previous question, n=9]



NOTE: *Small n-size, interpret with caution.

Additional Services| Selection of Verbatim

H61. Please describe what new services you would like, or how you would like existing services to be changed?

[Asked of all who said "yes" to previous question, n=9]

Verbatim
"Allow large customers to switch their loss factor to SSLA."
"At some point in the future we will need to have more DERs on our system which will mean Hydro One will need to be able to accommodate this."
"Explore including an option in mutual aid agreements with Hydro One for LDCs to be able rent MUS, as well as price for a spare power transformer. Overall this maybe efficient or a win-win for the industry and Hydro One."
"Our LDC services in Thunder Bay and Kenora, and MSP customers are in rural northern locations. We often find it difficult to find qualified metering staff, and it would be beneficial to be able to contract out some of those services when needed."
"Planning portal development (similar to IESO's)."
"We are sending our plant data to IESO and Hydro One separately. If this data can be shared between IESO and Hydro, so we don't have to pay an extra fee for Hydro One telemetry."
"We would be interested in transformer station maintenance services."

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B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 002

Reference:

Exhibit B-1-1, SPF Section 1.7, Page 5

Interrogatory:

Figure 3 provides Hydro One's strategic priorities and objectives.

Please discuss if these priorities have changed since EB-2019-0082 and EB-2017-0049.

Response:

In late 2019, Hydro One launched a new Corporate Strategy which identified five specific strategic priorities as identified in Figure 3 of Exhibit B-1-1, SPF Section 1.7 and summarized below:

- Plan, design and build a grid for the future
- Be the safest and most efficient utility
- Advocate for our customers and help them make informed decisions
- Be a trusted partner
- Innovate and grow the business

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B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 003

Reference:

Exhibit B-1-1, SPF Section 1.7, Page 6

Interrogatory:

Table 1 provides Hydro One's RRF Performance Outcome Objectives.

Please discuss if these priorities have changed since EB-2019-0082 and EB-2017-0049.

Response:

Since EB-2017-0049 and subsequently EB-2019-0082, Hydro One has continued to focus on outcome objectives which are aligned with the OEB's Renewed Regulatory Framework. These outcome objectives focus on the following elements, which guide Hydro One's approach to planning and operations:

- Customer satisfaction
- Customer focus
- Cost control
- Safety
- Employee Engagement
- System Reliability
- Public Policy Responsiveness
- Environment
- Financial Performance

Since EB-2017-0049 and subsequently EB-2019-0082, the following changes have been made in relation to Hydro One's outcome objectives:

- Safety - Enhanced focus on achieving top-tier safety performance and eliminating serious injuries.
- Cost control – Enhanced focus on continuous improvement to enhance efficiency, productivity and reliability.
- Customer focus – Enhanced focus on providing industry-leading customer service.
- Public policy responsiveness – Enhanced focus on complying with mandated legal and regulatory obligations and requirements.
- Environment – Enhanced focus on lowering greenhouse gas emissions.

- Financial performance – Enhanced focus on responsible investment in the grid to ensure the safety and reliability of the transmission and distribution systems and to provide manageable and stable rate impacts.

For reference, the table below reflects the three sets of outcome objectives:

	EB-2021-0110	EB-2019-0082	EB-2017-0049
Customer Focus	• Improve current levels of customer satisfaction • Engage with our customers consistently and proactively • Deliver industry-leading customer service, in response to identified customer preferences	• Improve current levels of customer satisfaction • Engage with our customers consistently and proactively • Ensure our investment plan reflects our customers' needs and desired outcomes	• Improve current levels of customer satisfaction • Engage with our customers consistently and proactively • Ensure our investment plan reflects our customers' needs and desired outcomes
Operational Effectiveness	• Achieve top-tier safety performance and eliminate serious injuries • Focus on continuous improvement to enhance efficiency, productivity, and reliability • Achieve and maintain employee engagement • Maintain top tier Transmission reliability performance and improve long-term Transmission and Distribution reliability	• Drive towards achieving an injury-free workplace • Actively control and lower costs through OM&A and capital efficiencies • Achieve and maintain employee engagement • Provide top quartile reliability relative to transmission peers	• Drive towards achieving an injury-free workplace for employees and the public • Actively control and lower costs through OM&A and capital efficiencies • Achieve and maintain employee engagement • Provide reliability consistent with customer expectations
Public Policy Responsiveness	• Deliver on obligations mandated by government through legislation and regulatory requirements • Lower Hydro One's environmental footprint through greenhouse gas reduction	• Ensure compliance with all codes, standards and regulations • Partner in the economic success of Ontario • Sustainably manage our environmental footprint	• Ensure compliance with all codes, standards, and regulations • Partner in the economic success of Ontario • Sustainably manage our environmental footprint

Financial Performance	• Responsible investment in rate base assets to ensure the safety and reliability of the grid • Manageable and stable rate impacts over the course of the planning period	• Achieve the ROE allowed by the OEB	• Achieve the ROE allowed by the OEB • Manage planning and spending to mitigate customer impacts

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B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 004

Reference:

Exhibit B-1-1, SPF Section 1.7, Page 10

Interrogatory:

The asset needs assessment processes are structured to determine individual asset needs. The process relies on asset data, including condition, utilization, performance, obsolescence and other factors, and focusses on major equipment groups in transmission (ex: transformers, conductor, breakers, and protection and control systems) and distribution (ex: station transformers, poles) that directly affect system reliability. This process drives effective planning decisions by ensuring a consistent view of asset information. As part of the preliminary needs assessment, asset condition and other factors are assessed against current and future requirements to identify investment candidates.

a) In previous applications, Hydro One utilized two additional risk factors related to demographics and economics to inform asset needs and the identification of candidate investments. In EB-2019-0082 I-12-4, Hydro One provided the relative weightings for the six risk factors for transmission conductors, transformers and breakers.

   Please explain why Hydro One has moved from six risk factors to four risk factors in its risk assessment and discuss the impact.

b) Hydro One provides definitions for the condition, utilization, performance and criticality risk factors in evidence. Please provide a definition for the economic and demographic risk factors.

c) Please complete the following tables to provide the current relative weightings for each risk factor for transmission and distribution assets on the same basis as EB-2019-0082 I-12-4:

Tx Assets	Condition	Utilization	Performance	Criticality	Economics	Demographics
Network Transformers						
Connection Transformers						
Conductors						
Circuit Breakers						
Protection and Control Systems						
Insulators						
Wood poles						
U/G Cable						

Dx Assets	Condition	Utilization	Performance	Criticality	Economics	Demographics
Station Transformers						
Connection Transformers						
Conductors						
Circuit Breakers						
Protection and Control Systems						
Insulators						
Wood poles						
Steel Structure						
U/G Cable						

d) Availability of data varies by asset type. Please complete the following tables to provide the percentage of available data for each asset risk for transmission and distribution assets:

Tx Assets	Population	% Data Condition	% Data Utilization	% Data Performance	% Data Criticality	% Data Economics	% Data Demographics
Network Transformers							
Connection Transformers							
Conductors							
Circuit Breakers							
Protection and Control Systems							
Insulators							
Wood poles							
U/G Cable							

Dx Assets	Population	% Data Condition	% Data Utilization	% Data Performance	% Data Criticality	% Data Economics	% Data Demographics
Transformer							
O/H Conductor							
Cross Arm							
Wood poles							
U/G Cable							
O/H Tranformer							
U/G Transformer							
Submarine Cable							
Insulator							

Response:

a) In this application, Hydro One has clarified the process steps related to the needs assessment and subsequent investment candidate risk assessment. The factors referenced below are only one piece of the comprehensive needs assessment process, which considers a variety of factors, as detailed in SPF Section 1.7. Depending on the nature of the asset, Hydro One may utilize up to eight factors in the asset needs assessment, including Condition, Demographics, Criticality, Performance, Utilization, Economics, Obsolescence, and Health & Safety.

For example, although a demographic index is calculated, the identification and selection of most System Renewal investments is ultimately driven by verified asset condition as described in TSP Section 2.2 and DSP Section 3.2, and the comprehensive needs assessment described in SPF Section 1.7.

b) The table below provides definitions for the demographic and economic indices:

Index	Description
Demographics	Takes into consideration the assets' physical age in relation to its projected service life value or "Expected Service Life" (ESL), along with other demographic criteria like type, batch, manufacturer, etc. Hydro One defines asset ESL as the "average time duration in years that an asset can be expected to operate under normal system conditions and is determined by considering manufacturer guidelines and Hydro One historical asset retirement data."
Economics	Takes into consideration the weighted average of emergency and corrective costs required to maintain the existing asset, as compared to the benchmark cost for the specific asset type/class.

c) The table below provides the relative weightings for the composite asset index on the same basis as the major assets included in EB-2019-0082 I-12-4. The analytics solution also includes obsolescence and health and safety factors associated with known issues; these are considered as part of the comprehensive asset needs assessment.

Transmission

Asset	Condition	Utilization	Performance	Criticality	Economics	Demographics
Conductors	40%	15%	15%	15%	0%	15%
Power Transformers	33%	13%	27%	7%	9%	11%
Breakers	33%	13%	27%	7%	9%	11%

Distribution

Asset	Condition	Utilization	Performance	Criticality	Economics	Demographics
Wood Poles	100%	0%	0%	0%	0%	0%
Station Transformers	100%	0%	0%	0%	0%	0%

d) The tables below provide the data availability by major asset type. In some cases, index values are not applicable, or only relevant for assets at a certain point in their life. In these cases, the availability has been identified as N/A.

Transmission

Assets	Population	% Data Condition	% Data Utilization	% Data Performance	% Data Criticality	% Data Economics	% Data Demographics	% Data Obsolescence	% Data Health & Safety
Conductors	28,552	73%	27%	100%	100%	N/A	99%	100%	N/A
Power Transformers	721	100%	100%	100%	100%	100%	100%	N/A	N/A
Breakers	4,756	100%	98%	100%	100%	100%	100%	100%	N/A

Distribution

Assets	Population	% Data Condition	% Data Utilization	% Data Performance	% Data Criticality	% Data Economics	% Data Demographics	% Data Obsolescence	% Data Health & Safety
Wood Poles	1,612,341	100%	N/A	100%	100%	N/A	98%	N/A	N/A
Station Transformers	1,197	100%	89%	100%	100%	100%	100%	N/A	N/A

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B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 005

Reference:

Exhibit B-1-1, SPF Section 1.7, Page 12

Interrogatory:

Hydro One indicates on-site assessments with field personnel are conducted to validate and confirm asset condition, based on site-specific considerations. For high-value assets such as transformers, subject matter experts perform a thorough assessment of asset condition and consider and advise on issues such as equipment obsolescence, manufacturer support, and "repair vs. replace" evaluations.

a) Please discuss at what point during the investment planning process repair versus replace evaluations are made for distribution and transmission assets and how they are made. Provide any analysis.

Response:

a) Repair vs. Replace evaluations are conducted during the current state assessment phase of the planning process; the output of these evaluations informs the development of candidate investments.

Please refer to response in Exhibit I-1-B2-Staff-076.

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B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 006

Reference:

Exhibit B-1-1, SPF Section 1.7, Page 15

Interrogatory:

The current state assessment establishes the necessary fact base to assess the probability and consequence of safety, reliability and environmental risks at the scoring stage of the Investment Planning process described in section 1.7.4.1 below. Risks related to asset con dition, performance and utilization inform the probability score, and risks relating to asset criticality directly inform the consequence score.

a) Please complete the following table to show the allocation of the transmission budget to the three risk taxonomies:

Risk Taxonomies	EB-2019-0082 Transmission Capital $	EB-2019-0082 Transmission Capital %	EB-2021-0110 Transmission Capital $	EB-2021-0110 Transmission Capital %
Safety				
Reliability				
Environmental				
Total				

b) Please complete the table to show the allocation of the distribution budget to the three risk taxonomies:

Risk Taxonomies	EB-2017-0049 Distribution Capital $	EB-2017-0049 Distribution Capital %	EB-2021-0110 Distribution Capital $	EB-2021-0110 Distribution Capital %
Safety				
Reliability				
Environmental Risks				
Total				

Response:

a) The table below shows the proportion of transmission capital that mitigates each of the three risks. Please note that some investments may address multiple risks and as a result the values shown will exceed the total capital envelope.

The percentages provided below show the proportion of the total dollars allocated to a specific taxonomy. Please note some investments may impact multiple taxonomies, as a result the sum of the percentages may exceed 100%.

Risk Taxonomies	EB-2019-0082 Transmission Capital $ (2020-24)	EB-2019-0082 Transmission Capital %	EB-2021-0110 Transmission Capital $ (2023-27)	EB-2021-0110 Transmission Capital %
Safety	2,233	34%	2,364	32%
Reliability	4,719	71%	5,945	82%
Environmental	2,108	32%	2,087	29%
Total Capital	6,621		7,258	

b) The table below shows the proportion of distribution capital that mitigates each of the three risks. Please note that some investments may address multiple risks and as a result the values shown will exceed the total capital envelope.

The percentages provided below show the proportion of the total dollars allocated to a specific taxonomy. Please note some investments may impact multiple taxonomies, as a result the sum of the percentages may exceed 100%.

As noted in Exhibit I-22-B1-SEC-056, enhancements were made to the investment planning process following EB-2017-0049, and as a result the requested information/breakdown cannot be provided for EB-2017-0049 on a comparable basis.

Risk Taxonomies	EB-2017-0049 Distribution Capital $	EB-2017-0049 Distribution Capital %	EB-2021-0110 Distribution Capital $	EB-2021-0110 Distribution Capital %
Safety	Not comparable		52	1%
Reliability			2,500	47%
Environmental			689	13%
Total			5,297	

B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 007

Reference:

Exhibit B-1-1, SPF Section 1.7, Page 16

Interrogatory:

Hydro one indicates risk assessment considers both the probability and consequence of an event. Risks relating to asset condition, performance and utilization inform the probability score. Risks related to criticality directly inform the consequence score.

a) Please confirm when the above risk assessment process was implemented.

b) Did the above risk assessment process impact the asset strategies in place for some asset types? If yes, please provide details.

c) Please discuss if there have been any adjustments in the risks that inform the probability score and consequence score in determining investment levels compared to previous distribution and transmission applications.

d) Please confirm demographic and economic risks do not inform the probability or consequence score.

Response:

a) The referenced risk assessment process was introduced in 2017 for the Transmission segment and 2018 for the Distribution segment. Please refer to Exhibit I-22-B1-SEC-056 for additional information.

b) No, the risk assessment process has not caused the asset strategies to change. However, there is a relationship and process tie-in between the asset strategies that are in place and the risk assessment process. Asset strategies, as described in each of Exhibit B-2-1, TSP Section 2.2 and Exhibit B-3-1, DSP Section 3.2, outline the overall approach to asset lifecycle management that underpins the identification of investment candidates. The implementation of asset strategies, including the type and frequency of inspections applicable to each asset class, allows Hydro One to gather the maintenance, inspections and condition information required to manage the asset over its lifecycle and to inform the risk assessment process. In turn, the

risk assessment ties into the prioritization and optimization process, which leads to the selection of specific investments and the implementation of asset strategies.

c) Hydro One's risk assessment process is materially consistent with the process presented during the prior transmission proceeding (EB-2019-0082). The process was updated since the last distribution proceeding (EB-2017-0049), introducing the taxonomies described within Exhibit B-1-1, SPF Section 1.7. In this Application, the process applied to distribution is consistent with that applied to transmission, with a distribution specific consequence taxonomy.

d) Confirmed. Risk is assessed against reliability, safety and environmental consequence taxonomies and the probability taxonomy as described in Exhibit B-1-1, SPF Section 1.7.

B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 008

Reference:

Exhibit B-1-1, SPF Section 1.7, Page 16

Interrogatory:

The risk assessment process is described in six steps.

a) By way of example, please illustrate the process and scoring.

b) Please provide the final mitigated risk scores for each of the proposed transmission investments.

c) Please provide the final mitigated risk scores for each of the proposed distribution investments.

d) Please summarize all changes to the risk assessment process and scoring from EB-2017-0049 and EB-2019-0082.

Response:

a) Please refer to response in Exhibit I-3-B1-AMPCO-009.

b) The table below includes the final mitigated risk that was scored for proposed transmission system investments. Where no risk mitigation is identified (denoted by "-"), non-risk assessment (e.g., application of "flags") provided the main basis for the assessment of investments, based on the criteria identified in Exhibit B-1-1, SPF Section 1.7.

ISD	Investment Title	Risk Mitigated
T-SA-01	New Customer Connection Station	-
T-SA-02	IAMGOLD - 115 kV Mine Connection	-
T-SA-03	Halton TS: Build a Second 230/27.6kV Station	-
T-SA-04	Connect Metrolinx Traction Substations	-
T-SA-05	Future Transmission Load Connection Plans	-
T-SA-06	Protection and Control Modifications for Distributed Energy Resources	556,691
T-SA-07	Secondary Land Use Projects	-
T-SA-08	H29/H30: Reconductor 230kV Circuits	-

T-SA-09	New Transformer Station in Northern York Region	-
T-SA-10	Build Leamington Area Transformer Stations	-
T-SR-01	Transmission Station Renewal - Network Stations	123,231,570
T-SR-02	Transmission Station Renewal - Air Blast Circuit Breakers	279,413,576
T-SR-03	Transmission Station Renewal - Connection Stations	67,542,070
T-SR-04	Wood Pole Structure Replacements	59,346,675
T-SR-05	Steel Structure Coating Program	-
T-SR-06	Tower Foundation Assess/Clean/Coat & LIfe Extension Program	8,343,804
T-SR-07	Transmission Line Shieldwire Replacement	1,428,667
T-SR-08	Transmission Line Insulator Replacement	35,079,595
T-SR-09	Transmission Station Demand and Spares and Targeted Assets	8,834,756
T-SR-10	Protection Relay Replacement Program	4,326,251
T-SR-11	Legacy SONET System Replacement	1,151,177
T-SR-12	Telecom Performance Improvements	761,462
T-SR-13	Transmission Line Complete Refurbishment	6,802,233
T-SR-14	Mobile Radio System Replacement	201,590
T-SR-15	Transmission Line Emergency Restoration	2,191,421
T-SR-16	HV UG Cable – Replace/Refurbish Pumping Plants	414,071
T-SR-17	OPGW Infrastructure Projects	4,346,999
T-SR-18	C5E/C7E Underground Cable Replacement	222,098
T-SS-01	Nanticoke TS: Connect HVDC Lake Erie Circuits	-
T-SS-02	St. Lawrence TS: Phase Shifters Replacement	-
T-SS-03	Merivale TS to Hawthorne TS: 230kV Conductor Upgrade	-
T-SS-04	Richview x Trafalgar 230kV Conductor Upgrade	-
T-SS-05	Merivale TS Add 230/115kV Autotransformers	-
T-SS-06	Southwest GTA Transmission Reinforcement	-
T-SS-07	West of Chatham Reinforcement	-
T-SS-08	Future Transmission Regional Plans	-
T-SS-09	West of London Reinforcement	-

c) The table below includes the final mitigated risk that was scored for proposed distribution system investments.

ISD	Investment Title	Risk Mitigated
D-SA-01	Joint Use and Relocations	-
D-SA-02	New Load Connections, Upgrades, Cancellations	-
D-SA-03	Connecting Distributed Energy Resources	-
D-SA-04	Metering Sustainment	411,915
D-SR-01	Distribution Stations Demand Capital Program	1,001,731

D-SR-02	Mobile Unit Substation Program	1,556,237
D-SR-03	Distribution Station Planned Component Replacement Program	2,795,669
D-SR-04	Distribution Station Refurbishment	5,109,572
D-SR-05	Distribution Lines Trouble Call and Storm Damage Response Program	18,171,767,592
D-SR-06	Distribution Lines PCB Equipment Replacement Program	79,923
D-SR-07	Pole Sustainment Program	93,174,340
D-SR-08	Distribution Lines Minor Component Replacement Program	46,140,512
D-SR-09	Submarine Cable Replacement Program	497,634
D-SR-10	Distribution Lines Sustainment Initiatives	12,168,348
D-SR-11	Life Cycle Optimization & Operational Efficiency Projects	745,805
D-SR-12	Advanced Meter Infrastructure 2.0 (AMI 2.0)	-
D-SS-01	System Upgrades Driven by Load Growth	31,783,551
D-SS-02	Reliability Improvements	9,679,390
D-SS-03	Demand Investments	4,181,875
D-SS-04	Energy Storage Solutions	6,835,247
D-SS-05	Worst Performing Feeders	8,164,461
D-SS-06	Stray Voltage	410,171

d) Please refer to response in Exhibit I-22-B1-SEC-056.

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B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 009

Reference:

Exhibit B-1-1, SPF Section 1.7, Page 17

Interrogatory:

Hydro One indicates the reliability consequence can be classified in terms of unsupplied energy, load impacted and minutes of interruption.

a) Please illustrate the reliability consequence concept by way of example.

b) Please discuss if and how reliability improvements from individual assessments are assessed and quantified as part of the process.

Response:

a) Example Project: D-SR-04 –Vanastra DS End of Life Refurbishment
Scope: End of life station refurbishment to address poor condition transformer
Worst Reasonable Direct Impact Scenario: A transformer failure impacting 889 customers that are fed from this station.

Baseline (Pre-investment):

Probability Assessment:

- Diagnostic tests have identified significant insulation degradation in a 73-year-old transformer at the station. Degraded insulation cannot be addressed by corrective maintenance.
- Pipe style station structures are in poor condition with limited rehabilitation capability.
- Expected time to failure is within 3 years as transformer health has degraded and cannot be restored. In addition, the outdated pipe style structures are at high risk for structural failures.

Consequence Assessment:

- Transformer failure is estimated to result in a 12-hour outage as the station reflected a configuration that pre-dated (and cannot accommodate) the use of Mobile Unit Substations (MUS) to provide temporary bypass supply.

- 889 Customers * 12 hours * 60 minutes = ~640,000 Customer Minutes Interrupted (CMI)

	Assessment	Description
Likelihood[1]	P5	1 – 3 years
Consequence[2]	C4	~640,000 CMI

Residual (Post-investment):

The refurbished station will have a configuration that accommodates the deployment of a MUS, which would allow for quicker power restoration in case of a transformer failure.

Probability:

- The standard lifespan for new station transformers is 50 years.
- The expected time to failure is between 25 – 100 years.

Consequence:

- MUS is expected to allow for power restoration (within 4 hours).
- 889 Customers * 4 hours * 60 minutes = ~213,000 CMI

	Assessment	Description
Likelihood	P2	25 – 100 years
Consequence	C3	~213,000 CMI

b) In scenarios like the one described above where the investment will result in reliability improvement, Hydro One considers the current performance of the relevant asset(s) to be the "status quo / do nothing" baseline for purposes of comparing and quantifying the expected improvement with and without the investment. Measures undertaken to improve reliability, such as transformer replacement and/or supply upgrades, would be expected to either reduce the likelihood of or exposure to a hazard, through either improved restoration time or alternate supply configurations.

[1] Likelihood scores reflect of the probability framework taxonomies provided in Exhibit B-1-1, SPF Section 1.7, Figure 8 (p.20); "P#" refers to the score metric provided in the taxonomy.
[2] Consequence scores reflect the distribution consequence framework taxonomies provided in Exhibit B-1-1, SPF Section 1.7, Figures 4, 6, and 7 (pp18-19); "C#" refers to the score metric provided in the taxonomy.

B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 010

Reference:

Exhibit B-1-1, SPF Section 1.7, Page 17

Interrogatory:

Hydro One indicates outage frequency was added to the probability framework to incorporate specific feedback from customers.

By way of example, please illustrate how and why this was implemented.

Response:

In preparation for Hydro One's 2017/18 Transmission Rate Application (EB-2016-0160), Hydro One conducted a customer engagement exercise which found, among other things:

- Reliability was the most frequently and consistently mentioned "need" that was raised by customers across all the consultation activities.
- For most large industrial customers, frequency of interruptions is a greater concern than duration. Conversely, LDCs were more likely to say that duration of interruptions is a greater concern than frequency of interruptions.

Based on this customer feedback, a frequency of event dimension was added to the probability framework to directly correlate the interruption impact of outage events on customers.

As an example, the reliability risk associated with the following two scenarios would be comparable, even though the magnitudes of the consequence of each event differ significantly, largely as a result of the difference in frequency of each reliability event.

	Scenario 1		**Scenario 2**	
	Assessment	**Description**	**Assessment**	**Description**
Likelihood	P5	Once every 1 – 3 years	P7	4 events per year
Consequence	C5	75 – 200 MW	C3	<25 MW

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B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 011

Reference:

Exhibit B-1-1, SFP Section 1.7

Interrogatory:

Hydro One's Reliability Model Risk Model (RRM) was central to customer engagement in EB-2016-0160 and was referenced d in the customer engagement in EB-2019-0082.

Please discuss how the RRM was used by Hydro One in the customer engagement and/or investment planning process to inform the transmission and distribution investment amounts in this proceeding.

Response:

The RRM was not used by Hydro One for the purposes of customer engagement or investment planning underpinning this Application.

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B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 012

Reference:

Exhibit B-1-1, SPF Section 1.7

Interrogatory:

a) Please complete the following table to show investment plan details at each stage of the investment planning process:

Investment Process	Total # Investments Transmission	Total Budget $ Transmission	Total # Investments Distribution	Total Budget $ Distribution
Strategy and Context				
Phase 1 Customer Engagement				
Asset Needs Assessment				
Risk Assessment Process				
Flagging				
Calibration				
Prioritizaton and Optimization				
Challenge Sessions				
Trade-Off Decisions				
Enterprise Engagement				
Phase 2 Customer Engagement				
Input from Third Party Studies				
Board of Director Approval				

b) Please provide the level of investment that was optimizable for the 2023-2027 investment/business cycle compared to the previous two cycles for transmission and distribution.

c) Please discuss any constraints placed on the investment planning process.

d) Please provide the forecast number of projects awarded for execution and the actual number of projects awarded for execution for the years 2016 to 2021 and the cost variance.

Response:

a) Please refer to the following:

- # of Transmission Investments: Exhibit I-22-B2-SEC-088
- $ of Transmission Investments: Exhibit I-22-B2-SEC-089
- # of Distribution Investments: Exhibit I-22-B3-SEC-135
- $ of Distribution Investments: Exhibit I-22-B3-SEC-136

The primary stages referenced in the above Interrogatories represent "output" stages, whereas the process steps that are not referenced reflected interim and activity-based phases of the process. For example, calibration entails an iterative process step, where risk assessments and flag application are reviewed and revised as appropriate. Similarly, trade-off review is the activity leading into Phase 2 customer engagement and enterprise engagement and is not necessarily tied to an "output" at a specific point in time.

b) The table below illustrates the optimizable portions of the transmission and distribution plans relative to the previous two planning cycles.

	Transmission	Distribution
Current Cycle (2021-27)	80%	68%
Prior Cycle -1 (2020-24)	72%	53%
Prior Cycle -2 (2019-24)	69%	55%

c) Please refer to the following:

- Transmission: Exhibit I-22-B2-Staff-063
- Distribution: Exhibit I-22-B2-SEC-134

d) The tables below summarize the planned releases for execution over the 2018 to 2021 period, and the actual releases as of September 2021.

Distribution System Investments

	Planned Releases (# of Projects)	**Planned Cost** (Gross $M - Total)	**Actual Releases** (# of Projects)	**Actual Cost** (Gross $M - Total)
2018	20	39	41	48
2019	68	221	17	104
2020	45	80	16	23
2021	37	127	23	195
Total	170	467	97	370

Transmission System Investments

	Planned Releases (# of Projects)	**Planned Cost** (Gross $M - Total)	**Actual Releases** (# of Projects)	**Actual Cost** (Gross $M - Total)
2018	15	519	56	694
2019	24	821	50	1,013
2020	59	1,235	52	1,089
2021	32	741	31	394
Total	130	3,317	189	3,300

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B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 013

Reference:

Exhibit B-1-1, SPF Section 1.7, Page 25

Interrogatory:

Hydro One developed three investment plans for each of Distribution and Transmission (Slower, Draft Plan, Accelerated).

a) Please set out the investment amounts and number of investments for each of these plans.

b) Please discuss if Hydro One's asset strategies in terms of reactive versus proactive approaches differ between the three investment plans.

Response:

a) Covering the period of 2021 to 2027, the investment amounts and number of investments for each of the three scenarios are summarized below:

	Transmission Capital (2021-27)		Distribution Capital (2021-27)	
Scenario	**Number of Investments**	**Investment Net $M**	**Number of Investments**	**Investment Net $M**
Slower	672	9,609	638	5,339
Draft Plan	694	10,175	747	6,138
Accelerated	701	10,778	836	6,955

b) Across the three sets of scenarios, the overarching asset strategies remained consistent. However, the outcomes associated with slower pacing were more likely to be associated with additional reactive investments and additional longer-term costs.

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B1 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 014

Reference:

EB-2019-0082, Exhibit JT 1.16

Interrogatory:

Hydro One provided a list of metrics it uses on both a project and portfolio basis.

Please provide the data for these project and portfolio level metrics for the 2020-2022 investment plan.

Response:

Please see below for the project and portfolio metric results as of Q3 2021 for the metrics identified in EB-2019-0082 Exhibit JT 1.16.

Project Level Metrics	**Q3 2021**
On-time: Project In-Service Date Forecast versus Current Approved (Note 1)	84%
On-time: Project In-Service Date Forecast versus Original Approved (Note 1)	60%
On-budget: Gross Project Total Forecast versus Current Approved (Note 2)	100%
On-budget: Gross Project Total Forecast versus Original Approved (Note 2)	76%
Portfolio Level Metrics	**Q3 2021**
In-Service Additions: Annual Forecast versus Budget (Note 3)	See Note 3
Capital Expenditures: Annual Forecast versus Budget (Note 3)	See Note 3
Portfolio Risk: Number of Projects Forecasting a Major Variance (+/- 10%) to Budget	9 of 166
Portfolio Risk: Value of Projects Forecasting a Major Variance (+/- 10%) to Budget (Note 4)	9%
Project Cost Performance: Number of Projects complete within AACE Estimate Class Range documented in original approval (Note 5)	25 of 32
Project Cost Performance: Value of Projects complete within AACE Estimate Class Range documented in original approval (Note 6)	71%
Cost Variance Distribution: Portion of Project Portfolio Delivered On Budget, Over Budget, Under Budget(Note 5)	78%
Cost Variance Distribution: Standard Deviation of Project Cost Performance represented as a percentage of original Budgets (Note 7)	25%
Schedule Variance Distribution: Portion of Project Portfolio Delivered On-time, Late, Early (Note 8)	34%
Schedule Variance Distribution: Standard Deviation of Schedule Variance in Days (Note 7)	333

Notes / Metric definitions:

1) Percentage of active major transmission capital power system projects (>$50M or strategic projects) forecasting an in-service date variance of less than 1 year.
2) Percentage of active major transmission capital power system projects (>$50M or strategic projects) forecasting to be within the upper range of AACE Class 3 estimate expected outcomes (+30% of estimated value).
3) See response to C-CCC-015 for ISA forecast and A-SEC-002 for Capex forecast information.
4) Calculated as the total gross forecast for the nine projects with cost variances divided by the total gross value of the active transmission capital portfolio.
5) Projects completed in the trailing 12 months (Oct 2020 – Sept 2021) within the upper range of AACE Class 3 expected outcomes (+30% of estimated value) relative to original funding approval for transmission power system projects greater than $3M.
6) Calculated as the gross value of projects completed in the trailing 12 months (Oct 2020 – Sept 2021) within the upper range of AACE Class 3 expected outcomes (+30% of estimated value) relative to original funding approval for transmission power system projects greater than $3M divided by total gross value of all projects completed in trailing 12 months (Oct 2020 – Sept 2021) for transmission power system projects greater than $3M.
7) Standard deviation calculation weighted by project cost for transmission power system projects greater than $3M completed in the trailing 12 months (Oct 2020 – Sept 2021).
8) Projects completed in trailing 12 months (Oct 2020 – Sept 2021) within 1 year of originally approved in-service date for transmission power system projects greater than $3M.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 015

Reference:

Exhibit B-2-1, TSP Section 2.1, Page 18

Interrogatory:

Hydro One indicates over 10% of all major transmission assets are in poor condition.

a) Please provide the calculation of the 10%.

b) Please provide the percentage of all major transmission asset in poor condition in 2016 and 2018.

Response:

a) TSP Section 2.1 Figure 6 presents the percentage of all major transmission assets in poor condition. The referenced percentage is not calculated but observed from Figure 6 as all assets for 2020 show over 10% of the fleet are in poor condition.

b) Please see TSP Section 2.1 Figure 6 which shows the percentage of the major transmission asset in poor condition in 2016, 2018, and 2020.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 016

Reference:

EB-2019-0082, Exhibit B-1-1, TSP Section 2.3, Pages 3-7, Table 1

Interrogatory:

Hydro One provided asset-specific strategies for transmission assets.

Please provide the current version of this Table.

Response:

Asset strategies can be found in their respective Asset Life Cycle section in TSP Section 2.2 and GSP Section 4.2. The section and page references are summarised in the table below.

Component	Asset Strategy Reference
Transformers	TSP Section 2.2.2.1, pg. 18
Breakers	TSP Section 2.2.2.2, pg. 29
Protection	TSP Section 2.2.2.3, pg. 38
Automation	TSP Section 2.2.2.4, pg. 47
Power System Telecom	TSP Section 2.2.2.5, pg. 61
Other Station Assets	TSP Section 2.2.2.6, pg. 74
Overhead Conductor	TSP Section 2.2.3.1, pg. 86
Underground Cables	TSP Section 2.2.3.2, pg. 93
Steel Structures	TSP Section 2.2.3.3, pg. 104
Wood Pole Structures	TSP Section 2.2.3.3, pg. 104
Insulators	TSP Section 2.2.3.4, pg. 121
Rights of Way (ROW)	TSP Section 2.2.3.5, pg. 126
Shieldwire	TSP Section 2.2.3.6, pg. 133
Other Line Components	TSP Section 2.2.3.7, pg. 137
Facilities and Real Estate	GSP Section 4.2.3.3, pg. 17-20
Transport and Work Equipment (Fleet)	GSP Section 4.2.2.3, pg. 10-14

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 017

Reference:

Exhibit B-2-1, TSP Section 2.2

Interrogatory:

Please advise if Hydro One has made changes it is Inspection and Maintenance practices related to its transmission assets since EB-2019-0082.

Response:

Transmission Stations:

Hydro One has made no major changes to its Stations' inspection and maintenance practices since EB-2019-0082.

Transmission Lines:

Hydro One has made changes to its Lines' inspection and maintenance practices. As discussed in Exhibit E-02-02, previously, Preventive Maintenance and Asset Condition Assessment was conducted uniformly without distinction between the age of circuits, type of structure, and the efficiency of each patrol type. In 2020, Hydro One undertook a review of these activities and implemented several changes to address the following objectives:

- Improving patrol cycles to more efficiently discover defects and to support proactive asset management;
- Reducing overlap of the various patrols and condition assessment activities, allowing for efficient data collection (e.g., executing steel tower condition assessments as part of other patrols, instead of executing them separately); and
- Focusing Preventive Maintenance and Asset Condition Assessment activities on higher risk (i.e., older) assets.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 018

Reference:

EB-2019-0082, Exhibit B, TSP Section 2.2, Page 3, Ref 2

Interrogatory:

Please complete the attached excel spreadsheet (B2-AMPCO-18-01).

Response:

Hydro One has transitioned to using Good Condition, Fair Condition, Poor Condition and Needs Assessment. Please see Interrogatory B2-Staff-040 part c) and j).

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 019

Reference:

Exhibit B-2-1, TSP Section 2.4, Page 4

Interrogatory:

ESL is defined as the average number of years that an asset is expected to operate safely and reliably under normal system conditions and is determined with reference to manufacturer guidelines and Hydro One's historical asset retirement data.

a) When was the last time Hydro One reviewed its ESL data in the context of its historical asset retirement data.

b) Please provide a description of the nature of Hydro One's historical asset retirement data.

c) Please provide the historical asset retirement data for transformers, conductors and wood poles for the years 2016 to 2021.

Response:

a) Hydro One has not requested any specific company wide studies to review the ESL data of its fixed assets. Major assets are reviewed on an asset by asset basis on Hydro One's knowledge of the asset's condition. Minor fixed assets are retired based on an asset's useful life as determined by the depreciation rates set. Depreciation rates used by Hydro One have been set based on guidance from depreciation rates studies performed by industry experts. Prior to the current Alliance Consultant Group Depreciation Study included in Exhibit E-08-01 Attachment 1, the most recent depreciation rate study was performed by Foster Associates for Distribution assets in 2016 and for Transmission assets in 2017.

b) For minor fixed assets, Hydro One relies on the fixed asset useful lives received as part of the depreciation studies performed by external consultants. Based on these depreciation studies, Hydro One will set the useful lives of different asset classes accordingly and will retire any fixed assets which have fully depreciated (reached a Net Book Value of $0). For major fixed assets, an asset by asset assessment is made by the appropriate line of business using a combination of manufacturer guidelines and Hydro One's inspection and knowledge of the asset's condition.

c) See below for retirement data:

Distribution (in $M)					
Retirements	**2016**	**2017**	**2018**	**2019**	**2020**
Transformers	-5	-2	-18	0	-1
Poles	-6	-7	-38	-33	-26
Conductors	-1	-1	-4	-1	0
Total	**-12**	**-10**	**-60**	**-34**	**-27**
Transmission (in $M)					
Retirements	**2,016**	**2,017**	**2,018**	**2,019**	**2,020**
Transformers	-1	-4	0	0	-1
Poles	0	-6	0	-1	-2
Conductors	0	0	-1	0	-2
Total	**-1**	**-11**	**-1**	**-1**	**-4**

Note - slight down-add difference above is due to rounding

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 020

Reference:

EB-2019-0082, Exhibit JT 1.37

Interrogatory:

Hydro One provided the number of unplanned outage hours due to equipment failure system-wide, for 2016, 2017, and 2018 as follows:

Year	Hours
2016	262,777
2017	255,116
2018	289,532

a) Please provide the data for 2019 to 2021.

b) For the years 2016 to 2018, please provide the total unplanned outage hours.

Response:

a) The table below provides the number of unplanned outage hours due to equipment failure system-wide. Given that only partial year data is available for 2021, that information is not provided as it would not yield a meaningful or appropriate comparison with the prior years.

Year	Hours
2019	343,712
2020	362,559

b) The table below provides the total number of unplanned outage hours system-wide

Year	Hours
2016	280,757
2017	294,064
2018	325,086

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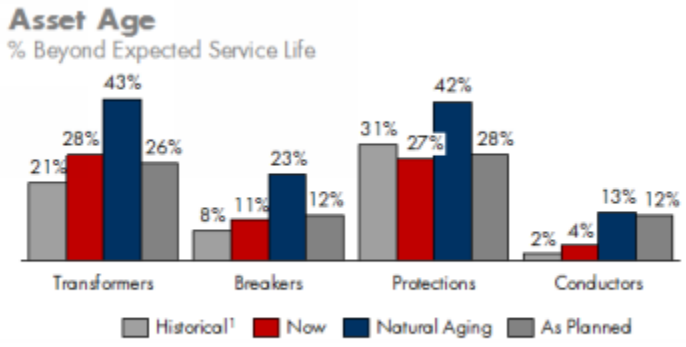
B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 021

Reference:

EB-2019-0082, Exhibit A-3-1, Attachment 1, Page 1

Interrogatory:

The 2019-2024 Business Plan from the last proceeding states "Based on Hydro One's assessment of its transmission system, a significant portion of the assets are reaching the end of their expected service life (ESL) and have deteriorated to the point where investment is required to maintain customer reliability and meet safety and environmental sustainability requirements. Through natural aging, it is forecast that 43% of transformers, 23% of breakers, 42% of protection systems, and 13% of conductors will reach their ESL over the next six years, as shown in the figure following. This evolving age profile is largely due to the significant system development in the 1950s and 1960s; these assets now require replacement.



[1]*Historical as per Transmission Rate Application EB-2012-0031 filed May 28, 201*

Please complete the following table regarding assets beyond their ESL at the end of 2017:

	Fleet Population	% Replaced 2018 to 2021	Current State (% Beyond ESL)	Natural Aging Over 6 years 2022 to 2027 (%)	Impact of Plan 2027 (% As Planned)
Transformers					
Breakers					
Protections					
Conductors					

Witness: JABLONSKY Donna

Response:

	Fleet Population	% Replaced 2018 to 2021	Current State (% Beyond ESL)	Natural Aging Over 6 years 2022 to 2027 (%)	Impact of Plan 2027 (% As Planned)
Transformers	715	12.3%	24%	37.3%	12.9%
Breakers	4,756	11%	16%	43%	17.5%
Protections	12,494	11.3%	27%	42.5%	24.6%
Conductors	29,107	1.2%	5%	14%	9%

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 022A

Reference:

EB-2018-0092, Figure 2 – Delivery Point Interruptions Related to Equipment (2008-2017)

Interrogatory:

a) Please complete the delivery point interruptions related to equipment (%) for the following assets:

Interruptions by Equipment Type	Avg 2008 to 2012 (%)	Avg 2013 to 2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)
Lines						
Protection Equipment						
Transformers						
Breakers						
Bus						
Other (switches, capacitors,						

b) Please provide a further breakdown of the data for the assets under Lines.

Response:

a) The completed table is provided below however it only addresses the subset of equipment failures that resulted in delivery point interruptions. Given that only partial year data is available for 2021, that information is not provided as it would not yield a meaningful or appropriate comparison with the prior years.

Interruptions by Equipment Type	**Avg 2008 to 2012 (%)**	**Avg 2013 to 2017 (%)**	**2018 (%)**	**2019 (%)**	**2020 (%)**
Lines	38%	51%	54%	61%	66%
Protection Equipment	16%	18%	24%	11%	9%
Transformers	15%	10%	11%	10%	6%
Breakers	18%	9%	4%	8%	4%
Bus	8%	5%	6%	8%	9%
Other (switches, capacitors,	5%	6%	2%	2%	7%

b) A further breakdown of the "Lines" data is provided below however it only addresses the subset of equipment failures that resulted in delivery point interruptions. Given that only partial year data is available for 2021, that information is not provided as it would not yield a meaningful or appropriate comparison with the prior years.

Interruptions by Line subcomponent	**Avg 2008 to 2012 (%)**	**Avg 2013 to 2017 (%)**	**2018 (%)**	**2019 (%)**	**2020 (%)**
CONDUCTOR	14%	9%	5%	12%	21%
CROSS-ARM	12%	17%	8%	11%	11%
HARDWARE	4%	2%	0%	0%	0%
INSULATOR	13%	21%	15%	23%	13%
OTHER	26%	11%	17%	12%	27%
PT/CVT	0%	0%	1%	0%	0%
SKYWIRE	19%	9%	4%	23%	0%
STRUCTURE	10%	6%	42%	6%	20%
SURGE ARRESTER	1%	11%	2%	8%	3%
LIMITATION	1%	1%	0%	0%	0%
CLEARANCE	0%	11%	7%	5%	4%

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 022B

Reference:

EB-2019-0082, Table 1: Historical Interruption Duration

Interrogatory:

a) Please provide the interruption duration data for Lines, Transformers, Breakers and Other for each of the years 2016 to 2021.

Interruption Duration by Equipment Type	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)
Lines						
Transformers						
Breakers						
Other						

b) Please provide a further breakdown of Lines by equipment type.

Response:

a) The table below provides the direct defective equipment caused interruption duration data for Lines, Transformers, Breakers and Other for each of the years 2016 to 2020. Given that only partial year data is available for 2021, that information is not provided as it would not yield a meaningful or appropriate comparison with the prior years.

Interruption Duration by Equipment Type	**2016 (%)**	**2017 (%)**	**2018 (%)**	**2019 (%)**	**2020 (%)**
Lines	28%	71%	73%	77%	94%
Transformers	68%	9%	10%	9%	2%
Breakers	1%	5%	1%	1%	0%
Other	3%	15%	16%	12%	4%

b) The table below provides a further breakdown of the Lines category by equipment type.

Interruption Duration by Line Equipment Type	**2016 (%)**	**2017 (%)**	**2018 (%)**	**2019 (%)**	**2020 (%)**
CONDUCTOR	12%	16%	4%	13%	26%
CROSS-ARM	24%	18%	14%	21%	49%
HARDWARE	0%	0%	0%	0%	0%
INSULATOR	52%	23%	58%	21%	7%
OTHER	2%	13%	0%	8%	13%
PT/CVT	0%	0%	0%	0%	0%
SKYWIRE	2%	4%	0%	17%	0%
STRUCTURE	5%	23%	22%	11%	4%
SURGE ARRESTER	0%	1%	0%	8%	1%
LIMITATION	0%	0%	0%	0%	0%
CLEARANCE	3%	1%	0%	0%	0%

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 023

Reference:

EB-2019-0082, Exhibit I-5-CME-19, Attachment 1

Interrogatory:

a) Please identify the transformer replacements not undertaken and why.

b) Please update the forecast in-service date in Attachment 1.

Response:

a) All the transformers identified in EB-2019-0082, Exhibit I-5-CME-19, Attachment 1 are being undertaken.

b) The table below includes the updated in-service dates.

Functional Location - Key	DGA Score	Trans - 20-24	EB-2019-0082 ISD	Undertaken Yes or No	ISD
N-TS-BECK2TS -TF-R27	Very High	N-TS-BECK2TS -TF-R27	2022	Yes	2029
N-TS-CARLTONTS -TF-T1	Very High	N-TS-CARLTONTS -TF-T1	2022	Yes	2026
N-TS-ELGINTS -TF-T2	Very High	N-TS-ELGINTS -TF-T2	2020	Yes	2021
N-TS-GLENDALETS-TF-T3	Very High	N-TS-GLENDALETS-TF-T3	2023	Yes	2027
N-TS-HANLONTS -TF-T1	Very High	N-TS-HANLONTS -TF-T1	2022	Yes	2022
N-TS-HANLONTS -TF-T2	Very High	N-TS-HANLONTS -TF-T2	2022	Yes	2022
N-TS-LAUZONTS -TF-T6	Very High	N-TS-LAUZONTS -TF-T6	2024	Yes	2024
N-TS-MARTINDLTS-TF-T21	Very High	N-TS-MARTINDLTS-TF-T21	2021	Yes	2021
N-TS-SHEPPARDTS-TF-T3	Very High	N-TS-SHEPPARDTS-TF-T3	2020	Yes	2021
N-TS-WINGHAMTS -TF-T1	Very High	N-TS-WINGHAMTS -TF-T1	2022	Yes	2023
N-TS-ARNPRIORTS-TF-T2	High	N-TS-ARNPRIORTS-TF-T2	2023	Yes	2023
N-TS-BELLEVILTS-TF-T2	High	N-TS-BELLEVILTS-TF-T2	2021	Yes	2021
N-TS-BRIDGMANTS-TF-T12	High	N-TS-BRIDGMANTS-TF-T12	2023	Yes	2024
N-TS-CARLTONTS -TF-T4	High	N-TS-CARLTONTS -TF-T4	2022	Yes	2026
N-TS-FAIRBANKTS-TF-T1	High	N-TS-FAIRBANKTS-TF-T1	2023	Yes	2024
N-TS-FAIRBANKTS-TF-T2	High	N-TS-FAIRBANKTS-TF-T2	2023	Yes	2024
N-TS-FAIRBANKTS-TF-T3	High	N-TS-FAIRBANKTS-TF-T3	2023	Yes	2024
N-TS-FAIRBANKTS-TF-T4	High	N-TS-FAIRBANKTS-TF-T4	2023	Yes	2024
N-TS-GAGETS -TF-T4	High	N-TS-GAGETS -TF-T4	2021	Yes	2021
N-TS-GAGETS -TF-T5	High	N-TS-GAGETS -TF-T5	2021	Yes	2021
N-TS-GAGETS -TF-T6	High	N-TS-GAGETS -TF-T6	2021	Yes	2021

Functional Location - Key	DGA Score	Trans - 20-24	EB-2019-0082 ISD	Undertaken Yes or No	ISD
N-TS-GLENDALETS-TF-T4	High	N-TS-GLENDALETS-TF-T4	2023	Yes	2027
N-TS-HANOVERTS -TF-T2	High	N-TS-HANOVERTS -TF-T2	2024	Yes	2028
N-TS-KEITHTS -TF-T1	High	N-TS-KEITHTS -TF-T1	2023	Yes	2023
N-TS-KEITHTS -TF-T11	High	N-TS-KEITHTS -TF-T11	2023	Yes	2023
N-TS-KEITHTS -TF-T12	High	N-TS-KEITHTS -TF-T12	2023	Yes	2023
N-TS-KINGSVILTS-TF-T1	High	N-TS-KINGSVILTS-TF-T1	2022	Yes	2022
N-TS-LAMBTONTS -TF-T5	High	N-TS-LAMBTONTS -TF-T5	2023	Yes	2023
N-TS-LONGUEILTS-TF-T3	High	N-TS-LONGUEILTS-TF-T3	2024	Yes	2024
N-TS-LONGUEILTS-TF-T4	High	N-TS-LONGUEILTS-TF-T4	2024	Yes	2024
N-TS-ORANGEVLTS-TF-T1	High	N-TS-ORANGEVLTS-TF-T1	2023	Yes	2023
N-TS-ORANGEVLTS-TF-T2	High	N-TS-ORANGEVLTS-TF-T2	2023	Yes	2023
N-TS-PORTHOPETS-TF-T3	High	N-TS-PORTHOPETS-TF-T3	2024	Yes	2025
N-TS-PORTHOPETS-TF-T4	High	N-TS-PORTHOPETS-TF-T4	2024	Yes	2025
N-TS-RUNNYMEDTS-TF-T3	High	N-TS-RUNNYMEDTS-TF-T3	2021	Yes	2021
N-TS-RUNNYMEDTS-TF-T4	High	N-TS-RUNNYMEDTS-TF-T4	2021	Yes	2021
N-TS-SARNSCOTTS-TF-T5	High	N-TS-SARNSCOTTS-TF-T5	2024	Yes	2024
N-TS-SHEPPARDTS-TF-T4	High	N-TS-SHEPPARDTS-TF-T4	2020	Yes	2021
N-TS-SLATERTS -TF-T2	High	N-TS-SLATERTS -TF-T2	2022	Yes	2023
N-TS-SLATERTS -TF-T3	High	N-TS-SLATERTS -TF-T3	2022	Yes	2023
N-TS-STANLEYTS -TF-T2	High	N-TS-STANLEYTS -TF-T2	2021	Yes	2021
N-TS-STTHOMASTS-TF-T1	High	N-TS-STTHOMASTS-TF-T1	2020	Yes	2020
N-TS-STTHOMASTS-TF-T2	High	N-TS-STTHOMASTS-TF-T2	2020	Yes	2020
N-TS-WINGHAMTS -TF-T2	High	N-TS-WINGHAMTS -TF-T2	2022	Yes	2023

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 024

Reference:

No Reference Provided.

Interrogatory:

Please complete the attached excel spreadsheet.

Response:

Please see Attachment 1.

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Replacement History by ESL & Condition

TRANSMISSION ASSETS	Population	Expected Service Life (ESL) (Years)	total # replaced 2018 to 2020 (actual)	total # repaired 2018 to 2020 (actual)[1]	# replaced 2021 to 2022 (forecast)	2018 # replaced beyond ESL	2019 # replaced beyond ESL	2020 # replaced beyond ESL	2021 # replaced beyond ESL (forecast)	2018 # replaced in poor condition	2019 # replaced in poor condition	2020 # replaced in poor condition	2021 # replaced in poor condition (forecast)	2018 # replaced beyond ESL & in poor condition	2019 # replaced beyond ESL & in poor condition	2020 # replaced beyond ESL & in poor condition	2021 # replaced beyond ESL & in poor condition (forecast)
Transformer	721	50	62	-[2]	40	28	16	10	21	28	24	10	21	28	16	10	21
Circuit Breakers	4,756	OCB - 55 Others - 40	358	-[2]	298	54	67	66	98	63	63	60	66	54	58	59	60
Protection Systems[3]																	
Electromechanical	1,784	45	347	-[2]	228	55	103	56	162								
Solid State	3,077	25	294	-[2]	124	103	93	89	119								
Microprocessor	7,633	20	248	-[2]	169	5	41	18	57								
Conductors (circuit km)	28,552	ACSR - 90 Copper - 70 Aluminum - 100	214	-[2]	533	51	7	22	0	51	82	81	18	51	7	22	0
Poles - Wood	40,041	50	2,358	-[2]	2,046	735	827	796	1,022	735	827	796	1,022	735	827	796	1,022
Insulators	119,459	90	10,984	-[2]	7,311	-	-	-	-	3,900	4,290	2,794	3,767	-	-	-	-
Underground Cable (circuit km)	273	LPLF/HPLF - 70 XLPE - 50	4.7	-[2]	-	-	-	-	-	-	-	4.7	-	-	-	-	-

Notes

[1] Major repairs

[2] Not applicable as these assets are not repaired (i.e. they are replaced) or any repair work is relatively minor

[3] Please see Interrogatory B2-Staff-039 for further information regarding protection equipment replacements.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 025

Reference:

Exhibit B-2-1, TSP Section 2.8, Page 9, Table 3
Exhibit B-2-1, TSP Section 2.8, Page 17, Table 5
Exhibit B-2-1, TSP Section 2.8, Page 17, Table 7

Interrogatory:

Please provide an excel version of Tables 3, 5 and 7 combined.

Response:

Please see Attachment 1.

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ISD	Investment Title	2023	2024	2025	2026	2027
T-SA-01	New Customer Connection Station	13.5	13.5	-	-	-
T-SA-02	IAMGOLD – 115 kV Mine Connection	10	-	-	-	-
T-SA-03	Halton TS: Build a Second 230/27.6kV Station[1]	-	1.5	4.5	1.9	-
T-SA-04	Connect Metrolinx Traction Substations	3.5	3.6	0.8	-	-
T-SA-05	Future Transmission Load Connection Plans	3.1	5.2	9.4	10.4	10.4
T-SA-06	Protection and Control Modifications for Distributed Generation	-	-	-	-	-
T-SA-07	Secondary Land Use Projects	37.8	2.8	2.8	0.8	0.8
T-SA-08	H29/H30: Reconductor 230kV Circuits [1,2]	0.2	0.4	0.3	2.1	2.3
T-SA-09	New Transformer Station in Northern York Region [1]	-	-	5.6	3.7	2.4
T-SA-10	Build Leamington Area Transformer Stations [1,2]	7.6	40.9	33.5	14.5	32.6
	Other Transmission System Access	3.7	2.9	2.9	3	1.5
Total System Access		**79.4**	**70.9**	**59.8**	**36.5**	**50.1**

[1] *Investments identified in the Regional Planning Process*

[2] *Investments that require Leave to Construct Approval*

ISD	Investment Title	2023	2024	2025	2026	2027
T-SR-01	Transmission Station Renewal - Network Stations	209.4	199.6	213.6	158.4	213.1
T-SR-02	Transmission Station Renewal - Air Blast Circuit Breakers	172.3	153.8	115.8	99.3	34.4
T-SR-03	Transmission Station Renewal - Connection Stations	334.5	357.7	350.1	406.5	428.6
T-SR-04	Wood Pole Structure Replacements	56.5	57.6	58.8	60	61.2
T-SR-05	Steel Structure Coating Program	23.6	24.1	24.5	25	25.4
T-SR-06	Tower Foundation Assess/Clean/Coat Program	17.3	17.6	17.9	18.3	18.6
T-SR-07	Transmission Line Shieldwire Replacement	12.1	12.3	12.5	12.8	13
T-SR-08	Transmission Line Insulator Replacement	78.4	78.1	79.5	81	82.5
T-SR-09	Transmission Station Demand and Spares and Targeted Assets	43.9	44.7	45.2	46.2	47
T-SR-10	Protection Relay Replacement Program	8.8	8.9	9	9.1	9.2
T-SR-11	Legacy SONET System Replacement	19.5	29.4	29.2	27.6	8.3
T-SR-12	Telecom Performance Improvements	4.2	5.8	3.8	0	0
T-SR-13	Transmission Complete Line Refurbishment	60.1	125.8	190.8	235.9	220.5
T-SR-14	Mobile Radio System Replacement	5.2	6.7	5.6	2.4	0
T-SR-15	Transmission Line Emergency Restoration	10.2	10.4	10.6	10.8	11
T-SR-16	HV UG Cable – Replace/Refurbish Pumping Plants	0	0	0.1	0.2	5.5
T-SR-17	OPGW Infrastructure Projects	28.5	27.8	30.4	20.1	10.5
T-SR-18	C5E/C7E Underground Cable Replacement	38.3	23.7	4.6	0.1	0
	Other Transmission System Renewal Work	55.4	44.7	49.6	63.9	75.3
Total System Renewal		**1,178.00**	**1,228.30**	**1,251.60**	**1,277.30**	**1,264.00**

ISD	Investment Title	2023	2024	2025	2026	2027
T-SS-01	Nanticoke TS: Connect HVDC Lake Erie Circuits[3]	-	-	-	-	-
T-SS-02	St. Lawrence TS: Phase Shifter Upgrade	6	-	-	-	-
T-SS-03	Merivale TS to Hawthorne TS: 230kV Conductor Upgrade[2,3]	9	-	-	-	-
T-SS-04	Richview x Trafalgar 230kV Conductor Upgrade[2]	12.6	16.4	12.1	2.4	-
T-SS-05	Merivale TS: Add 230/115kV Autotransformers[1]	25	30	22	-	-
T-SS-06	Southwest GTA Transmission Reinforcement [1,2]	6.5	7.5	3	-	1
T-SS-07	West of Chatham Reinforcement[2]	8.3	20.4	5.2	-	-
T-SS-08	Future Transmission Regional Plans	10.7	20	20.4	20.4	20.4
T-SS-09	West of London Reinforcement[2]	4.2	4.2	18.7	60.9	54.8
Other System Service Investments		8.5	3.1	4.4	9.4	13.8
Total System Service		**90.9**	**101.6**	**85.8**	**93.1**	**90.1**

[1] *Investment identified in the Regional Planning Process*

[2] *Investment that requires Leave to Construct Approval*

[3] *Investment identified in the 2017 Long-Term Energy Plan*

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 026

Reference:

Exhibit B-2-1, TSP Section 2.11

Interrogatory:

a) Please identify the innovation projects.

b) Please identify the new investments that were not part of EB-2019-0082.

Response:

a) There are no standalone innovation projects. However, innovation is built into the technology used in all the projects under way. More specifically:

- Under T-SR-10 covering Protection Systems replacement, Hydro One will be employing the latest protection technology. This new microprocessor-based protection systems technology has advanced monitoring and diagnostic capabilities which can provide insight into station equipment performance and early detection of problems.

- Under T-SR-03.42 covering refurbishment work at Bunting TS, Hydro One is planning to deploy a new protection and control protocol to enhance communication between substation protection and control devices.

- Under T-SS-02 covering replacement of the Phase Shifters at St. Lawrence TS, Hydro One will be using new phase shifters that will permit a wider angle range of phase shift (±60 degrees) that will allow power flow control over a greater range of system conditions.

b) There is only one specific innovation investment (T-SR-03.42) that was not part of EB-2019-0082.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 027

Reference:

Exhibit B-2-1, TSP Section 2.9, Attachment 1, Appendix 2-AA

Interrogatory:

a) Please provide Appendix 2-AA on the basis of in-service capital additions and provide an excel version of the table.

Response:

Please see Interrogatory B2-SEC-95.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 028

Reference:

Exhibit B-2-1, TSP Section 2.9, Attachment 1, Appendix 2-AA

Interrogatory:

For each relevant investment category in Appendix 2-AA, please provide the number of transformers, circuit breakers, wood poles, protection systems, conductors, underground cables and insulators replaced under each category for the period 2018 to 2022 and forecast for 2023 to 2027.

Response:

Please see the table below.

Projects	2018 Actual	2019 Actual	2020 Actual	2021 F/Cast	2022 F/Cast	2023 Test	2024 Test	2025 Test	2026 Test	2027 Test
System Renewal										
Circuit Breakers										
Circuit Breakers	-	3	1	-	-	-	-	-	-	-
Integrated Station Investment										
Transformers	28	24	10	21	19	30	18	27	21	24
Circuit Breakers	155	69	66	168	130	88	107	98	146	154
Protections	325	322	242	500	391	401	236	324	414	512
Overhead Lines Refurbishment Projects, Component Replacement Programs										
Wood Poles	735	827	796	1013	1024	1076	1076	1078	1082	1084
Conductors (circuit-km)	51	82	39	18	515	19	300	338	235	679
Insulators	3900	4290	2794	3767	3544	3980	3980	3980	3980	3980
Protection and Automation										
Protections	-	-	-	21	21	42	42	42	42	42
Tx Transformers Demand and Spares										
Transformers	8	5	3	4	4	5	5	5	5	5
Circuit Breakers	1	0	1	3	2	2	2	2	2	2
Underground Lines Cable Refurbishment & Replacement	16.5									
Underground Cables (circuit-km)	-	-	4.7	-	-	-	-	7.2	-	-

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 029

Reference:

Exhibit B-2-1, TSP Section 2.9, Attachment 1, Appendix 2-AA
Exhibit B-2-1, TSP Section 2.11

Interrogatory:

Please map the Investment Summary Documents (ISDs) at reference #2 to the capital projects listed in Appendix 2-AA.

Response:

Please see Interrogatory B2-VECC-009.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 030

Reference:

EB-2019-0082, Exhibit I-12-AMPCO-037-01

Interrogatory:

Please add the following columns to the table: 2020 actuals, 2021 actuals and update the forecast for 2022 to 2024 and provide an excel version of the table.

Response:

Please see Attachment 1 for the table from EB-2019-0082 Exhibit I-12-AMPCO-037-01 updated to include 2020 actuals and the 2021 to 2024 forecast included in this Application.

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List of Material Capital Investments (EB-2019-0082 Exhibit B-1-1 TSP Section 3.3.6.1)

Table 5 - System Access - Material Capital Investments Proposed

		EB-2019-0082 (As Filed)					EB-2021-0110 (As Filed)				
		Plan	Plan	Plan	Plan	Plan	Actual	Forecast	Forecast	Forecast	Forecast
ISD	**Investment Name**	**2020**	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**
SA-01	Connect New IAMGOLD Mine	24.9	0.0	0.0	0.0	0.0	4.0	15.0	19.4	23.3	0.0
SA-02	Horner TS: Build a Second 230/27.6kV Station	29.9	0.0	0.0	0.0	0.0	31.3	13.0	0.5	0.0	0.0
SA-03	Halton TS: Build a Second 230/27.6kV Station	8.0	17.7	6.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4
SA-04	Connect Metrolinx Traction Substations	6.5	7.9	7.1	1.0	0.0	0.4	0.3	0.3	10.0	12.2
SA-05	Future Transmission Load Connection Plans	0.0	5.0	24.9	24.9	0.0	0.0	0.0	0.0	5.2	23.9
SA-06	Protection and Control Modifications for Distributed Generation	3.8	3.1	2.7	2.8	2.8	7.7	5.0	5.0	4.0	4.0
SA-07	Secondary Land Use Transmission Asset Modifications	55.1	15.0	13.9	15.6	3.9	15.6	21.8	19.1	9.8	4.9
System Access Projects & Programs Less Than $3M		**27.6**	**9.4**	**8.5**	**7.8**	**9.2**	**31.2**	**58.7**	**34.0**	**105.4**	**103.8**
Total Gross System Access Capital ($M)		**155.7**	**58.1**	**63.0**	**52.0**	**15.8**	**90.2**	**113.8**	**78.3**	**157.6**	**154.3**
Less Capital Contributions ($M)		*-130.9*	*-46.7*	*-51.3*	*-39.3*	*-11.7*	*-70.6*	*-73.6*	*-46.9*	*-78.2*	*-83.4*
Total Net System Access Capital ($M)		**24.8**	**11.3**	**11.7**	**12.7**	**4.1**	**19.5**	**40.1**	**31.5**	**79.4**	**70.9**

Table 6 - System Renewal - Material Capital Investments Proposed

ISD	**Investment Name**	**2020**	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**
SR-01	Air Blast Circuit Breaker Replacement Projects	107.5	128.4	133.5	129.2	98.7	177.8	138.6	130.4	150.3	124.6
SR-02	Station Reinvestment Projects	107.0	125.4	120.6	87.9	53.9	121.7	94.7	110.6	100.8	76.6
SR-03	Bulk Station Transformer Replacement Projects	33.2	51.8	72.5	131.5	113.8	15.1	20.2	63.1	107.2	97.0
SR-04	Bulk Station Switchgear and Ancillary Equipment Replacement Projects	17.5	32.4	41.4	34.6	49.3	12.2	12.1	47.2	73.0	57.2
SR-05	Load Station Transformer Replacement Projects	91.2	132.3	129.4	178.5	200.0	83.9	101.1	140.7	156.4	162.9
SR-06	Load Station Switchgear and Ancillary Equipment Replacement Projects	19.2	30.8	47.5	58.4	77.0	17.8	12.9	22.6	39.1	48.1
SR-07	Protection and Automation Replacement Projects	6.7	8.6	12.7	12.2	21.7	7.1	7.0	8.9	2.2	1.5
SR-08	John Transformer Station Reinvestment Project	3.5	17.9	25.6	24.0	20.9	0.0	0.0	0.0	0.3	0.4
SR-09	Transmission Station Demand and Spares and Targeted Assets	44.2	36.4	37.0	37.7	38.3	61.3	40.2	41.0	43.9	44.7
SR-10	Transformer Protection Replacement	3.8	0.0	0.0	0.0	0.0	0.3	0.6	0.6	0.0	0.0
SR-11	Legacy SONET System Replacement	4.1	26.0	27.6	28.1	28.1	0.4	0.6	4.6	19.5	29.4
SR-12	Telecom Performance Improvements	0.0	0.9	5.5	3.7	0.0	0.0	0.0	0.0	1.0	5.8
SR-13	ADSS Fibre Optic Cable Replacements	7.0	7.1	1.0	0.0	0.0	0.5	5.0	3.3	3.2	0.0
SR-14	Mobile Radio System Replacement	2.9	6.2	6.1	4.0	0.0	0.0	0.3	3.0	5.2	6.7
SR-15	Telecom Fibre IRU Agreement Renewals	0.0	2.8	8.5	2.6	1.5	0.0	2.8	8.5	2.6	1.5
SR-16	NERC CIP-014 Physical Security Implementation	18.0	18.0	18.0	0.0	0.0	24.2	20.6	15.1	0.0	0.0
SR-17	NERC CIP Transient Cyber Asset Project	3.5	0.0	0.0	0.0	0.0	1.1	7.5	7.6	0.0	0.0
SR-18	PSIT Cyber Equipment Replacement	1.0	5.0	7.7	7.0	3.4	2.9	6.4	8.3	0.0	0.0
SR-19	Transmission Line Refurbishment - End of Life ACSR, Copper Conductors & Structures	81.8	122.1	94.5	51.0	75.9	43.5	54.7	96.0	46.5	47.4
SR-20	Transmission Line Refurbishment - Near End of Life ACSR Conductor	62.2	63.4	111.7	117.8	137.7	0.1	5.9	0.0	6.3	61.7
SR-21	Wood Pole Structure Replacements	51.0	52.0	53.0	54.1	55.2	47.0	48.8	52.7	56.5	57.6
SR-22	Steel Structure Coating Program	11.4	21.8	22.3	22.7	23.2	8.1	21.4	22.6	23.6	24.1
SR-23	Tower Foundation Assess/Clean/Coat Program	11.8	22.3	22.8	23.3	23.7	8.4	8.5	11.3	10.5	10.7
SR-24	Transmission Line Shieldwire Replacement	12.3	12.6	12.8	13.1	13.4	4.5	12.2	12.9	12.1	12.3
SR-25	Transmission Line Insulator Replacement	68.3	69.7	66.3	67.6	68.9	57.1	67.5	68.6	78.4	78.1
SR-26	Transmission Line Emergency Restoration	9.6	9.8	10.0	10.2	10.4	12.0	9.7	9.9	10.2	10.4
SR-27	C5E/C7E Underground Cable Replacement	2.1	29.8	30.9	32.2	29.2	2.8	11.8	25.1	38.3	23.7
SR-28	OPGW Infrastructure Projects	5.3	7.5	2.2	6.2	9.7	0.1	1.7	11.2	16.1	10.7
SR-29	Physical Security ISL Application Replacement	5.0	1.1	0.0	0.0	0.0	4.3	1.5	0.0	0.0	0.0
System Renewal Projects & Programs Less Than $3M		**77.8**	**67.3**	**60.1**	**44.1**	**41.1**	**98.3**	**29.8**	**59.2**	**180.8**	**237.5**
Total Gross System Renewal Capital ($M)		**869.1**	**1109.2**	**1181.1**	**1181.5**	**1194.9**	**812.4**	**744.2**	**984.9**	**1183.9**	**1230.3**
Less Capital Contributions ($M)		*-3.8*	*-6.1*	*-8.3*	*-4.1*	*-1.1*	*-8.4*	*-4.5*	*-13.4*	*-6.0*	*-2.0*
Total Net System Renewal Capital ($M)		**865.2**	**1103.1**	**1172.8**	**1177.4**	**1193.8**	**804.0**	**739.6**	**971.5**	**1178.0**	**1228.3**

List of Material Capital Investments (EB-2019-0082 Exhibit B-1-1 TSP Section 3.3.6.1)

Table 7 - System Service - Material Capital Investments Proposed

ISD	Investment Name	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
SS-01	Lennox TS: Install 500kV Shunt Reactors	32.3	0.0	0.0	0.0	0.0	21.8	19.0	0.0	0.0	0.0
SS-02	Wataynikaneyap Line to Pickle Lake Connection	24.9	1.5	0.0	0.0	0.0	5.1	22.9	4.0	0.0	0.0
SS-03	Nanticoke TS: Connect HVDC Lake Erie Circuits	3.0	10.0	4.0	0.0	0.0	0.0	0.0	3.1	10.2	4.1
SS-04	East-West Tie Connection	46.3	38.8	22.6	0.0	0.0	68.1	21.5	20.0	1.0	0.0
SS-05	St. Lawrence TS: Phase Shifter Upgrade	9.0	18.0	9.0	0.0	0.0	0.9	17.0	37.8	12.0	0.0
SS-06	Merivale TS to Hawthorne TS: 230kV Conductor Upgrade	5.0	10.0	8.4	0.0	0.0	0.3	1.0	9.0	9.0	0.0
SS-07	Milton SS: Station Expansion and Connect 230kV Circuits	0.0	2.0	3.0	69.4	119.1	0.0	0.0	0.0	0.0	0.0
SS-08	Northwest Bulk Transmission Line	8.0	12.9	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SS-09	Barrie Area Transmission Upgrade	38.1	28.2	8.5	0.0	0.0	13.2	31.2	34.6	0.0	0.0
SS-10	Kapuskasing Area Transmission Reinforcement	6.7	3.8	0.0	0.0	0.0	16.6	3.0	2.3	0.0	0.0
SS-11	South Nepean Transmission Reinforcement	27.5	10.5	0.0	0.0	0.0	29.4	17.6	3.3	0.0	0.0
SS-12	Alymer-Tillsonburg Area Transmission Reinforcement	10.0	13.1	6.1	0.0	0.0	0.7	2.7	0.7	0.0	0.0
SS-13	Leamington Area Transmission Reinforcement	4.9	9.7	59.1	63.8	63.8	44.4	99.7	27.3	0.2	0.0
SS-14	Southwest GTA Transmission Reinforcement	10.3	7.8	6.9	3.9	2.0	0.6	0.5	4.1	6.5	7.5
SS-15	Future Transmission Regional Plans	0.0	0.0	10.5	19.6	0.0	0.0	0.0	0.0	10.7	20.0
SS-16	Customer Power Quality Program	3.3	3.4	3.4	3.4	3.5	1.2	0.0	0.0	0.0	0.0
System Service Projects & Programs Less Than $3M		**9.1**	**8.2**	**9.9**	**14.0**	**15.9**	**19.6**	**11.3**	**16.4**	**57.4**	**74.2**
Total Gross System Service Capital ($M)		**238.3**	**177.9**	**160.3**	**174.3**	**204.2**	**221.9**	**247.4**	**162.5**	**107.1**	**105.8**
Less Capital Contributions ($M)		*-34.2*	*-29.7*	*-8.5*	*0.0*	*0.0*	*-25.8*	*-23.5*	*-40.5*	*-16.2*	*-4.2*
Total Net System Service Capital ($M)		**204.1**	**148.2**	**151.8**	**174.3**	**204.2**	**196.1**	**223.9**	**122.0**	**90.9**	**101.6**

Table 8 - General Plant - Material Capital Investments Proposed

ISD	Investment Name	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
GP-01	Integrated System Operations Centre - New Facility Development	32.4	12.7	0.0	0.0	0.0	28.1	42.2	0.0	0.0	0.0
GP-02	Grid Control Network Sustainment	8.0	6.1	6.3	6.5	6.6	3.6	4.4	4.4	6.5	6.6
GP-03	Network Management System Capital Sustainment	0.0	7.8	22.4	8.2	0.0	5.0	10.4	16.6	7.6	0.0
GP-04	Integrated Voice Communications and Telephony System Refresh	0.0	1.9	3.2	1.1	0.0	0.0	1.0	3.2	1.0	0.0
GP-05	Transmission Non-Operational Data Management System	5.2	5.3	5.4	5.5	1.1	0.0	5.3	5.4	5.5	1.1
GP-06	Operating Common IT Infrastructure	0.8	2.0	3.7	3.3	2.2	0.0	2.0	2.0	3.4	3.0
GP-07	Hardware/Software Refresh and Maintenance	2.0	2.0	1.9	1.9	5.8	4.0	2.2	1.7	1.2	2.4
GP-08	Corporate Services Transformation - HR / Payroll	5.0	1.5	0.0	0.0	0.0	4.3	5.2	6.2	0.0	0.0
GP-09	Corporate Services Transformation - Finance	1.0	3.0	5.0	6.5	5.0	0.1	2.6	0.5	10.0	13.4
GP-10	Facility Accommodation & Improvements Service Centres & Admin	8.1	4.9	8.2	16.4	4.3	5.3	5.5	5.2	11.7	11.9
GP-11	Transmission Facilities & Site Improvements	9.4	9.5	9.6	9.7	9.9	11.4	9.5	9.6	9.7	9.9
GP-12	Transport & Work Equipment	13.2	13.2	13.3	13.3	13.3	8.8	12.3	9.7	20.8	21.3
General Plant Projects & Programs Less Than $3M		**30.2**	**24.3**	**15.8**	**11.1**	**10.7**	**54.2**	**35.2**	**38.2**	**69.3**	**54.5**
Total Gross System Service Capital ($M)		**115.4**	**94.4**	**94.7**	**83.6**	**58.9**	**124.7**	**137.8**	**102.8**	**146.8**	**124.0**
Total Net General Plant Capital ($M)		**115.4**	**94.4**	**94.7**	**83.6**	**58.9**	**124.7**	**137.8**	**102.8**	**146.8**	**124.0**

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 031

Reference:

EB-2019-0082, Exhibit I-12-AMPCO-038-01

Interrogatory:

Please add a new column, 2019 actuals, to the table and provide an excel version of the table.

Response:

Please see Attachment 1 for the table updated to include 2019 actuals.

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EB-2019-0082 ISD List of Material Capital Investments
(Net $ Millions)

Table 5 - System Access - Material Capital Investments Proposed

		EB-2019-0082									
ISD	Investment Name	Actual 2015	Plan 2015	Actual 2016	Plan 2016	Actual 2017	Plan 2017	Actual 2018	Plan 2018	Actual 2019	Forecast 2019
SA-01	Connect New IAMGOLD Mine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
SA-02	Horner TS: Build a Second 230/27.6kV Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	2.0
SA-03	Halton TS: Build a Second 230/27.6kV Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4
SA-04	Connect Metrolinx Traction Substations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
SA-05	Future Transmission Load Connection Plans	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0
SA-06	Protection and Control Modifications for Distributed Generation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SA-07	Secondary Land Use Transmission Asset Modifications	0.1	0.4	1.2	0.5	-0.7	-1.0	4.3	5.0	5.1	2.9

Table 6 - System Renewal - Material Capital Investments

		EB-2019-0082									
ISD	Investment Name	Actual 2015	Plan 2015	Actual 2016	Plan 2016	Actual 2017	Plan 2017	Actual 2018	Plan 2018	Actual 2019	Forecast 2019
SR-01	Air Blast Circuit Breaker Replacement Projects	66.8	61.0	89.2	58.9	88.0	79.6	79.0	61.6	116.7	88.5
SR-02	Station Reinvestment Projects	6.7	45.7	37.8	38.6	67.6	64.4	70.0	63.1	107.2	104.8
SR-03	Bulk Station Transformer Replacement Projects	-0.2	0.0	0.2	0.2	1.2	1.3	0.9	7.8	7.1	9.9
SR-04	Bulk Station Switchgear and Ancillary Equipment Replacement Projects	0.0	0.0	0.0	0.0	0.5	0.2	1.8	3.3	2.9	2.4
SR-05	Load Station Transformer Replacement Projects	10.1	5.0	8.8	0.9	12.2	12.0	15.0	26.8	31.6	40.3
SR-06	Load Station Switchgear and Ancillary Equipment Replacement Projects	0.3	1.9	3.7	9.7	1.6	1.7	16.0	15.7	13.1	11.7
SR-07	Protection and Automation Replacement Projects	0.0	0.0	0.0	0.0	0.2	0.2	0.4	2.5	2.1	1.9
SR-08	John Transformer Station Reinvestment Project	0.1	14.0	0.0	5.9	0.0	0.1	0.0	0.0	0.0	0.2
SR-09	Transmission Station Demand and Spares and Targeted Assets	27.0	11.1	24.2	16.4	18.5	23.6	49.6	37.1	66.6	49.7
SR-10	Transformer Protection Replacement	0.1	0.0	1.5	0.0	3.4	3.1	3.1	4.1	1.4	3.0
SR-11	Legacy SONET System Replacement	0.0	0.0	0.0	0.0	1.2	1.1	3.3	2.4	1.5	1.5
SR-12	Telecom Performance Improvements	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-13	ADSS Fibre Optic Cable Replacements	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.4	0.2	0.5
SR-14	Mobile Radio System Replacement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
SR-15	Telecom Fibre IRU Agreement Renewals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-16	NERC CIP-014 Physical Security Implementation	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	8.0	17.9
SR-17	NERC CIP Transient Cyber Asset Project	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	3.5
SR-18	PSIT Cyber Equipment Replacement	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	3.9	5.4
SR-19	Transmission Line Refurbishment - End of Life ACSR, Copper Conductors & Structures	0.2	0.0	2.1	0.0	8.1	7.8	42.7	47.0	52.4	104.6
SR-20	Transmission Line Refurbishment - Near End of Life ACSR Conductor	0.0	0.0	0.0	0.0	0.4	0.4	0.3	3.6	0.4	12.8
SR-21	Wood Pole Structure Replacements	20.8	13.8	43.8	14.1	42.7	40.3	35.3	34.9	39.7	34.8
SR-22	Steel Structure Coating Program	5.1	8.8	2.3	10.3	42.1	39.0	37.7	27.0	11.1	9.3
SR-23	Tower Foundation Assess/Clean/Coat Program	1.4	4.2	1.6	4.3	7.0	5.9	4.7	7.7	10.8	13.1
SR-24	Transmission Line Shieldwire Replacement	4.8	4.3	1.4	4.4	5.4	4.8	9.3	10.2	8.4	9.9
SR-25	Transmission Line Insulator Replacement	2.9	3.6	29.5	3.7	48.9	53.1	65.5	64.8	78.5	66.2
SR-26	Transmission Line Emergency Restoration	8.7	10.9	13.8	11.1	8.3	7.6	9.7	9.0	9.9	9.4
SR-27	C5E/C7E Underground Cable Replacement	0.0	0.0	0.0	0.0	0.5	0.3	0.5	0.6	1.0	3.2
SR-28	OPGW Infrastructure Projects	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	1.2
SR-29	Physical Security ISL Application Replacement	0.0	0.0	0.0	0.0	0.0	0.0	3.3	5.0	3.1	7.8

EB-2019-0082 ISD List of Material Capital Investments
(Net $ Millions)

Table 7 - System Service - Material Capital Investments

		EB-2019-0082									
ISD	**Investment Name**	**Actual 2015**	**Plan 2015**	**Actual 2016**	**Plan 2016**	**Actual 2017**	**Plan 2017**	**Actual 2018**	**Plan 2018**	**Actual 2019**	**Forecast 2019**
SS-01	Lennox TS: Install 500kV Shunt Reactors	0.0	0.0	0.0	0.0	0.3	0.2	1.1	2.0	5.0	13.2
SS-02	Wataynikaneyap Line to Pickle Lake Connection	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	3.2
SS-03	Nanticoke TS: Connect HVDC Lake Erie Circuits	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SS-04	East-West Tie Connection	0.1	0.0	1.7	0.0	4.4	4.3	8.6	10.8	46.4	31.5
SS-05	St. Lawrence TS: Phase Shifter Upgrade	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5
SS-06	Merivale TS to Hawthorne TS: 230kV Conductor Upgrade	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.3	0.2	0.5
SS-07	Milton SS: Station Expansion and Connect 230kV Circuits	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SS-08	Northwest Bulk Transmission Line	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	5.0
SS-09	Barrie Area Transmission Upgrade	0.0	0.0	0.4	0.0	1.8	2.0	1.8	6.5	4.9	2.6
SS-10	Kapuskasing Area Transmission Reinforcement	0.0	0.0	0.1	0.0	0.7	0.7	1.7	1.5	7.6	17.5
SS-11	South Nepean Transmission Reinforcement	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.8	0.8	0.0
SS-12	Alymer-Tillsonburg Area Transmission Reinforcement	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0	0.2	1.0
SS-13	Leamington Area Transmission Reinforcement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	4.9
SS-14	Southwest GTA Transmission Reinforcement	0.0	0.0	0.2	0.0	0.1	0.1	0.3	1.2	0.3	1.9
SS-15	Future Transmission Regional Plans	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0
SS-16	Customer Power Quality Program	0.0	0.0	0.0	0.0	0.0	0.0	0.4	3.3	2.4	3.3

Table 8 - General Plant - Material Capital Investments

		EB-2019-0082									
ISD	**Investment Name**	**Actual 2015**	**Plan 2015**	**Actual 2016**	**Plan 2016**	**Actual 2017**	**Plan 2017**	**Actual 2018**	**Plan 2018**	**Actual 2019**	**Forecast 2019**
GP-01	Integrated System Operations Centre - New Facility Development	0.2	0.0	4.0	0.0	0.8	1.0	0.6	23.0	1.4	28.8
GP-02	Grid Control Network Sustainment	0.5	2.0	3.4	3.0	2.9	2.4	3.6	6.4	5.6	7.2
GP-03	Network Management System Capital Sustainment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GP-04	Integrated Voice Communications and Telephony System Refresh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GP-05	Transmission Non-Operational Data Management System	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GP-06	Operating Common IT Infrastructure	0.0	0.0	0.0	1.6	0.0	0.9	0.0	1.0	0.0	1.7
GP-07	Hardware/Software Refresh and Maintenance	5.7	4.7	8.0	4.4	6.2	6.5	4.0	7.3	4.7	3.7
GP-08	Corporate Services Transformation - HR / Payroll	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.0	0.4	0.5
GP-09	Corporate Services Transformation - Finance	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.5	0.2	0.2
GP-10	Facility Accommodation & Improvements Service Centres & Admin	0.1	0.8	6.4	0.8	5.3	7.9	4.9	19.3	1.3	7.2
GP-11	Transmission Facilities & Site Improvements	0.0	0.0	6.2	0.0	10.6	12.0	16.4	10.0	7.9	12.0
GP-12	Transport & Work Equipment	16.7	14.9	20.4	17.1	13.7	14.5	7.2	14.1	11.0	13.3

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 032

Reference:

TSP Section 2.11, T-SR-01

Interrogatory:

a) Page 8: Figure 1 provides the condition summary of the Network Station Transformer Fleet in 2020.

Please provide Figure 1 based on 2016 asset condition data.

b) Page 9: Figure 2 provides the condition summary of HV Breaker Fleet.

Please provide Figure 2 based on 2016 asset condition data.

c) Page 13: Over the 2023-2027 period, the Investment targets 30 stations and addresses the replacement of 35 transformers (22 to be in-serviced during the 2023-2027 period), 154 breakers (93 to be in-serviced during the 2023-2027 period), and 753 protection systems (523 to be in-serviced during the 2023-2027 period).

Please provide the investments replaced on the same basis over the 2018-2022 period.

d) Page 15: Please provide Table 3 for the period 2018 to 2022.

e) Pages 17-18: Please provide the estimated cost of Alternative 1 and Alternative 2.

f) Page 30 Appendix B: Please provide Appendix B Detailed Investment Costs for the period 2018 to 2022.

g) Please identify the investments in Appendix B (part f) not undertaken and explain why.

Response:

a) The breakdown of this subset of the 2016 asset condition data is not readily available however Hydro One has provided the 2016 poor condition data for transformers and breakers in TSP Section 2.2 Figure 1.

b) Please see part a).

c) This information is not readily available for network station investments but the overall number of major station assets replaced may be found in Interrogatory B2-Staff-059.

d) Table 3 for the 2018-2022 period has been provided below. The table only includes historical costs associated with the network station investments planned over the 2023-2027 period.

($ Millions)	2018 Actuals	2019 Actuals	2020 Actuals	2021 Bridge	2022 Bridge	Total
Capital and Minor Fixed Assets	1.4	3.3	8.5	26.1	126.6	165.9
Less Removals	0.0	0.0	0.0	1.1	3.5	4.6
Gross Investment Cost	**1.4**	**3.3**	**8.5**	**25.0**	**123.1**	**161.3**
Less Capital Contributions	0.0	0.0	0.0	0.0	1.2	1.2
Net Investment Cost	**1.4**	**3.3**	**8.5**	**25.0**	**121.9**	**160.1**

e) An estimated cost is not available for Alternative 1 as this alternative involves waiting for deteriorated condition transformers, breakers, or ancillary equipment to fail and replace components on a reactive basis. Hydro One does not run transmission assets to failure given their criticality to the integrity of the transmission system and the significant reliability, safety and environmental impact associated with their failures. Hydro One rejected this alternative due to the unacceptable risk that occurs when a failure results.

An estimated cost is not available for Alternative 2 because planned replacements as Integrated Station Investments have the advantage of minimizing system and equipment outages through coordinated outage plans. When only a single component at a transmission station has deteriorated and must be replaced, Hydro One will address these assets through investments in T-SR-09 and/or T-SR-10. However, Alternative 2 is not efficient when multiple components at a transmission station are in poor condition or have inadequate performance.

f) T-SR-01 Appendix B Detailed Investment Costs for the 2018-2022 period is shown below. The table only includes historical costs associated with the network station investments planned over the 2023-2027 period.

ISD Ref.	Station Name	EB-2019-0082	Type	Net Capital Investment ($ Millions)							In Service Year
				2018 Actuals	2019 Actuals	2020 Actuals	2021 Bridge	2022 Bridge	23-27 Total	Proj. Total	
T-SR-01.01	Claireville TS	SR-04	E	0.5	0.7	0.8	3.1	7.9	8.6	21.7	2023
T-SR-01.02	Seaforth TS	SR-03	P	0.1	0.2	0.5	4.7	28.5	20.1	54.4	2023
T-SR-01.03	Fort Frances TS	SR-03	P	0.0	0.2	0.3	0.4	7.2	11.9	20.1	2023
T-SR-01.04	Keith TS	SR-03	E	0.4	0.4	1.8	7.8	15.0	11.0	36.5	2023
T-SR-01.05	Whitedog Falls SS	-	P	0.0	0.1	0.4	0.4	3.6	3.7	8.1	2023
T-SR-01.06	Milton SS	SR-04	P	0.0	0.0	0.5	1.3	4.8	12.6	19.2	2023
T-SR-01.07	Rabbit Lake SS	SR-04	P	0.2	0.3	0.8	0.3	10.4	11.0	23.1	2023
T-SR-01.08	Lakehead TS	SR-04	P	0.1	0.0	0.4	1.3	12.5	21.6	36.1	2024
T-SR-01.09	Sarnia Scott TS	SR-03	P	0.0	0.2	0.8	1.3	2.7	21.4	26.4	2024
T-SR-01.10	Kenora TS	SR-04	P	0.0	0.0	0.0	0.3	1.9	13.7	15.9	2025
T-SR-01.11	Marathon TS	SR-04	P	0.1	0.0	0.3	0.5	2.0	11.6	14.7	2025
T-SR-01.12	Wawa TS	SR-02	P	0.1	0.1	0.5	0.4	6.9	36.6	44.8	2025
T-SR-01.13	Lakehead TS	-	P	0.0	0.0	0.0	0.5	4.4	24.2	29.1	2025
T-SR-01.14	Middleport TS	SR-03	P	0.0	0.0	0.0	0.1	0.5	29.2	29.8	2025
T-SR-01.15	Porcupine TS	SR-03	P	0.0	0.0	0.5	0.5	5.1	71.6	77.7	2025
T-SR-01.16	Essa TS	-	P	0.0	0.0	0.0	0.2	0.5	35.8	36.6	2025
T-SR-01.17	Mackenzie TS	SR-04	P	0.0	0.8	0.4	0.4	3.3	46.6	51.4	2025
T-SR-01.18	Algoma TS	SR-03	P	0.0	0.0	0.2	0.5	0.8	28.6	30.0	2026

ISD Ref.	Station Name	EB-2019-0082	Type	Net Capital Investment ($ Millions)							In Service Year
				2018 Actuals	2019 Actuals	2020 Actuals	2021 Bridge	2022 Bridge	23-27 Total	Proj. Total	
T-SR-01.19	Des Joachims TS	-	P	0.0	0.0	0.0	0.0	0.0	6.7	6.7	2026
T-SR-01.20	Otto Holden TS	SR-03	P	0.0	0.2	0.4	0.4	2.2	61.4	65.3	2026
T-SR-01.21	Ansonville TS	-	P	0.0	0.0	0.0	0.0	0.0	8.7	8.7	2027
T-SR-01.22	Manby TS	SR-03	P	0.0	0.0	0.0	0.1	0.7	51.7	52.5	2027
T-SR-01.23	Fort Frances TS	-	P	0.0	0.0	0.0	0.0	0.0	20.6	20.6	2027
T-SR-01.24	Merivale TS	SR-04	P	0.0	0.0	0.0	0.2	0.4	167.8	168.4	2027
T-SR-01.25	Beach TS	SR-03	P	0.0	0.0	0.0	0.1	0.4	44.4	45.3	2028
T-SR-01.26	Lennox TS	-	P	0.0	0.0	0.0	0.0	0.0	31.4	34.4	2028
T-SR-01.27	Buchanan TS	SR-03	P	0.0	0.0	0.0	0.0	0.0	32.8	39.8	2028
T-SR-01.28	Owen Sound TS	SR-06	P	0.0	0.0	0.0	0.0	0.0	21.6	28.1	2028
T-SR-01.29	Kenora TS	-	P	0.0	0.0	0.0	0.0	0.0	10.8	15.0	2028
T-SR-01.30	Mississagi TS	SR-04	P	0.0	0.0	0.0	0.0	0.0	22.1	32.4	2028
T-SR-01.31	Hawthorne TS	-	P	0.0	0.0	0.0	0.0	0.0	27.1	33.7	2028
T-SR-01.32	Cataraqui TS	-	P	0.0	0.0	0.0	0.0	0.0	24.9	31.1	2028
T-SR-01.33	Claireville TS	-	P	0.0	0.0	0.0	0.0	0.0	22.0	49.2	2029
T-SR-01.34	Beck 2 TS	-	P	0.0	0.0	0.0	0.0	0.0	9.4	16.7	2029
T-SR-01.35	Claireville TS	-	P	0.0	0.0	0.0	0.0	0.0	11.0	21.1	2029
	Net Investment Cost			**1.4**	**3.4**	**8.5**	**25.0**	**121.9**	**994.1**	**1244.6**	

g) All investments in Appendix B are planned to be undertaken.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 033

Reference:

TSP Section 2.11, T-SR-02

Interrogatory:

a) Page 5: There is still a number of obsolete, poor condition ABCBs in Hydro One's breaker fleet that require replacement.

Please provide the quantity of ABCDs that require replacement.

b) Page 8: Please provide Table 3 for the period 2018 to 2022.

c) Pages 9-10: Please provide the estimated cost of Alternative 1 and Alternative 2.

d) Page 12 Appendix A: Please provide the total assets replaced over the 2018 to 2022 period with respect to transformers, breakers and protection systems.

e) Page 15 Appendix B: Please provide Appendix B Detailed Investment Costs for the period 2018 to 2022.

f) Please identify the investments in Appendix B (part e) not undertaken and explain why.

Response:

a) There are 101 HV ABCBs that require replacement.

b) T-SR-02 Table 3 for the period 2018 to 2022 has been provided below. The table only includes historical costs associated with the network station investments planned over the 2023-2027 period.

($ Millions)	2018 Actuals	2019 Actuals	2020 Actuals	2021 Forecast	2022 Forecast
Capital and Minor Fixed Assets	53.0	100.6	164.5	140.5	140.5
Less Removals	1.6	2.3	2.1	5.9	6.1
Gross Investment Cost	**51.5**	**98.3**	**162.4**	**134.6**	**134.4**
Less Capital Contributions	0.1	0.0	-0.1	0.0	0.0
Net Investment Cost	**51.6**	**98.3**	**162.3**	**134.6**	**134.4**

c) An estimated cost is not available for Alternative 1 because this involves waiting for deteriorated condition transformers, breakers, or ancillary equipment to fail and replace components on a reactive basis. Hydro One does not run transmission assets to failure given their criticality to the integrity of the transmission system and the significant reliability, safety and environmental impact associated with their failures. Hydro One rejected this alternative due to the unacceptable risk that occurs when a failure results.

An estimated cost is not available for Alternative 2 because each station is analyzed based on its specific needs. Switchyard rebuilds will be more costly due to the expansion of the existing station property, real estate acquisition, and potential reconfiguration of the existing switchyard connections. This alternative is considered when operational constraints, space and execution timelines prevent an in-situ option to be deployed.

d) This information is not readily available but the overall number of replaced units may be found in Interrogatory B2-Staff-059.

e) T-SR-02 Appendix B Detailed Investment Costs for the period 2018 to 2022 is shown below. The table only includes historical costs associated with the network station investments planned over the 2023-2027 period.

ISD Ref.	Station Name	EB-2019-0082	Type	Net Capital Investment ($ Millions)							In Service Year
				2018 A	2019 A	2020 A	2021 F	2022 F	23-27 Total	Proj. Total	
T-SR-02.01	Cherrywood TS	SR-01	E	16.2	26.2	26.7	11.0	14.0	15.4	111.6	2023
T-SR-02.02	Beck 2 TS	SR-01	E	13.7	12.0	11.4	11.5	17.6	11.5	128.4	2023
T-SR-02.03	Bruce B SS	SR-01	E	0.9	1.5	46.3	60.5	24.5	45.2	180.2	2024
T-SR-02.04	Cherrywood TS	SR-01	E	0.0	0.7	4.4	14.5	16.9	38.4	74.9	2025
T-SR-02.05	Middleport TS	SR-01	E	3.9	29.3	35.3	9.4	9.9	29.6	119.8	2025
T-SR-02.06	Nanticoke TS	SR-01	E	0.6	4.9	16.7	10.5	9.3	23.3	66.5	2025
T-SR-02.07	Lennox TS	SR-01	E	15.5	18.0	12.5	8.0	9.5	36.0	142.5	2026
T-SR-02.08	Beck 1 SS	SR-01	E	0.7	5.9	7.8	6.9	4.9	4.6	31.8	2026
T-SR-02.09	Bruce A TS	SR-01	P	0.0	0.0	0.8	1.6	23.6	213.5	239.5	2027
T-SR-02.10	Essa TS	-	P	0.0	0.0	0.3	0.6	3.3	73.0	77.2	2027
T-SR-02.11	Cherrywood TS	-	P	0.0	0.0	0.0	0.1	0.8	85.0	92.1	2028
	Total			**51.6**	**98.5**	**162.3**	**134.6**	**134.4**	**575.6**	**1264.4**	

f) All investments in Appendix B are planned to be undertaken.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 034

Reference:

TSP Section 2.11, T-SR-02, Page 5

Interrogatory:

Figure 1 shows the Circuit Breaker forced outage duration by breaker type.

a) Please confirm all forced outages in Figure 1 resulted in customer interruptions.

b) Please provide the data point for 2021.

c) Please provide the number of ABCBs replaced in each of the years 2010 to 2022.

Response:

a) No, not all forced outages resulted in customer interruptions.

b) Hydro One does not have complete annual data for 2021. Given that Hydro One has only partial data for 2021 (i.e. through September 2021), any comparison would not be appropriate or meaningful.

c) 123 ABCB were replaced between 2010 and the end of September 2021.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 035

Reference:

TSP Section 2.11, T-SR-03

Interrogatory:

a) Page 7: Figure 1 provides the condition summary of the Connection Station Transformer Fleet in 2020.

Please provide Figure 1 based on 2016 asset condition data.

b) Page 9: Figure 2 provides the condition summary of MV Breaker Fleet.

Please provide Figure 2 based on 2016 asset condition data.

c) Page 15: Please provide Table 3 for the period 2018 to 2022.

d) Pages 17-18: Please provide the estimated cost of Alternative 1 and Alternative 2.

e) Page 20 Appendix A: Please provide the total assets replaced over the 2018 to 2022 period with respect to transformers, breakers and protection systems.

f) Page 39 Appendix B: Please provide Appendix B Detailed Investment Costs for the period 2018 to 2022.

g) Please identify the investments in Appendix B (part f) not undertaken and explain why.

Response:

a) The breakdown of this subset of the 2016 asset condition data is not readily available however Hydro One has provided the 2016 poor condition data for transformers and breakers in TSP Section 2.2 Figure 1.

b) Please see part a).

c) Table 3 for the 2018-2022 period has been provided below. The table only includes historical costs associated with the connection station investments planned over the 2023-2027 period.

($ Millions)	2018 Actuals	2019 Actuals	2020 Actuals	2021 Bridge	2022 Bridge	Total
Capital and Minor Fixed Assets	8.5	13.7	34.3	99.1	223.3	378.9
Less Removals	0.0	1.0	0.5	2.0	6.6	10.1
Gross Investment Cost	**8.5**	**12.6**	**33.9**	**97.0**	**216.7**	**368.7**
Less Capital Contributions	0.0	0.7	0.9	1.7	10.3	13.6
Net Investment Cost	**8.5**	**12.0**	**32.9**	**95.3**	**206.5**	**355.2**

d) An estimated cost is not available for Alternative 1 as this alternative involves waiting for deteriorated condition transformers, breakers, or ancillary equipment to fail and replace components on a reactive basis. Hydro One does not run transmission assets to failure given their criticality to the integrity of the transmission system and the significant reliability, safety and environmental impact associated with their failures. Hydro One rejected this alternative due to the unacceptable risk that occurs when a failure results.

An estimated cost is not available for Alternative 2 because planned replacements as an Integrated Station Investments have the advantage of minimizing system and equipment outages through coordinated outage plans. When only a single component at a transmission station has deteriorated and must be replaced, Hydro One will address these assets through investments in T-SR-09 and/or T-SR-10. However, Alternative 2 is not efficient when multiple components at a transmission station are in poor condition or have inadequate performance.

e) This information is not readily available for connection station investments but the overall number of major station assets replaced may be found in Interrogatory B2-Staff-059.

f) T-SR-03 Appendix B Detailed Investment Costs for the 2018 - 2022 period is shown below. The table only includes historical costs associated with the connection station investments planned over the 2023-2027 period.

ISD Ref.	Station Name	EB-2019-0082	Type	Net Capital Investment ($ Millions)							In Service Year
				2018 Actuals	2019 Actuals	2020 Actuals	2021 Bridge	2022 Bridge	23-27 Total	Project Total	
T-SR-03.01	Parry Sound TS	SR-05	E	0.1	0.4	0.9	5.1	8.3	0.1	23.0	2022
T-SR-03.02	Port Colborne TS	SR-02	E	0.0	1.0	3.0	10.5	7.3	0.0	31.0	2022
T-SR-03.03	Main TS	SR-05	E	3.3	1.4	4.1	10.2	10.5	3.3	33.9	2023
T-SR-03.04	Wilson TS	SR-05	P	0.1	0.4	0.8	4.5	21.3	0.1	41.4	2023
T-SR-03.05	Wonderland TS	SR-02	P	0.0	0.9	1.8	4.3	10.7	0.0	24.7	2023
T-SR-03.06	Moose Lake TS	SR-05	P	0.3	0.5	0.1	0.6	0.6	0.3	8.8	2023
T-SR-03.07	Orangeville TS	SR-05	E	0.2	0.5	3.5	4.9	10.1	0.2	34.5	2023
T-SR-03.08	Lambton TS	SR-02	P	0.0	0.4	1.9	4.1	24.4	0.0	47.7	2023
T-SR-03.09	Crowland TS	SR-05	P	0.0	0.1	0.3	1.8	14.1	0.0	35.8	2023
T-SR-03.10	Slater TS	SR-02	E	0.1	0.5	0.4	4.3	7.9	0.1	29.0	2023
T-SR-03.11	Lincoln Heights TS	-	P	0.0	0.0	0.4	1.2	2.9	0.0	21.4	2023
T-SR-03.12	Arnprior TS	SR-02	E	0.6	1.2	0.8	3.2	9.1	0.6	28.3	2023
T-SR-03.13	John TS	-	P	0.0	0.0	0.2	0.3	2.3	0.0	20.9	2024
T-SR-03.14	Rexdale TS	SR-06	E	0.6	0.6	0.2	3.0	10.0	0.6	29.3	2024
T-SR-03.15	Kirkland Lake TS	SR-06	P	0.5	0.7	1.3	4.3	6.8	0.5	27.7	2024
T-SR-03.16	Fairbank TS	SR-02	E	1.3	-0.2	8.8	13.0	13.0	1.3	68.4	2024
T-SR-03.17	Bridgman TS	SR-05	E	0.6	0.7	1.8	12.7	18.9	0.6	65.2	2024
T-SR-03.18	Murray TS	SR-05	P	0.0	0.2	0.2	0.4	2.6	0.0	39.3	2024

ISD Ref.	Station Name	EB-2019-0082	Type	Net Capital Investment ($ Millions)							In Service Year
				2018 Actuals	2019 Actuals	2020 Actuals	2021 Bridge	2022 Bridge	23-27 Total	Project Total	
T-SR-03.19	Lauzon TS	SR-05	P	0.0	0.1	0.3	0.4	3.8	0.0	41.2	2024
T-SR-03.20	Longueuil TS	SR-05	P	0.0	0.0	0.1	0.4	1.6	0.0	17.0	2024
T-SR-03.21	Bridgman TS	-	P	0.0	0.0	-0.3	0.5	-3.0	0.0	3.7	2024
T-SR-03.22	Riverdale TS	-	P	0.0	0.0	0.0	0.1	0.3	0.0	7.0	2024
T-SR-03.23	Port Arthur TS #1	SR-06	P	0.0	0.0	0.0	0.3	1.1	0.0	24.2	2025
T-SR-03.24	Port Hope TS	SR-05	P	0.0	0.0	0.0	0.0	0.1	0.0	23.8	2025
T-SR-03.25	Manby TS	-	P	0.0	0.0	0.0	0.4	0.8	0.0	16.8	2025
T-SR-03.26	Elliot Lake TS	SR-05	P	0.0	0.0	0.3	0.4	2.1	0.0	23.5	2025
T-SR-03.27	Preston TS	SR-05	P	0.0	0.0	0.0	0.2	0.6	0.0	22.9	2025
T-SR-03.28	Wallace TS	SR-05	P	0.0	0.0	0.0	0.2	0.5	0.0	20.3	2025
T-SR-03.29	Bermondsey TS	SR-05	P	0.0	0.0	0.0	0.2	0.5	0.0	20.6	2025
T-SR-03.30	Scarboro TS	-	P	0.0	0.0	0.0	0.2	0.5	0.0	9.7	2025
T-SR-03.31	Newton TS	-	P	0.0	0.0	0.1	0.3	1.2	0.0	12.6	2025
T-SR-03.32	St. Andrews TS	SR-02	P	0.0	0.0	0.0	0.1	0.3	0.0	43.8	2025
T-SR-03.33	Picton TS	-	P	0.0	0.0	0.0	0.0	0.6	0.0	14.0	2025
T-SR-03.34	Midhurst TS	-	P	0.0	0.0	0.0	0.1	0.4	0.0	9.2	2025
T-SR-03.35	Orillia TS	-	P	0.0	0.0	0.0	0.2	0.3	0.0	8.0	2025
T-SR-03.36	Bracebridge TS	-	P	0.0	0.0	0.0	0.1	0.3	0.0	8.0	2026

ISD Ref.	Station Name	EB-2019-0082	Type	Net Capital Investment ($ Millions)							In Service Year
				2018 Actuals	2019 Actuals	2020 Actuals	2021 Bridge	2022 Bridge	23-27 Total	Project Total	
T-SR-03.37	Charles TS	SR-05	P	0.0	0.0	0.0	0.2	0.6	0.0	30.1	2026
T-SR-03.38	Manby TS	-	P	0.0	0.0	0.0	0.1	0.2	0.0	21.0	2026
T-SR-03.39	Russell TS	SR-05	P	0.0	0.0	0.0	0.0	0.2	0.0	24.4	2026
T-SR-03.40	Duplex TS	SR-05	P	0.0	0.0	0.0	0.2	0.5	0.0	22.5	2026
T-SR-03.41	Lake TS	SR-06	P	0.0	0.0	0.0	0.3	2.6	0.0	33.8	2026
T-SR-03.42	Bunting TS	SR-06	P	0.0	0.6	0.6	1.9	1.9	0.0	41.0	2026
T-SR-03.43	Nebo TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	19.0	2026
T-SR-03.44	Palermo TS	SR-05	P	0.0	0.0	0.0	0.0	0.2	0.0	19.5	2026
T-SR-03.45	Carlton TS	SR-02	P	0.6	1.4	0.1	0.0	0.3	0.6	36.0	2026
T-SR-03.46	Birmingham TS	SR-05	P	0.0	0.0	0.0	0.0	0.2	0.0	25.7	2026
T-SR-03.47	Carling TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	8.9	2026
T-SR-03.48	Cherrywood TS	SR-06	P	0.0	0.0	0.0	0.0	0.3	0.0	15.6	2026
T-SR-03.49	Gage TS	SR-05	P	0.0	0.0	0.0	0.0	0.2	0.0	25.1	2026
T-SR-03.50	Woodbridge TS	SR-05	P	0.0	0.0	0.0	0.0	0.2	0.0	12.6	2027
T-SR-03.51	Fairchild TS	SR-05	P	0.0	0.0	0.0	0.0	0.2	0.0	40.5	2027
T-SR-03.52	Cedar TS	SR-05	P	0.0	0.0	0.0	0.0	0.7	0.0	23.6	2027
T-SR-03.53	Halton TS	SR-07	P	0.0	0.0	0.0	0.0	0.1	0.0	10.3	2027
T-SR-03.54	Waubaushene TS	-	P	0.0	0.0	0.0	0.0	0.1	0.0	17.8	2027

ISD Ref.	Station Name	EB-2019-0082	Type	Net Capital Investment ($ Millions)							In Service Year
				2018 Actuals	2019 Actuals	2020 Actuals	2021 Bridge	2022 Bridge	23-27 Total	Project Total	
T-SR-03.55	Kent TS	SR-02	P	0.0	0.0	0.0	0.0	0.1	0.0	28.1	2027
T-SR-03.56	Muskoka TS	SR-06	P	0.0	0.0	0.0	0.0	0.0	0.0	7.6	2027
T-SR-03.57	Timmins TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	8.5	2027
T-SR-03.58	Glendale TS	SR-02	P	0.1	0.6	0.9	0.2	5.0	0.1	55.0	2027
T-SR-03.59	Vansickle TS	SR-06	P	0.0	0.0	0.0	0.0	0.0	0.0	14.5	2027
T-SR-03.60	Dundas TS	SR-06	P	0.0	0.0	0.0	0.0	0.0	0.0	11.5	2027
T-SR-03.61	Mohawk TS	SR-06	P	0.0	0.0	0.0	0.0	0.0	0.0	9.8	2027
T-SR-03.62	Bathurst TS	SR-05	P	0.0	0.0	0.0	0.0	0.0	0.0	17.5	2027
T-SR-03.63	Leslie TS	SR-05	P	0.0	0.0	0.0	0.0	0.0	0.0	33.9	2027
T-SR-03.64	Burlington TS	SR-06	P	0.0	0.0	0.0	0.0	0.0	0.0	11.6	2027
T-SR-03.65	Alliston TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	17.7	2028
T-SR-03.66	Dobbin TS	-	P	0.0	0.0	0.0	0.1	0.2	0.0	100.8	2028
T-SR-03.67	Strachan TS	SR-05	P	0.0	0.0	0.0	0.0	0.0	0.0	42.0	2028
T-SR-03.68a	Clarke TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	22.3	2028
T-SR-03.68b	Clarke TS	SR-05	P	0.0	0.0	0.0	0.0	0.0	0.0	25.2	2028
T-SR-03.69	Albion TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	44.9	2028
T-SR-03.70	Bilberry Creek TS	SR-05	P	0.0	0.0	0.0	0.0	0.0	0.0	25.1	2028
T-SR-03.71	Talbot TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	28.6	2028

ISD Ref.	Station Name	EB-2019-0082	Type	Net Capital Investment ($ Millions)							In Service Year
				2018 Actuals	2019 Actuals	2020 Actuals	2021 Bridge	2022 Bridge	23-27 Total	Project Total	
T-SR-03.72	Havelock TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	19.9	2028
T-SR-03.73	Lisgar TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	12.7	2028
T-SR-03.74	Duplex TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	23.1	2028
T-SR-03.75	Crystal Falls TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	27.8	2028
T-SR-03.76	Douglas Point TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	28.0	2028
T-SR-03.77	Trout Lake TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	19.4	2028
T-SR-03.78	Lauzon TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	32.8	2028
T-SR-03.79	Galt TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	12.8	2028
T-SR-03.80	Martindale TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	23.2	2028
T-SR-03.81	Bruce B HWP TS	-	P	0.0	0.0	0.3	0.0	0.0	0.0	27.4	2028
T-SR-03.82	Campbell TS	SR-06	P	0.0	0.0	0.0	0.0	0.0	0.0	18.1	2028
T-SR-03.83	Bramalea TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	19.1	2028
T-SR-03.84	Erindale TS	SR-07	P	0.0	0.0	0.0	0.0	0.0	0.0	23.0	2028
T-SR-03.85	Gardiner TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	26.2	2028
T-SR-03.86	Morrisburg TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	10.2	2028
T-SR-03.87	Nepean TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	16.6	2028
T-SR-03.88	Beach TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	40.4	2028
T-SR-03.89	Port Arthur TS #1	-	P	0.0	0.0	0.0	0.0	0.0	0.0	10.4	2028

ISD Ref.	Station Name	EB-2019-0082	Type	Net Capital Investment ($ Millions)							In Service Year
				2018 Actuals	2019 Actuals	2020 Actuals	2021 Bridge	2022 Bridge	23-27 Total	Project Total	
T-SR-03.90	South March TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	20.1	2028
T-SR-03.91	Clarabelle TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	18.0	2028
T-SR-03.92	Tomken TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	23.3	2029
T-SR-03.93	Malvern TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	15.3	2029
T-SR-03.94	Allanburg TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	10.7	2029
T-SR-03.95	Caledonia TS	-	P	0.0	0.1	0.2	0.0	0.0	0.0	10.2	2029
T-SR-03.96	Finch TS	SR-06	P	0.0	0.0	0.0	0.0	0.0	0.0	32.0	2029
T-SR-03.97	Tomken TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	24.0	2029
T-SR-03.98	Murray TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	17.3	2029
T-SR-03.99	Lake TS	-	P	0.0	0.0	0.0	0.0	0.0	0.0	25.3	2029
T-SR-03.100	Stratford TS	-	P	0.0	0.1	0.5	1.3	7.2	9.2	25.1	2029
T-SR-03.101	Bramalea TS	SR-07	P	0.0	0.0	0.3	0.9	3.9	5.2	27.2	2030
T-SR-03.102	Fergus TS	-	P	0.0	0.0	0.1	0.6	1.4	2.1	26.1	2030
Net Investment Cost				**8.5**	**12.0**	**33.1**	**95.3**	**206.5**	**1877.3**	**2534.6**	

g) All investments in Appendix B are planned to be undertaken.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 036

Reference:

TSP Section 2.11, T-SR-04

Interrogatory:

a) Page 4: Figure 1 provides the condition summary of the Wood Pole population in 2020.

Please provide Figure 1 based on 2016 asset condition data.

b) Page 4: Figure 2 provides the Wood pole forced outage frequency.

Please provide the data point for 2021.

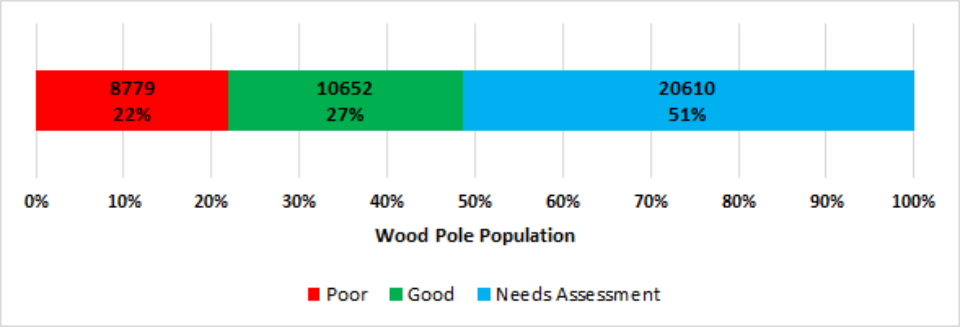
c) Page 7: Please provide Table 1 for the period 2018 to 2022.

d) Page 8: Please provide Table 3 for the period 2018 to 2022.

e) Page 9: Please provide the estimated cost of Alternative 1.

Response:

a) Please see the 2016 wood pole condition data below:



b) Hydro One does not have complete annual data for 2021. Given that Hydro One has only partial data for 2021, any comparison would not be appropriate or meaningful.

c) Please see Interrogatory B2-Staff-059

Witness: JABLONSKY Donna

d) Please see below for Total Investment Cost 2018-2022:

($ Millions)	**2018**	**2019**	**2020**	**2021 (Forecast)**	**2022 (Forecast)**
Gross Investment Cost	38.4	43.3	51.1	63.3	57.3
Less Removals	3.1	3.5	4.1	5.1	4.6
Capital and Minor Fixed Assets	**35.3**	**39.8**	**47.0**	**58.2**	**52.7**
Less Capital Contributions	0.0	0.0	0.0	0.0	0.0
Net Investment Cost	**35.3**	**39.8**	**47.0**	**58.2**	**52.7**

e) An estimated cost is not available since this alternative involves waiting for poles in poor condition to fail before replacing them. Hydro One rejected this alternative because it would lead to increased asset failures resulting in elevated safety and reliability risks. This would also cause emergency restorations and trouble calls to increase, directly impacting customers who may be faced with long outages due to the radial nature of many wood pole lines.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 037

Reference:

Exhibit B-2-1, TSP Section 2.11, T-SR-04, Page 5

Interrogatory:

Figure 3 shows the Woodpole forced outage duration.

a) Please confirm all forced outages in Figure 3 resulted in customer interruptions.

b) Please provide the data point for 2021.

c) Please provide the number of woodpoles replaced in each of the years 2010 to 2022.

d) Please provide the number of woodpoles tested each year for the years 2016 to 2020.

Response:

a) Not all forced outages resulted in customer (DP) interruptions.

b) Hydro One does not have complete annual data for 2021. Given that Hydro One has only partial data for 2021 any comparison would not be appropriate or meaningful.

c) Please see below for number of wood poles replaced in 2010-2022:

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021F	2022F
442	412	584	635	897	845	761	966	735	827	796	1022	1024

d) Please see below for wood poles tested each year 2016-2020:

2016	2017	2018	2019	2020
2484	1421	1778	1234	1635

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 038

Reference:

TSP Section 2.11, T-SR-05

Interrogatory:

a) Page 3: Table 1 provides 2020 steel structure demographic data.

Please provide Table 1 based on 2016 data.

b) Page 6: Hydro One states based on the best available data, 20% of Hydro One's steel structures have been recoated, and 27% have fair/poor condition (23% is in fair, 4% in poor condition), reflecting that the steel structure is experiencing corrosion on the HDG and on the bare steel layer.

Please provide the same information based on 2016 data.

c) Page 6: Table 2 provides forecast Steel Structure Coating units.

Please provide Table 2 for the period 2018 to 2022.

d) Page 7: Please provide Table 4 for the period 2018 to 2022.

e) Page 8: Please provide the estimated cost of Alternative 1.

Response:

a) Steel Structure Demographics from EB-2016-0160 Exhibit B1-02-06 are shown below. In the 2016 application the C4 and C5 zones were defined differently.

	Quantity	Average Age	ESL (Years)	Beyond ESL Currently
Steel Towers in Light Corrosion Zones (C2 and C3)	39,000	61	80	2,200
Steel Towers In Heavy and Very High Corrosion Zones (C4 and C5)	13,000	60	80	2,100
Total	52,000	61	80	4,300

b) For 2016, based on the best available data, 17% of Hydro One's steel structures had been recoated, and 18% were in fair/poor condition (14% is in fair, 4% is in poor condition).

c) Please see Interrogatory B2-Staff-059.

d) Table 4 - Investment Cost ($ Millions) for the period 2018 to 2022 is shown below.

	Actual			Forecast	
	2018	**2019**	**2020**	**2021**	**2022**
Gross Investment Cost	37.7	11.1	8.1	21.4	22.6
Less Removals	0.0	0.0	0.0	0.0	0.0
Capital and Minor Fixed Assets	**37.7**	**11.1**	**8.1**	**21.4**	**22.6**
Less Capital Contributions	0.0	0.0	0.0	0.0	0.0
Net Investment Cost	**37.7**	**11.1**	**8.1**	**21.4**	**22.6**

e) There is no estimated cost available for Alternative 1. This alternative has been rejected because reactive management of transmission lines structures would lead to increased asset failures, resulting in elevated safety and reliability risks. Further, as steel structures deteriorate, the cost to perform demand emergency repairs would cause a high financial impact on the company and its ratepayers.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 039

Reference:

TSP Section 2.11, T-SR-06

Interrogatory:

a) Page 8: Table 1 provides the forecast units for the Tower Foundation Assess/Clean/Coat Program.

Please provide Table 1 for the period 2018 to 2022.

b) Page 8: Table 2 provides the forecast units for the Tower Member Refurbishment Program.

Please provide Table 2 for the period 2018 to 2022.

c) Page 9: Please provide Table 4 for the period 2018 to 2022.

d) Page 10: Please provide the estimated cost of Alternative 1.

Response:

a) Please see Interrogatory B2-SEC-109.

b) Please see Interrogatory B2-SEC-109.

c) Table 4 - Total Investment Cost Revised for the period 2018 to 2022 is shown below.

($ Millions)	**2018**	**2019**	**2020**	**2021**	**2022**
Gross Investment Cost	5.8	13.8	10.6	15.1	18.5
Less Removals	0.0	0.3	0.2	0.5	0.6
Capital and Minor Fixed Assets	**5.8**	**13.5**	**10.4**	**14.6**	**17.9**
Less Capital Contributions	0.0	0.0	0.0	0.0	0.0
Net Investment Cost	**5.8**	**13.5**	**10.4**	**14.6**	**17.9**

d) There is no estimated cost available for Alternative 1. This alternative has been rejected for the following reasons:

- Reactive management of tower foundations, anchors and members would lead to increased asset failures, resulting in elevated safety and reliability risks;

- As tower foundations and anchors deteriorate, emergency restoration and trouble call volumes would be unmanageable;

- Due to the complicated procedure to replace a tower foundation and an arm member, multiple lengthy power outages will be required, which will significantly interrupt the power supply to customers and reduce system operation reliability;

- Cost of replacing a tower foundation could be significantly higher than cleaning and coating the foundation, as more labour and heavy equipment is required.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 040

Reference:

TSP Section 2.11, T-SR-07

Interrogatory:

a) Page 4: Figure 2 provides the condition summary of Shieldwire in 2020. Please provide Figure 2 based on 2016 asset condition data.

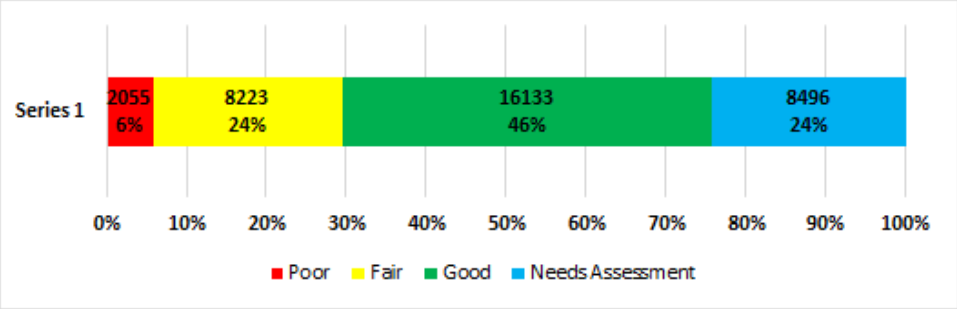
b) Page 6: Table 1 provides the forecast Shieldwire replacements for the period 2023 to 2027. Please provide Table for the 2018 to 2022 period.

c) Page 7: Please provide Table 3 for the period 2018 to 2022.

d) Pages 8-9: Please provide the estimated cost of Alternative 1 and Alternative 3.

Response:

a) Hydro One does not have this information as it was not presented in EB-2016-0160. Hydro One's database is not capable of providing a historical point-in-time output of this information. This data was last presented during the 2020-2022 rate filing and reflects the shieldwire condition status at the end of 2018.



b) Shieldwire replacements for the 2018 to 2022 period are shown below.

Table 1 – Shieldwire Replacements

Shieldwire	2018 Actual	2019 Actual	2020 Actual	2021 Forecast	2022 Forecast
Units (Km)	209	119	42	339	333
% of Fleet	0.60%	0.34%	0.12%	0.97%	0.96%

c) Table 3 for the period 2018 to 2022 is shown below.

Table 2 – Total Investment Cost

($M)	2018	2019	2020	2021 F	2022 F	Total
Gross Investment Cost	10.5	9.2	4.8	13.3	14.0	51.8
Less Removals	1.2	0.8	0.3	1.1	1.1	4.5
Capital and Minor Fixed Assets	**9.3**	**8.4**	**4.5**	**12.2**	**13.0**	**47.4**
Less Capital Contributions	0.0	0.0	0.0	0.0	0.0	0.0
Net Investment Cost	**9.3**	**8.4**	**4.5**	**12.2**	**13.0**	**47.4**

d) Alternative 1 was not estimated because reactive management of shieldwire would lead to an increased number of asset failures and elevated safety and reliability risks. Please see TSP Section 2.11 ISD T-SR-07 for further information about why this alternative was rejected.

The gross estimate for Alternative 3, proactive replacement of all poor condition shieldwire, is approximately $130M or $26M per year.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 041

Reference:

TSP Section 2.11, T-SR-08

Interrogatory:

a) Page 9: Figure 7 provides the insulator fleet condition status in 2020. Please provide Figure 7 based on 2016 asset condition data.

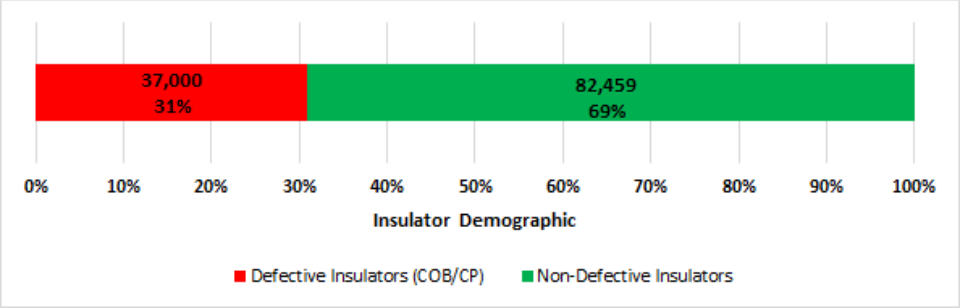
b) Page 18: Table 2 provides the Insulator replacements for the period 2023 to 2027. Please provide Table 2 for the 2018 to 2022 period.

c) Page 19: Please provide Table 4 for the period 2018 to 2022.

d) Pages 19: Please provide the estimated cost of Alternative 1.

Response:

a) The insulator fleet condition as of January 2016:



b) The table below shows the insulator replacements for the 2018-2022 period.

Insulators	2018	2019	2020	2021 (Forecast)	2022 (Forecast)
Units	3900	4290	2794	3767	3544
% Of Fleet	3.3 %	3.6 %	2.3 %	3.2 %	3.0 %

c) The table below shows the investment costs for the 2018-2022 period.

($ Millions)	**2018 Actual**	**2019 Actual**	**2020 Actual**	**2021 Forecast**	**2022 Forecast**
Gross Investment Cost	71.1	85.3	62.1	68.6	74.6
Less Removals	5.7	6.8	5.0	5.5	6.0
Capital and Minor Fixed Assets	**65.4**	**78.5**	**57.1**	**63.1**	**68.6**
Less Capital Contributions	0.0	0.0	0.0	0.0	0.0
Net Investment Cost	**65.4**	**78.5**	**57.1**	**63.1**	**68.6**

d) An estimated cost is not available since this alternative involves waiting for insulator that are known to be defective to fail and replacing these insulators on a reactive basis, which is more costly. Hydro One rejected this alternative due to the unacceptable public safety risk that occurs when a failure results in conductor drop in a public area. The basis for the systematic replacement of defective porcelain insulators was provided in EB-2016-0160 where the OEB found that "investments related to insulators … are necessary based on the supporting evidence."[1]

[1] EB-2016-0160, Decision, September 28, 2017, p 29.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 042

Reference:

TSP Section 2.11, T-SR-09, Page 10

Interrogatory:

Figure 8 shows the frequency of COB/CP Insulator Failures.

a) Please confirm all forced outages in Figure 8 resulted in customer interruptions.

b) Please provide the data point for 2021.

c) Please provide the number of insulators replaced in each of the years 2010 to 2022.

Response:

a) Not all forced outages resulted in delivery point interruptions affecting transmission customers.

b) Hydro One does not have complete annual data for 2021. Given that Hydro One has only partial data for 2021 any comparison would not be appropriate or meaningful.

c) The table below shows the insulators replacements for the 2010 to 2022 period. Since 2016, the program has focussed on replacing defective COB and CP porcelain insulators across the transmission system. The basis for the systematic replacement of defective porcelain insulators was provided in EB-2016-0160 where the OEB found that "investments related to insulators … are necessary based on the supporting evidence."[1]

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021F	2022F
638	878	210	433	233	155	2100	3422	3900	4290	2794	3767	3544

[1] EB-2016-0160, Decision, September 28, 2017, p 29.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 043

Reference:

TSP Section 2.11, T-SR-09

Interrogatory:

a) Page 6: Please provide Table 2 for the period 2018 to 2022.

b) Please explain how the budget for 2023 to 2027 was determined.

Response:

a) The investment cost for the 2018-2022 period is shown below.

Table 2 - Total Investment Cost - Actual

($ Millions)	2018	2019	2020	2021 Forecast	2022 Forecast
Investment	49.6	66.6	60.8	40.2	41.0

b) The budget for the 2023-2027 period is based on historical failure information in conjunction with a statistical model.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 044

Reference:

TSP Section 2.11, T-SR-10

Interrogatory:

a) Page 5: Over the rate term, Hydro One is planning to replace approximately 210 protection relays at various transmission network and connection stations. Please provide the number of protection relays replaced over the 2018 to 2022 period.

b) Page 7: Please provide Table 3 for the period 2018 to 2022.

c) Page 8: Please provide the estimated cost of Alternative 1.

Response:

a) The Protection Relay Replacement Program is a new program with the first relay replacements occurring in 2021. The forecast is to replace 21 protection relays per year in 2021 and 2022 under this program. These protection relays are a subset of the units included in the Interrogatory B2-Staff-059.

b) The table below shows the investment costs for the 2021-2022 period.

($M)	**2021**	**2022**
Gross Investment Cost	4.7	4.7
Less Removals	0.0	0.0
Capital and Minor Fixed Assets	**4.7**	**4.7**
Less Capital Contributions	0.0	0.0
Net Investment Cost	**4.7**	**4.7**

c) An estimated cost is not available since this alternative involves waiting for protection systems to fail and replacing components on a reactive basis, which is more costly. Hydro One rejected this alternative for the reasons outlined in TSP Section 2.11 T-SR-10 pages 8-9.

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO INTERROGATORY - 045

Reference:

TSP Section 2.11, T-SR-11

Interrogatory:

a) Page 5: Table 1 provides a summary of SONET equipment. Please provide the equipment to be replaced over the 2023 to 2027 period compared to 2018 to 2022.

b) Page 6: Figure 1 provides failure incidents for SONET Equipment. Please provide the data for 2021.

c) Page 9 Table 3: Please provide Table 3 for the 2018 to 2022 period.

d) Page 9: Please provide the estimated cost of Alternative 1.

Response:

a) No replacements are planned in the 2018 to 2022 period under T-SR-11. Equipment expected to be replaced under T-SR-11 over the 2023 to 2027 period is shown below.

Telecom System/Asset Class	Asset Type	Equipment to be Replaced over the 2023-2027 Period
SONET Communication Network	Multiplexers	164
	Optical Amplifiers	32
	48 VDC Batteries	96
	48 VDC Chargers	30

b) Hydro One does not have complete annual data for 2021. Given that Hydro One has only partial data for 2021, any comparison would not be appropriate or meaningful.

c) T-SR-11 Table 3 for the 2018 to 2022 period is shown below.

($ Millions)	Prev. Years	2018	2019	2020	2021	2022	Total
Gross Investment Cost	1.1	3.3	1.5	0.4	0.5	4.8	11.6
Less Removals	0.0	0.0	0.0	0.0	0.0	0.2	0.2
Capital and Minor Fixed Assets	**1.1**	**3.3**	**1.5**	**0.4**	**0.5**	**4.6**	**11.4**
Less Capital Contributions	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Investment Cost	**1.1**	**3.3**	**1.5**	**0.4**	**0.5**	**4.6**	**11.4**

d) There is no estimated cost available for Alternative 1. This alternative takes a reactive approach that results in unplanned equipment outages that negatively impact communication system performance and service to customers. The existing infrastructure cannot be sustained long-term on a reactive basis due to hardware obsolescence, diminishing inventory of spare equipment and increasing challenges of procuring spare equipment.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 046

Reference:

TSP Section 2.11, T-SR-13

Interrogatory:

a) Page 10: Please provide Table 2 for the years 2018 to 2022.

b) Pages 12-13: Please provide the estimated cost of Alternative 1 and Alternative 2.

c) Page 16 Appendix A: Please provide the circuit-km replaced for the period 2018 to 2022.

d) Page 22 Appendix B: Please provide Appendix B Detailed Investment Costs for the period 2018 to 2022.

e) Please identify the investments in Appendix B (part d) not undertaken as planned and explain why.

Response:

a) T-SR-13 Table 2 for the 2018-2022 period is shown below for investments included in this ISD.

($ Millions)	2018	2019	2020	2021	2022
Gross Investment Cost	4.6	1.5	0.7	0.6	23.2
Less Removals	0.3	0.1	0.0	0.1	1.8
Capital and Minor Fixed Assets	**4.3**	**1.4**	**0.7**	**0.5**	**21.4**
Less Capital Contributions	0.0	0.0	0.0	0.0	0.0
Net Investment Cost	**4.3**	**1.4**	**0.7**	**0.5**	**21.4**

b) The estimated cost of Alternative 1 is not available because reactive management of transmission line assets would lead to an increased number of asset failures and elevated safety and reliability risks, and is therefore unacceptable.

The estimated cost of Alternative 2 is not available but is expected to be more costly than Alternative 3 (Comprehensive Line Section Refurbishment – Bundling) and would be significantly more disruptive to connected customers and the public. The advantages of work

bundling are significant considering construction mobilization and demobilization, site access requirements (example: farm land crop destruction and road closures), efficiencies in planning, engineering, equipment commissioning, reduced outages which result in a reduction in customer interruptions. This planning and execution methodology is consistent with the approach detailed within Hydro One's previous applications.

c) The 16 investments included in T-SR-13 are expected to be in-serviced throughout the 2023-2028 period as shown in T-SR-13 Appendix B. Therefore, no circuit-kms will be in-serviced during the 2018 to 2022 period.

d) T-SR-13 Appendix B Detailed Investment Costs for the period 2018 to 2022 is provided below.

ISD Ref.	Line	Net Capital Investment ($ Millions)				
		2018	2019	2020	2021	2022
T-SR-13.1	T22C/T28C, 230 KV	0.0	0.0	0.0	0.0	0.0
T-SR-13.2	T25B, 230 KV	0.0	0.0	0.0	0.0	0.0
T-SR-13.3	E1C, 115 KV	3.5	0.1	0.1	0.1	15.9
T-SR-13.4	D2H/D3H/D6T/D4, 115 KV	0.5	0.9	0.6	0.4	4.8
T-SR-13.5	T33E, 230 KV	0.0	0.0	0.0	0.0	0.0
T-SR-13.6	Q2AH/A8G, 115 KV	0.0	0.0	0.0	0.0	0.0
T-SR-13.7	E8V/E9V, 230 KV	0.0	0.0	0.0	0.0	0.0
T-SR-13.8	L22H, 230 KV	0.0	0.0	0.0	0.0	0.0
T-SR-13.9	M6E/M7E, 230 KV	0.2	0.1	0.0	0.0	0.0
T-SR-13.10	A4H/A5H, 115 KV	0.0	0.0	0.0	0.0	0.0
T-SR-13.11	B5QK, 115 KV	0.0	0.0	0.0	0.0	0.0
T-SR-13.12	A4L, 115 KV	0.1	0.2	0.0	0.0	0.0
T-SR-13.13	D1M/D2M/D3M/D4M, 230 KV	0.0	0.0	0.0	0.0	0.0
T-SR-13.14	N5K, 115 KV	0.0	0.0	0.0	0.0	0.0
T-SR-13.15	S2N, 115 KV	0.0	0.0	0.0	0.0	0.7
T-SR-13.16	C27P, 230 KV	0.0	0.0	0.0	0.0	0.0
Total		**4.3**	**1.4**	**0.7**	**0.5**	**21.4**

e) All investments in Appendix B are planned for the 2023-2027 period.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 047

Reference:

TSP Section 2.11, T-SR-15, Page 6

Interrogatory:

Table 2 provides the total investment cost for each of the years 2023 to 2027. Please provide Table 2 for the period 2018 to 2022.

Response:

Table 1 - Total Investment Cost

($M)	2018	2019	2020	2021 (Forecast)	2022 (Forecast)	Total
Gross Investment Cost	10.9	10.7	13.1	10.6	10.8	56.1
Less Removals	1.2	0.8	1.1	0.9	0.9	4.9
Capital and Minor Fixed Assets	**9.7**	**9.9**	**12.0**	**9.7**	**9.9**	**51.2**
Less Capital Contributions	0.0	0.0	0.0	0.0	0.0	0.0
Net Investment Cost	**9.7**	**9.9**	**12.0**	**9.7**	**9.9**	**51.2**

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 048

Reference:

TSP Section 2.11, T-SR-15, Page 7

Interrogatory:

Hydro One indicates the average investment cost for this investment over the five-year period is in line with the average five-year historical spending. The factors influencing the cost of the investment include:

- The scope of the replacement work required; and
- The type and quantity of assets requiring replacement.

Please provide the type and quantity of assets replaced on an emergency basis for the period 2018 to 2020.

Response:

This investment involves the emergency replacement of transmission line components either because they failed or because they have been identified as being in imminent danger of failure. Below are the three largest categories of emergency replacements during the 2018-2020 period:

Category	Number of Replacements
Insulators	40
Wood Pole Arm	39
Full Structure	156

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B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 049

Reference:

TSP Section 2.11, T-SR-17

Interrogatory:

a) Page 5 Table 1: Please provide the outage statistics for 2021.

b) Pages 14 Table 2: Please provide Table 2 for the period 2018 to 2022.

c) Page 16: Please provide the estimated cost of Alternative 1.

Response:

a) Hydro One does not have complete annual data for 2021. Given that Hydro One has only partial data for 2021 any comparison would not be appropriate or meaningful.

b) T-SR-17 Table 2 (Investment Summary) has been updated for the 2018 to 2022 period.

Modified Table 2 - Investment Summary ($ Millions)

Circuits	Investment Description	2018-2022 Net Expenditure	2023-2027 Net Expenditure	In-Service Year
H1L,H3L,H6LC, H8LC	Telecom Infrastructure-Leaside TS x Downtown GTA		4.4	2026
L24L	Macksville Junction x Longwood L24L OPGW		1.4	2024
S2B	Martindale TS by Algoma TS OPGW link	0.2	9.5	2026
X25S	Martindale x Hanmer X25S OPGW		2.3	2025
X26S	Martindale x Hanmer X26S OPGW		2.6	2025
H24S	Martindale x Widdifield Completion of OPGW Path	1.5	3.9	2024
A4H	Ansonville x Hunta A4H Completion of OPGW		1.6	2023
X2Y, X1P, W3B	Pembrooke TS x Barrett Chute SS OPGW		12.2	2026
L28C/L29C/K2Z	Kent x Chatham OPGW Installation		1.4	2025

F11C/D7F/D9F	Preston x Cedar x Detweiler OPGW		7.9	2028
W36/W37/W5NL/W6NL/W2S/N21W	London Area West Telecom OPGW Infrastructure Installation		3.2	2029
M31W/M32W	London Area East OPGW Infrastructure (Salfrod Junction x Ingersol)		3.7	2027
S2S	OPGW Installation (Stayner x Owen Sound)		9	2028
B3/B4	OPGW Installation (Horning Mt x Burlington)		4.3	2026
B22D/B23D	OPGW Installation (Stratford x Detweiler)		4.2	2030
D4W/D5W	OPGW Installation (Detweiler x Buchanon)		3.2	2030
K13J/K14J	OPGW Riverside Junction x Manby TS		0.6	2028
P3S/T31H	Peterborough Dobbin_T31H OPGW Installation		2.2	2024
X2H/Q3K	Kingston Area OPGW Installation		3.6	2025
D5A	D5A Cumberland Junction St Isidore Install New OPGW fibre		7.5	2026
C2P, A6C,A7C, D3A	Port Colborne to Crowland OPGW Connectivity to Allanburg TS		3	2024
Q2AH/Q4N/A36N	Hamilton/Niagara Area new OPGW Investments		4.7	2026
H82V/H83V, B88H/B89H, M80B, M81B	Claireville TS by Beaverton TS OPGW link	4.2	7.5	2025
W6CS,M32S, C7BM,W3B	Ottawa Ring 9 Fibre Infrastructure Development	7.5	13.4	2025
TOTAL			**117.3**	

c) There is no estimated cost available for Alternative 1. This alternative was not recommended as the reliability degradation of the Hydro One power system telecom network will directly impact the operation of the transmission system. Further information may be found at TSP Section 2.11 T-SR-17.

B2 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 050

Reference:

TSP Section 2.11, T-SR-18

Interrogatory:

a) Page 1: This investment involves the replacement of 7.2 circuit km of 115 kV low-pressure oil-filled underground cables with cross-linked polyethylene (XLPE) type cable. Please provide the circuit km replaced over the 2018 to 2022 period.

b) Page 4 Table 2: Please provide Table 2 for the period 2018 to 2022.

c) Page 5: Please provide the estimated cost of Alternative 1.

Response:

a) From 2018 to 2022 approximately 4.7 circuit km of underground cables is forecasted to be replaced.

b) T-SR-18 Table 2 Investment Cost has been provided for the 2018-2022 period.

($ Millions)	2018	2019	2020	2021	2022	2018-2022 Total
Gross Investment Cost	0.4	1.0	2.8	11.8	25.1	41.1
Less Removals	0.0	0.0	0.0	0.0	0.0	0.0
Capital and Minor Fixed Assets	**0.4**	**1.0**	**2.8**	**11.8**	**25.1**	**41.1**
Less Capital Contributions	0.0	0.0	0.0	0.0	0.0	0.0
Net Investment Cost	**0.4**	**1.0**	**2.8**	**11.8**	**25.1**	**41.1**

c) Failure of these cables and their unplanned replacement (Alternative 1) according to the same scope of work as Alternative 2 (Planned Replacement) would exceed the current estimate of $108.2M for Alternative 2. Transmission cable replacement investments are complex multi-year projects requiring significant time for design and construction, which includes an environmental assessment, public consultations, permits, applications, and coordination with the City of Toronto and other utilities in the surrounding area. Unplanned replacement of these cables would result in higher cost to complete all aspects of the investment. Alternative

1 (unplanned replacement) was considered and rejected as failure of these cables will result in prolonged circuit outages, potential customer interruptions, loss of redundant supply negatively affecting operational flexibility, and potential oil leaks requiring environmental remediation. In contrast, Alternative 2 mitigates these risks as the existing cables will remain in-service while the new cables are being installed.

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 051

Reference:

Exhibit B-3-1, DSP Section 3.2, Page 3

Interrogatory:

ESL enables a view of asset demographics based on the average number of years that an asset is expected to operate under normal system conditions and is determined with reference to manufacturer guidelines and Hydro One's historical asset retirement data.

a) Has Hydro One has adjusted the ESL for any distribution assets since EB-2017-0049? If yes, please provide the data.

b) Please provide a table that sets out the following for each major asset category in Section 3.2:
- ESL
- average asset age in 2016
- average asset age in 2020
- percentage of fleet beyond ESL in 2016
- percentage of fleet beyond ESL in 2020
- average age of asset retirement over the period 2010 to 2015
- average age of asset retirement over the period 2016 to 2020

Response:

a) ESL for Wood poles, station transformers, Wholesale Revenue & Retail Revenue Meters have not been adjusted since EB2017-0049

b) The following table includes the major asset types from section 3.2.

	ESL	Average asset age in 2016	Average asset age in 2020	Percentage of fleet beyond ESL in 2016	Percentage of fleet beyond ESL in 2020	Average age of asset retirement over the period 2010 to 2015	Average age of asset retirement over the period 2016 to 2020
Station Transformers	50	38	39	23%	33%	52.8**	50.7
Poles	62	38.1	40.0	13.7%	19.6%	40.1 *	42.5 *
Wholesale Revenue & Retail Revenue Meters	15	7.1	9.8	0.03%	0%	6.8	8.8

*Data is only available for the pole replacement program and for 2015 onwards

**With respect to transformer replacements, data is only available for 2014 onwards

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 052

Reference:

Exhibit B-3-1, DSP Section 3.2, Page 3

Interrogatory:

The current average age of Hydro One's distribution station transformer fleet is 39 years. Currently, 33% of the fleet is beyond their ESL of 50 years, and an additional 17% (if no capital replacements are undertaken) will reach or exceed their ESL by 2027, which would bring the total to 50%.

Please provide the percentage of transformers that will reach or exceed their ESL by 2027 based on planned capital replacements.

Response:

With the inclusion of planned capital replacements, 39% of distribution station transformers will reach or exceed their ESL by 2027.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 053

Reference:

Exhibit B-3-1, DSP Section 3.2, Page 4

Interrogatory:

The average age of poles is 40.2 years. There are currently 378,000 poles (23%) that are 60 year of age or older. Over the 2023 to 2027 planning period, the number of poles 60 years or older would increase to 500,000 poles (31%) in the absence of pole replacements.

Please provide the percentage of poles that will reach or exceed their ESL by 2027 based on planned capital replacements.

Response:

Assuming that the age profile of poles in poor condition remains the same throughout the plan and that poles replaced in other projects and programs are similar age profile to the current demographics which are aged annually, the percentage of poles beyond their ESL of 62 years will increase from 20% at the end of 2020 to 25% at the end of 2027.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 054

Reference:

Exhibit B-3-1, DSP Section 3.2

Interrogatory:

Please discuss how the use of testing results and maintenance history has been improved since EB-2017-0049 in making replace versus repair decisions for substation equipment.

Response:

Since EB-2017-0049, Hydro One has updated the station transformer condition rating to include oil leak data. This data is obtained through station visual inspections. Details of *station visual inspections* and other *preventive maintenance* practices used to determine transformer condition are described in EB-2021-0110, Exhibit B-3-1, Section 3.2, page 13-14. This additional data further informs the repair versus replace decision.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 055

Reference:

Exhibit B-3-1, DSP Section 3.2

Interrogatory:

Please provide a table that sets out the percentage contribution to SAIDI for each of the years 2010 to 2021 for the following assets excluding Force Majeure:

- Transformer
- Pole
- Cross arm
- Overhead conductor
- Underground cable
- Submarine cable
- Overhead transformer
- Underground transformer
- Vegetation outages (tree caused)

Response:

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cross Arm	1.78%	1.13%	0.81%	1.25%	2.57%	0.69%	1.17%	1.41%	1.14%	0.62%
Station Transformer	0.10%	0.04%	0.89%	0.22%	0.08%	0.20%	0.62%	0.29%	0.14%	0.26%
Overhead Conductor	3.43%	3.31%	3.73%	6.91%	3.38%	2.47%	2.73%	4.44%	4.63%	3.40%
Overhead Transformer	0.34%	0.21%	0.27%	0.24%	0.36%	0.14%	0.15%	0.17%	0.15%	0.15%
Pole	2.53%	3.42%	2.19%	3.00%	4.93%	2.79%	2.14%	3.05%	2.64%	3.80%
Submarine Conductor	2.00%	0.39%	0.50%	0.50%	0.49%	0.51%	0.39%	0.52%	0.24%	0.52%
Underground Conductor	0.17%	0.19%	0.08%	0.33%	0.08%	0.08%	0.16%	0.20%	0.30%	0.08%
Underground Transformer	0.05%	0.02%	0.08%	0.03%	0.04%	0.02%	0.02%	0.03%	0.03%	0.03%
Vegetation	27.20%	31.02%	28.61%	27.30%	29.41%	38.01%	44.70%	40.51%	33.56%	42.37%

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 056

Reference:

Exhibit B-3-1, DSP Section 3.2

Interrogatory:

Please provide a table that sets out the percentage contribution to SAIFI for each of the years 2010 to 2021 for the following assets excluding Force Majeure:

- Transformer
- Pole
- Cross arm
- Overhead conductor
- Underground cable
- Submarine cable
- Overhead transformer
- Underground transformer
- Vegetation outages (tree contact)

Response:

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cross Arm	0.94%	0.75%	0.63%	0.78%	1.88%	0.82%	0.98%	1.23%	0.88%	0.69%
Station Transformer	0.08%	0.04%	0.30%	0.11%	0.01%	0.21%	0.28%	0.22%	0.06%	0.27%
Overhead Conductor	2.68%	2.15%	2.90%	3.89%	2.81%	2.06%	2.61%	4.42%	3.35%	2.65%
Overhead Transformer	0.15%	0.12%	0.12%	0.13%	0.17%	0.09%	0.09%	0.10%	0.08%	0.09%
Pole	1.25%	1.99%	1.37%	1.24%	2.30%	1.42%	1.66%	2.27%	1.69%	1.78%
Submarine Conductor	0.14%	0.08%	0.13%	0.14%	0.11%	0.10%	0.09%	0.12%	0.08%	0.09%
Underground Conductor	0.12%	0.22%	0.02%	0.24%	0.05%	0.04%	0.31%	0.12%	0.17%	0.12%
Underground Transformer	0.03%	0.01%	0.06%	0.02%	0.04%	0.02%	0.02%	0.02%	0.03%	0.02%
Vegetation	17.90%	20.89%	17.84%	18.13%	19.12%	24.11%	25.40%	23.07%	21.26%	23.31%

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 057

Reference:

Exhibit B-3-1, DSP Section 3.2, Page 83

Interrogatory:

Hydro One's non-force majeure SAIDI due to vegetation contacts from 2010 to 2017 shows a worsening trend and the trend was not expected to change without intervention. Based on the recommendation from the 2017 Forestry Assessment study by Clear Path, Hydro One switched from a corridor-driven vegetation management program to a defect driven program (i.e., OCP).

The implementation of OCP has resulted in a 13% improvement in overall system wide reliability from 2017 to 2020.

Please provide the calculation of the 13%.

Response:

The implementation of OCP has resulted in a 13% improvement in vegetation caused system reliability performance measured through non-FM SAIDI from 2017 to 2020. Exhibit B-3-1, DSP Section 3.2, Page 83, incorrectly states a 13% improvement in overall system wide reliability from 2017 to 2020.

The 13% was calculated by finding the decrease from one value to the other in terms of a percentage. To accomplish this the values were run through a standard percentage decrease formula:

$$Percentage\ Decrease = \frac{3.55 - 3.08}{3.55} \times 100 = 13.3\%$$

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 058

Reference:

Exhibit B-3-1, DSP Section 3.5

Interrogatory:

a) Please provide the total number of interruptions on the system for the each of years 2016 to 2021.

b) Please provide the total number of interruptions on the system for the each of years 2016 to 2021 excluding Force Majeure, Loss of Supply and Planned Outages.

c) Please provide the number of Force Majeure events per year for the years 2016 to 2021.

d) Please provide the number of storm events per year for the years 2016 to 2021.

Response:

a)

Year	Total Number of Interruptions
2016	35762
2017	35720
2018	42712
2019	35413
2020	40943

b)

Year	Number of Interruptions excluding Loss of Supply, FM & Planned Outages
2016	24092
2017	24602
2018	25262
2019	26948
2020	29212

c)

Year	Number of FM events
2016	3
2017	6
2018	5
2019	2
2020	2

d)

Year	Number of storm events	Number of storm days
2016	23	30
2017	27	34
2018	23	31
2019	27	34
2020	25	41

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 059

Reference:

Exhibit B-3-1, DSP Section 3.5

Interrogatory:

Please confirm Hydro One does not track MAIDI or MAIFI.

Response:

Confirmed. Hydro One does not track MAIDI or MAIFI.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 060

Reference:

Exhibit B-3-1, DSP Section 3.5

Interrogatory:

With respect to the number of asset failures resulting in a customer interruption, please complete the attached excel spreadsheet.

Response:

Hydro One is unable to provide the data as requested. The following table provides the number of incidents resulting in a customer interruption attributed to the failure of a given asset type, for all asset types where this data is available. Total number of asset failures for each asset type is only available for station transformers and mobile unit substations.

Asset Category	Asset Failures 2018	Asset Failures 2019	Asset Failures 2020	Interruptions 2018	Interruptions 2019	Interruptions 2020
Station Transformers	17	13	17	5	4	9
Mobile Unit Substations	1	0	0	1	0	0
Circuit Breakers	N/A			N/A		
Station Service Transformers						
Insulators				166	250	211
Protection Relays				N/A		
IEDs						
MUS Structures						
Poles				285	325	360
Line Transformers				1,159	1,186	1,266
Submarine Cables				95	111	96
O/H Conductor				750	994	740
Switches				2,891	3,545	3,653
Reclosers				280	444	364
Regulators				24	15	26
Capacitor Banks				N/A		
AMI				0	0	0

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 061

Reference:

Exhibit B-3-1, DSP Section 3.5, Page 19

Interrogatory:

Please provide SAIDI for the years 2016 to 2020 excluding Loss of Supply, Excluding Force Majeure and Excluding Planned Outages.

Response:

Year	SAIDI
2016	6.4
2017	7.1
2018	5.7
2019	5.7
2020	6.2

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 062

Reference:

Exhibit B-3-1, DSP Section 3.5, Page 21

Interrogatory:

Please provide SAIFI for the years 2016 to 2020 excluding Loss of Supply, Excluding Force Majeure and Excluding Planned Outages.

Response:

Year	SAIFI
2016	1.9
2017	1.9
2018	1.8
2019	2.1
2020	2.1

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 063

Reference:

EB-2017-0049, Exhibit I-24-AMPCO-21

Interrogatory:

Please update part (b) to provide the number of all variance proposals and the cost impact at EOY for the years 2018 to 2021.

Response:

Hydro One is unable to provide the total "schedule impact" on a per year basis, as each investment has a different timeline and the total schedule change is not indicative of the impact of the variance.

Please see below for the number of variance proposals and the cost impact overall for distribution system plan capital investments.

Year	Number of Variance Proposals	Distribution Cost Impact ($M)
2018	6	$2.3
2019	4	$4.6
2020	8	$22.7
2021	2	$3.4

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 064

Reference:

EB-2017-0049, Exhibit I-24-AMPCO-22

Interrogatory:

Please update Table 1 to reflect the variance between annual forecast quantities compared to actuals for the years 2017 to 2021.

Response:

Please see the table below.

Notes:

1. The table below represents the variance of actual values minus the DRO plan value. Negative numbers therefore represent under-accomplishment relative to the plan.
2. N/A indicates the referenced ISD 2021 data does not exist for the full year. As a result, variances have not been reported since comparisons between planned values (full year) and actual values (partial year) are not appropriate. These variances are indicated as "unavailable".

	ISD	2017	2018	2019	2020	2021
Transformer Replacements	S-01	-1	N/A	N/A	N/A	N/A
Transformer Spares	S-01	-21	0	-1	-3	Unavailable
MUS Trailer Replacements	S-02	-1	N/A	N/A	N/A	N/A
MUS Purchases	S-02	0	0	0	-1	Unavailable
Stations targeted for Spill Containment	S-03	-2	0	N/A	N/A	Unavailable
Feeders identified for Recloser Upgrades	S-05	-8	0	-11	5	Unavailable
Station Refurbishments	S-07	-29	0	0	-7	Unavailable
Pole Replacements	S-10	-3558	0	-2986	-3639	Unavailable

PCB Lines Equipment Replacements	S-11	-2200	0	-1196	-1957	Unavailable
Large Sustainment Initiatives	S-12	-9	0	1	1	Unavailable
Development Capital - New Connections	D-01	1423	0	-974	2,108	Unavailable
Development Capital - Service Upgrades	D-01	-719	0	99	559	Unavailable
Development Capital - Service Cancellations	D-01	-1556	0	-1,956	-2,386	Unavailable
Upgrades Driven by Load Growth	D-02	2	0	-5	-29	Unavailable
Asset Life Cycle Optimization and Operational Efficiency	D-05	0	0	-4	-2	Unavailable
Reliability Improvements	D-06	-1	0	-2	2	Unavailable
Distribution Station Security Upgrades	C-05	-3	0	N/A	N/A	N/A

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 065

Reference:

EB-2017-0049, Exhibit I-24-AMPCO-23, Attachment 1

Interrogatory:

a) Please update the excel spreadsheet to include the condition data for the years 2018 to 2021. Please provide a copy of the excel spreadsheet

b) Please indicate the asset types or sub-types with condition algorithms.

c) Please provide the condition algorithm information for each asset type identified in part (b).

Response:

a) See Excel Attachment 'I-03-B3-AMPCO-065-01'. Please note that condition algorithms do not exist for metering assets and are not included.

b) Condition algorithms do not exist for metering assets. For all other assets, please See EB-2017-0049, I-24-Staff-119 b).

c) Condition algorithms do not exist for metering assets. For all other assets, please see EB-2017-0049, I-24-Staff-119 b). For changes in condition assessment, please refer to SEC-114.

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Asset Condition

Asset Category		# asset units				# asset units				# asset units				# asset units			
		Population	2018 Condition			Population	2019 Condition			Population	2020 Condition			Population	2021 Q3 Condition		
			Poor	Fair	Good		Poor	Fair	Good		Poor	Fair	Good		Poor	Fair	Good
Station Transformers	All	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	In Service	1,184	24%	21%	55%	1,186	28%	32%	40%	1,197	20%	19%	61%	1,192	25%	16%	59%
	Spares	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mobile Unit Substations		29	45%	7%	48%	32	44%	9%	47%	35	51%	9%	40%	35	43%	17%	40%
Reclosers	All	2256	30%	15%	56%	2270	27%	15%	58%	2288	19%	14%	67%	2283	17%	15%	68%
	Oil	**Note 1**															
	Vaccum	**Note 1**															
Circuit Breakers	All	**148**	**1%**	**0%**	**99%**	**149**	**1%**	**0%**	**99%**	**152**	**3%**	**0%**	**97%**	**150**	**3%**	**0%**	**97%**
	Metalclad	146	1%	0%	99%	147	1%	0%	99%	149	3%	0%	97%	147	3%	0%	97%
	SF6	1	0%	0%	100%	1	0%	0%	100%	2	0%	0%	100%	3	0%	0%	100%
	Oil	1	0%	0%	100%	1	0%	0%	100%	1	0%	0%	100%	0	0%	0%	0%
Switches		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuses		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Station Structures		2143	2%	4%	94%	2143	2%	4%	94%	2143	3%	5%	91%	2139	2%	3%	95%
Fences		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Station Grounding Systems		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Station Service Transformers		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Insulators		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bus Work		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protection Relays		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
IEDs		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Spill Containment Systems		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MUS Structures		785	8%	24%	68%	781	5%	35%	60%	787	9%	26%	65%	781	7%	31%	62%
Poles	All	**1,608,042**	**5%**	**95%**		**1,609,945**	**5%**	**95%**		**1,612,341**	**5%**	**95%**		**1,612,511**	**5%**	**95%**	
	Wood	1,576,251	4%	96%		1,578,745	4%	96%		1,582,395	4%	96%		1,583,680	4%	96%	
	Steel	6,218	0%	100%		6,243	0%	100%		6,202	0%	100%		6,251	0%	100%	
	Concrete	2,462	0%	100%		2,496	0%	100%		2,497	1%	99%		2,334	1%	99%	
	Composite	3,073	0%	100%		3,403	0%	100%		3,876	0%	100%		4,146	0%	100%	
	Red Pine Wood	20,038	100%	0%		19,059	100%	0%		17,371	100%	0%		16,100	100%	0%	
Rights of Way		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Line Transformers	All	520,875	NA	NA	NA	523,120	NA	NA	NA	527,050	NA	NA	NA	532,762	NA	NA	NA
	Pole Mounted Transformers	459,818	NA	NA	NA	460,422	NA	NA	NA	461,940	NA	NA	NA	464,851	NA	NA	NA
	Pad Mounted Transformers	61,057	NA	NA	NA	62,698	NA	NA	NA	65,110	NA	NA	NA	67,911	NA	NA	NA
	Submersible transformers		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA
	Transclosures and Pole-Trans Transformer		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA

I-03-B3-AMPCO-065-01
Ref: EB-2017-0049, Exhibit I-24-AMPCO-23, Attachment 1

Asset Condition

Asset Category		# asset units				# asset units				# asset units				# asset units			
		Population	2018 Condition			Population	2019 Condition			Population	2020 Condition			Population	2021 Q3 Condition		
			Poor	Fair	Good		Poor	Fair	Good		Poor	Fair	Good		Poor	Fair	Good
Submarine Cables (circuit km)		3,849	NA	NA	NA	3,896	NA	NA	NA	3,953	NA	NA	NA	3,964	NA	NA	NA
Conductor (circuit km)	All	123,176	NA	NA	NA	123,139	NA	NA	NA	123,489	NA	NA	NA	123,976	NA	NA	NA
	Overhead	113,618	NA	NA	NA	113,390	NA	NA	NA	113,478	NA	NA	NA	113,834	NA	NA	NA
	Underground	5,709	NA	NA	NA	5,853	NA	NA	NA	6,058	NA	NA	NA	6,178	NA	NA	NA
AMI	All	1,412,126	NA	NA	NA	1,425,521	NA	NA	NA	1,440,623	NA	NA	NA	1,506,940	NA	NA	NA
	Retails Meters	1,362,318	NA	NA	NA	1,375,647	NA	NA	NA	1,390,746	NA	NA	NA	1,457,037	NA	NA	NA
	Collectors	11,031	NA	NA	NA	11,113	NA	NA	NA	11,125	NA	NA	NA	11,190	NA	NA	NA
	Repeaters	38,777	NA	NA	NA	38,761	NA	NA	NA	38,752	NA	NA	NA	38,713	NA	NA	NA
Switches	Air Break & Load Break - 3 Phase	3,539	NA	NA	NA	3,539	NA	NA	NA	3,545	NA	NA	NA	3,666	NA	NA	NA
Reclosers (Note 3)	All	12,387	NA	NA	NA	12,414	NA	NA	NA	12,616	NA	NA	NA	12,737	NA	NA	NA
	Hydraulic	12,039	NA	NA	NA	12,011	NA	NA	NA	12,029	NA	NA	NA	12,019	NA	NA	NA
	Electronic	348	NA	NA	NA	403	NA	NA	NA	587	NA	NA	NA	718	NA	NA	NA
Regulators		2,288	NA	NA	NA	2,326	NA	NA	NA	2,374	NA	NA	NA	2,379	NA	NA	NA
Capacitor Banks		2,832	NA	NA	NA	2,824	NA	NA	NA	2,794	NA	NA	NA	2,784	NA	NA	NA

NA	This implies that there is no condition algorithm for this asset class, however defect and/or testing data exists
Note 1	Condition algorithms have not been developed to this level of granularity for this asset sub-type.
Note 2	Feeder lengths are provided are from Q3-2021 (row 46-49). All other population counts provided in column O (excluding pole counts) are as of Nov. 12, 2021.
Note 3	Assumed this refers to line reclosers

The data provided in I-24-AMPCO-23, Attachment 1 for AMI was incorrect. Below is the corrected data for AMI for the 2014-2017 period.

		# asset units				# asset units				# asset units				# asset units			
		Population	2014 Condition			Population	2015 Condition			Population	2016 Condition			Population	2017 Condition		
			Poor	Fair	Good		Poor	Fair	Good		Poor	Fair	Good		Poor	Fair	Good
AMI	All	1,305,012	NA	NA	NA	1,334,486	NA	NA	NA	1,382,085	NA	NA	NA	1,397,106	NA	NA	NA
	Retails Meters	1,256,020	NA	NA	NA	1,284,898	NA	NA	NA	1,332,305	NA	NA	NA	1,347,295	NA	NA	NA
	Collectors	10,545	NA	NA	NA	10,871	NA	NA	NA	10,982	NA	NA	NA	10,999	NA	NA	NA
	Repeaters	38,447	NA	NA	NA	38,717	NA	NA	NA	38,798	NA	NA	NA	38,812	NA	NA	NA

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 066

Reference:

EB-2017-0049, Exhibit I-24-AMPCO-25, Attachment 1

Interrogatory:

Please update the excel spreadsheet provided in response to the above interrogatory to include the actual replacement for the years 2018 to 2021 and the planned asset replacement for the years 2022 to 2027. Please provide a copy of the excel spreadsheet.

Response:

Please refer to Excel Attachment 'I-03-B3-AMPCO-066-01' of this response.

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Asset Replacment - Planned

Asset Category		Population	# Asset Units									
			# Replaced 2018	# Replaced 2019	# Replaced 2020	# Replaced 2021 Q3	# Forecast to be Replaced 2022	# Forecast to be Replaced 2023	# Forecast to be Replaced 2024	# Forecast to be Replaced 2025	# Forecast to be Replaced 2026	# Forecast to be Replaced 2027
Station Transformers	All	Note 1	22	21	14	17	2	20	31	23	21	33
	In Service **(Note 8)**		20	15	12	15	0	18	29	21	19	31
	Spares		2	6	2	2	2	2	2	2	2	2
Mobile Unit Substations **(Note 6)**			0	3	2	0	2	1	2	2	2	2
Reclosers **(Note 7)**	All		46	274	284	161	276	307	244	54	81	126
	Oil		**Note 2**									
	Vaccum											
	Metalclad		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Circuit Breakers	All		**Note 3**									
	Oil											
	Vaccum											
	Metalclad											
Switches			18	23	10	15	19	10	14	12	11	20
Fuses			**Note 4**									
Station Structures												
Fences												
Station Grounding Systems												
Station Service Transformers												
Insulators												
Bus Work												
Protection Relays												
IEDs												
Spill Containment Systems			0	0	0	0	0	0	0	0	0	0
MUS Structures			10	16	22	14	20	23	26	23	25	34
Poles	All		5,982	3,984	4,519	5,062	5,050	10,300	10,300	10,300	10,300	10,300
	Wood		**Note 2**									
	Steel											
	Concrete											
	Composite											
	Red Pine Wood		1,166	1,437	1,720	1,774	**Note 5**					
Rights of Way	kilometers of line clearing completed		26,070	28,009	22,716	26,242	33,053	31,364	30,318	30,319	30,320	30,322
Line Transformers	All		1,753	1,558	1,093	1,055	1,684	1,555	1,558	1,423	70	20
	Pole Mounted Transformers		1,753	1,539	1,028	997	1,453	1,325	1,248	1,153		
	Pad Mounted Transformers											
	Submersible transformers		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Transclosures and Pole-Trans Transformer		0	19	65	58	231	230	310	270	70	20
Submarine Cables (metres)			25.1 km	155 units	199 units	122 units	280 units	280 units	280 units	280 units	280 units	280 units
Conductor	All		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Overhead (metres)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Underground		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Switches	Air Break & Load Break - 3 Phase		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reclosers/Regulators	All		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hydraulic		**Note 2**									
	Electronic											
Capacitor Banks			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AMI	All		24,513	28,141	29,806	23,581	108,382	116,402	101,030	67,889	40,429	21,725
	Retails Meters		22,397	25,894	27,833	22,166	106,387	114,402	99,025	65,982	38,871	20,664
	Collectors		972	741	778	551	914	917	919	874	714	486
	Repeaters		1,144	1,506	1,195	864	1,081	1,083	1,086	1,033	844	575

NA	Not applicable/Not available.
Note 1	Please refer to Exhibit I-03-B3-AMPCO-65 and Exhibit B1, Tab 1, Schedule 1, DSP Section 3.2 for the population information.
Note 2	Hydro One does not track plannned replacements to this level of granularity for subtype.
Note 3	When distribution station breakers are replaced, they are replaced with reclosers.
Note 4	Hydro One does not track planned replacements to this level of granularity; as these assets are generally addressed as part of the integrated distribution station refurbishments not as individual component replacements.
Note 5	Hydro One does not have a forecast for red pine poles specifically as they will be addressed based on condition and priority relative to other poles.
Note 6	The 2023-2027 forecast represent the number of MUS replacements and MUS transformer replacements.
Note 7	These replacements include the total number replaced under both the component replacement program and station refurbishments.
Note 8	The 2023-2027 forecast is based on 106 and 12 poor condition transformers identified in SR-04 and SR-11, respectively.

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 067

Reference:

Exhibit B-3-1, DSP Section 3.5
EB-2017-0049

Interrogatory:

a) Please complete the following table (excluding Force Majeure & Loss of Supply events):

SAIDI (Avg 2016 to 2020)	Avg Outages/ year	Avg # Customers/ Outage	Avg # Hours/ Outage	Contribution to SAIDI	Contribution to SAIDI (%)	Forecast Impact of Plan on SAIDI in 2027 (%)
Poles						
Stations						
Other Line Components						
Vegetation						
Estimated Impact to SAIDI (%)						
Forecasted SAIDI (hours)						

b) Please complete the following table (excluding Force Majeure & Loss of Supply events):

SAIFI (Avg 2016 to 2021)	Avg Outages/ year	Avg # Customers/ Outage	Avg # Hours/ Outage	Contribution to SAIFI	Contribution to SAIFI (%)	Forecast Impact of Plan on SAIFI in 2027 (%)
Poles						
Stations						
Other Line Components						
Vegetation						
Estimated Impact to SAIFI (%)						
Forecasted SAIFI (instances)						

Response:

a)

SAIDI (Avg 2016 to 2020)	Avg Outages/year	Avg # Customers/ Outage	Avg # Hours/ Outage	Contribution to SAIDI	Contribution to SAIDI (%)
Poles	0.3k	0.2k	4	0.3	4%
Stations	0.1k	1.0k	3	0.2	3%
Other Line Components	9.7k	0.1k	3	1.8	24%
Vegetation	7.7k	0.1k	5	2.9	40%

b)

SAIFI (Avg 2016 to 2020)	Avg Outages/year	Avg # Customers/ Outage	Avg # Hours/ Outage	Contribution to SAIFI	Contribution to SAIFI (%)
Poles	0.3k	0.2k	4	0.1	3%
Stations	0.1k	1.0k	3	0.1	3%
Other Line Components	9.7k	0.1k	3	0.7	27%
Vegetation	7.7k	0.1k	5	0.6	24%

For reliability targets over the 2023-2027 period, please refer to Exhibit B-03-01 Section 3.5, Figure 1 & Figure 4.

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 068

Reference:

Exhibit B-3-1, DSP Section 3.5

Interrogatory:

Please complete the following table:

Defective Equipment	2016	2017	2018	2019	2020	5 year average
SAIDI including FM						
SAIDI excluding FM						
SAIFI including FM						
SAIFI excluding FM						

Response:

Defective Equipment	**2016**	**2017**	**2018**	**2019**	**2020**	**5 year average**
SAIDI including FM	3.01	3.62	7.02	3.16	4.15	4.19
SAIDI excluding FM	1.92	2.32	2.08	2.51	2.29	2.22
SAIFI including FM	0.75	0.96	1.24	1.07	1.07	1.02
SAIFI excluding FM	0.61	0.74	0.76	0.96	0.86	0.79

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 069

Reference:

Exhibit B-3-1, DSP Section 3.5

Interrogatory:

Please complete the following table:

Tree Contacts	2016	2017	2018	2019	2020	5 year average
SAIDI including FM						
SAIDI excluding FM						
SAIFI including FM						
SAIFI excluding FM						

Response:

Tree Contacts	**2016**	**2017**	**2018**	**2019**	**2020**	**5 year average**
SAIDI including FM	6.20	6.22	11.36	3.47	7.34	6.92
SAIDI excluding FM	2.98	3.55	2.76	2.36	3.08	2.95
SAIFI including FM	0.81	0.88	1.10	0.67	0.87	0.87
SAIFI excluding FM	0.60	0.59	0.51	0.53	0.59	0.56

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 070

Reference:

Exhibit B-3-1, DSP Section 3.5, Page 20

Interrogatory:

Figure 2 below provides a breakdown of contributors to SAIDI.

a) Please confirm Figure 2 excludes Loss of Supply and Force Majeure.

b) Pease provide a further breakdown of the contribution to Defective Equipment by equipment type for each of the years 2016 to 2020.

Response:

a) Confirmed. Figure 2 excludes Loss of Supply and Force Majeure.

b)

Equipment Type	2016	2017	2018	2019	2020
Cross Arm	0.054	0.093	0.096	0.080	0.045
Station Transformer	0.016	0.023	0.018	0.010	0.019
Overhead Conductor	0.194	0.217	0.303	0.326	0.247
Overhead Transformer	0.011	0.012	0.012	0.011	0.011
Pole	0.218	0.170	0.208	0.186	0.276
Station Recloser	0.006	0.026	0.005	0.000	0.003
Submarine Conductor	0.040	0.031	0.036	0.017	0.038
Underground Conductor	0.006	0.013	0.014	0.021	0.006
Underground Transformer	0.002	0.002	0.002	0.002	0.002
Other	1.373	1.731	1.388	1.860	1.644

The 'Other' category consists of equipment types outside of the types listed in the table that contributed to SAIDI defective equipment, such as insulators and surge arrestors.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 071

Reference:

Exhibit B-3-1, DSP Section 3.5, Page 22

Interrogatory:

Figure 3 below provides a breakdown of contributors to SAIFI.

a) Please confirm Figure 3 excludes Loss of Supply and Force Majeure.

b) Please provide a further breakdown of the contribution to Defective Equipment by equipment type for each of the years 2016 to 2020.

Response:

a) Yes. Figure 3 excludes Loss of Supply and Force Majeure.

b)

Equipment Type	2016	2017	2018	2019	2020
Cross Arm	0.020	0.023	0.027	0.022	0.018
Station Transformer	0.005	0.004	0.004	0.001	0.005
Overhead Conductor	0.051	0.061	0.098	0.084	0.067
Overhead Transformer	0.002	0.002	0.002	0.002	0.002
Pole	0.035	0.039	0.050	0.042	0.045
Station Recloser	0.004	0.012	0.002	0.000	0.001
Submarine Conductor	0.002	0.002	0.003	0.002	0.002
Underground Conductor	0.001	0.007	0.003	0.004	0.003
Underground Transformer	0.000	0.000	0.000	0.001	0.001
Other	0.487	0.587	0.570	0.803	0.714

The 'Other' category consists of equipment types outside of the types listed in the table that contributed to defective equipment SAIFI, such as insulators and surge arrestors.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 072

Reference:

EB-2017-0049, Exhibit I-23-AMPCO-11a

Interrogatory:

Please update the table (Power Outage Causes %) in response to part (a) for the years 2018 to 2021.

Response:

Percentages by SAIFI:

Power Outage Causes	2018	2019	2020
Tree damage	26%	19%	24%
Equipment failure	29%	31%	29%
Unconfirmed causes	9%	9%	11%
Scheduled outages	10%	13%	12%
Loss of power supply	20%	20%	16%
Animal or vehicle damage	6%	8%	8%

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 073

Reference:

EB-2017-0049, Exhibit A-3-1, Page 16-17

Interrogatory:

Table 4 and Table 5 indicates that Hydro One's proposed Plan B Modified investment plan was forecast to deliver a 0% impact on SAIDI and a 0% impact on SAIFI, respectively by the end of 2022.

a) With respect to Table 4, please update the forecasted impact on SAIDI by the end of 2022 column, based on the investment plan spending undertaken by Hydro One to the end of 2022.

b) With respect to Table 5, please update the forecasted impact on SAIFI column by the end of 2022 based on the investment plan spending undertaken by Hydro One to the end of 2022.

Response:

a) Please refer to B3-SEC-130 and B3-SEC-133 for 2021 forecast values for SAIDI and SAIFI. For 2022, Hydro One is managing to the targets provided in EB-2017-0049 and replicated in DSP Section 3.5, Figures 1 and 4.

b) See response for (a).

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 074

Reference:

EB-2017-0049, Exhibit B1-1-1, DSP Section 2.3, Table 36

Interrogatory:

Table 36 provides the asset strategy summary by component. Please update Table 36 to align with the current application.

Response:

The information requested is set out in Exhibit B-3-1, Section 3.2 under the headings "Life Cycle Strategy - Inspection and Maintenance Practices" and "Replacement and Refurbishment" for each asset category.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 075

Reference:

2017-0049, Exhibit B1-1-1, DSP Section 3.3, Page 18

Interrogatory:

At Table 60 Hydro One provides the projects driving innovation over the 2018 to 2022 period. Please provide the projects driving innovation over the 2023 to 2027 period.

Response:

The following distribution system investments are driving innovation over the 2023-27 period:

D-SS-04	Energy Storage Solutions	Deployment of energy storage solutions to provide a temporary source of backup power when the upstream supply is lost.
D-SS-05	Worst Performing Feeders	Deployment of distribution automation and fault location capabilities to modernize select feeders.
D-SR-04	Distribution Station Refurbishment	Select deployment of lower cost padmount transformer configurations.
D-SR-10	Distribution Lines Sustainment Initiatives	Introduction of cable injection for underground cables, which involves injecting cables with a proprietary fluid in order to fill defects in the cable insulation that may have developed over time.
D-SR-12	Advanced Meter Infrastructure 2.0 (AMI 2.0)	Deploy a modern AMI platform reflective of current technology and capabilities.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 076

Reference:

No Reference provided.

Interrogatory:

Please complete the following Table:

	Transformer	Wood Pole	Conductor	Cross Arm
2018-2022 # Assets Added to Poor Condition Category				
2018-2022 # Assets Replaced				
2023-2027 Forecast # assets added to poor condition category		50,000		

Response:

	Transformer[1]	**Wood Pole**	**Conductor**	**Cross Arm**
2018-2020 # Assets Added to Poor Condition Category[2]	344	35,768	N/A	1,300
2018-2022 # Assets replaced in targeted asset replacement investments[3]	62	26,585	N/A	4,900
2023-2027 Forecast # assets added to poor condition category[4]	620	50,000	N/A	5,000

Notes:

1. Assuming "Transformer" refers to station transformers
2. Count of assets added to the poor condition category is only available for historical years (2018-2020)

Witness: FALTAOUS Peter

3. Count of assets replaced from 2018 to 2022 includes actual and planned volumes for targeted asset replacement investments
4. “Forecast # assets added to poor condition category” is an estimate based on historical number of assets added to the poor condition category

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 077

Reference:

Exhibit B-3-1, DSP Section 3.2

Interrogatory:

a) Please complete the following table:

	2018-2022	2023-2027
Total # Major Assets Replaced		
% of Major Assets Replaced		

Response:

The requested data is provided as follows for poles, station transformers, and meters.

	2018-2022	**2023-2027**
Total # of Poles Replaced	26,585	51,500
% of Poles Replaced	1.6%	3.2%
Total # of Station Transformers addressed	62	118(1)
% of Station Transformers Replaced	6.1%	9.3%
Total # of Meters Replaced	217,068(2)	338,944
% of Meters Replaced	15.4%(2)	22.3%

Notes:

1. Based on 106 and 12 poor condition transformers identified in SR-04 and SR-11, respectively
2. Based on actuals to October 27, 2021 plus forecast until end of 2022

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 078

Reference:

Exhibit B-3-1, DSP Section 3.9, Attachment 1

Interrogatory:

a) Please add 2018 to 2020 Plan amounts to Appendix 2-AA and provide an excel version.

b) Please provide Appendix 2-AA from part (a) on the basis of Inservice Additions and provide an excel version.

c) Please provide the annual amount of System Service work: (1) deferred; (2) cancelled; and (3) advanced for each of the years 2016 to 2021.

Response:

a) Please see interrogatory response to B3-SEC-141.

b) Please see Excel Attachment 'I-03-B3-AMPCO-078-01' of this interrogatory response.

c) For 2016, System Service Plan = $103.3M, Actual = $77.4M, representing deferrals of $25.9M in capital. These deferrals were as a result of reprioritization, to accommodate unforeseen increases in other areas of capital spending. For 2017, Plan = $110.1M, Actual = $66.6M, representing deferrals of $43.5M. These deferrals were a result of reprioritization to accommodate increased spending in General Plant driven by IT investments as well as unplanned TX capital contributions. Due to the timing of the Decision for the previous filing, there is no annual variance for the year 2018. For the years 2019 and 2020, please see the Capital Performance report included in this filing, B-03-01 Section 3.9 Attachment 2, for details on variations from planned expenditures. For 2021, please see Exhibit B-03-01 Section 3.9 for an explanation of the forecast $11.5M in System Service deferrals.

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Appendix 2-AA: On the basis of ISA
Capital Projects Table ($M)

Projects	2018 Plan (DRO)	2018	2019 Plan (DRO)	2019	2020 Plan (DRO)	2020	2021 Plan (DRO)	2021 Bridge	2022 Plan (DRO)	2022 Bridge	2023 Test	2024 Test	2025 Test	2026 Test	2027 Test
Reporting Basis		USGAAP		USGAAP		USGAAP		USGAAP		USGAAP	USGAAP	USGAAP	USGAAP	USGAAP	USGAAP
System Access															
D-SA-01 Joint Use and Relocations	23.4	23.4	17.1	26.9	17.7	24.6	17.7	23.8	17.9	19.3	24.4	28.7	27.1	26.5	27.2
D-SA-02 New Load Connections, Upgrades, Cancellations	124.5	124.5	101.8	134.8	106.0	147.3	104.7	137.0	105.6	141.6	150.7	154.5	158.4	162.4	166.5
D-SA-03 Customer Demand Distributed Energy Resources	15.7	15.7	8.0	8.2	2.7	3.8	2.2	5.0	1.6	1.7	2.4	2.4	1.4	1.4	1.4
D-SA-04 Metering Sustainment	32.0	32.0	20.8	20.0	18.4	21.7	36.2	16.9	18.0	18.6	62.1	56.1	40.5	22.2	8.9
D-SA-Other	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total System Access	**196.9**	**196.9**	**147.7**	**189.9**	**144.7**	**197.5**	**160.8**	**182.7**	**143.1**	**181.2**	**239.6**	**241.8**	**227.5**	**212.5**	**204.1**
System Renewal															
D-SR-01 Distribution Stations Demand Capital Program	3.9	3.9	5.3	4.8	4.7	5.2	4.8	5.9	4.9	4.9	6.2	6.7	7.3	6.0	6.1
D-SR-02 Mobile Unit Substation Program	0.0	0.0	3.3	7.2	4.6	5.3	4.3	3.5	4.8	3.2	4.0	3.8	3.8	3.0	3.7
D-SR-03 Distribution Station Planned Component Replacement Program	4.4	4.4	7.4	7.9	6.4	8.0	6.7	9.9	6.8	7.0	6.5	3.3	1.1	1.1	1.2
D-SR-04 Distribution Station Refurbishment	15.0	15.0	33.1	26.7	21.3	7.6	23.9	15.4	28.0	7.4	26.4	56.3	34.0	26.8	38.0
D-SR-05 Distribution Lines Trouble Call and Storm Damage Response	112.0	112.0	75.6	74.5	80.2	117.6	78.7	92.2	79.5	93.8	107.1	109.2	111.4	113.6	115.9
D-SR-06 Distribution Lines PCB Equipment Replacement Program	6.3	6.3	9.9	8.1	11.0	4.8	12.4	9.5	12.5	9.5	9.4	9.5	9.5	0.0	0.0
D-SR-07 Pole Sustainment Program	51.8	51.8	53.2	44.2	59.7	43.5	58.8	73.3	58.3	60.1	107.9	110.0	112.2	114.4	116.7
D-SR-08 Distribution Lines Minor Component Replacement Program	4.1	4.1	7.0	4.9	4.1	6.3	7.2	9.9	7.6	12.5	12.5	12.4	12.2	8.3	6.5
D-SR-09 Submarine Cable Replacement Program	3.6	3.6	9.1	6.2	9.7	6.6	9.8	10.2	9.9	11.1	12.1	12.4	12.7	12.9	13.2
D-SR-10 Distribution Lines Sustainment Initiatives	7.6	7.6	11.1	9.4	12.8	9.8	26.4	13.0	30.4	11.2	30.3	33.1	37.2	31.9	47.6
D-SR-11 Life Cycle Optimization & Operational Efficiency Projects	18.2	18.2	6.2	5.1	4.9	2.4	3.1	4.4	6.2	0.0	1.0	6.0	8.5	3.0	0.2
D-SR-12 Advanced Meter Infrastructure 2.0 (AMI 2.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	3.9	30.9	62.0	153.7	154.4	157.3
D-SR-Other	2.7	2.7	2.2	2.8	6.1	0.9	5.8	0.6	2.3	0.8	0.9	0.9	0.9	0.9	0.9
Sub-Total System Renewal	**229.6**	**229.6**	**223.3**	**201.9**	**225.3**	**217.8**	**241.9**	**248.7**	**251.2**	**225.5**	**355.2**	**425.6**	**504.4**	**476.3**	**507.3**
System Service															
D-SS-01 System Upgrades Driven by Load Growth	34.4	34.4	15.8	24.7	125.0	58.1	94.3	20.4	74.0	95.4	147.8	52.6	150.4	90.9	83.9
D-SS-02 Reliability Improvements	2.1	2.1	7.8	4.2	5.3	5.0	5.9	2.8	0.0	5.5	5.5	3.2	5.5	13.4	13.2
D-SS-03 Demand System Modifications	12.5	12.5	8.8	11.4	8.8	12.9	8.6	8.1	10.6	8.9	12.1	13.0	13.3	13.5	13.8
D-SS-04 Energy Storage Solutions	0.0	0.0	8.1	0.0	0.0	0.0	0.0	8.5	0.0	3.4	16.3	34.6	35.2	35.9	36.2
D-SS-05 Worst Performing Feeders	4.7	4.7	18.5	18.6	15.8	17.2	15.2	26.9	12.8	21.0	40.6	41.4	42.7	43.0	43.8
D-SS-06 Power Quality and Stray Voltage	1.0	1.0	0.8	1.3	0.9	1.2	0.9	3.3	0.9	3.4	3.8	3.9	4.0	4.0	4.1
D-SS-Other	59.2	59.2	21.8	28.9	15.2	2.8	13.9	0.8	14.2	0.1	0.1	0.1	0.1	0.1	0.1
Sub-Total System Service	**113.9**	**113.9**	**81.6**	**89.2**	**170.9**	**97.3**	**138.8**	**70.8**	**112.4**	**137.7**	**226.3**	**148.8**	**251.2**	**200.9**	**195.1**
General Plant Allocated to Distribution															
Fleet	18.1	18.1	27.8	29.0	29.4	25.7	28.3	28.3	28.2	28.5	50.6	51.7	52.2	53.0	54.7
Facilities & Real Estate	13.0	13.0	11.4	12.0	34.5	41.4	15.1	14.4	50.6	29.5	31.1	82.4	58.8	29.1	63.5
Information Solutions	45.0	45.0	56.7	63.2	67.8	80.1	36.7	65.7	22.3	50.5	54.6	51.7	105.3	85.1	78.5
System Operations	7.3	7.3	6.6	2.2	4.2	6.3	84.1	89.5	2.3	3.5	10.5	23.1	4.0	3.3	3.5
System Capability Reinforcement	4.1	4.1	1.5	0.3	0.0	-0.7	0.0	0.0	0.0	0.0	3.0	2.2	0.0	1.1	1.0
Other	0.0	0.0	0.0	-2.7	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total General Plant	**87.4**	**87.4**	**103.9**	**104.1**	**135.9**	**155.5**	**164.1**	**197.9**	**103.4**	**112.0**	**149.9**	**211.1**	**220.4**	**171.5**	**201.2**
Subtotal (SA, SR, SS)	**540.4**	**540.4**	**452.6**	**481.1**	**540.9**	**512.6**	**541.4**	**502.2**	**506.7**	**544.4**	**821.0**	**816.2**	**983.1**	**889.7**	**906.5**
GRAND TOTAL	**627.8**	**627.8**	**556.5**	**585.1**	**676.8**	**668.1**	**705.5**	**700.1**	**610.1**	**656.4**	**970.9**	**1,027.3**	**1,203.4**	**1,061.2**	**1,107.8**

Notes:

1 Please provide a breakdown of the major components of each capital project undertaken in each year. Please ensure that all projects below the materiality threshold are included in the miscellaneous
2 The applicant should group projects appropriately and avoid presentations that result in classification of significant components of the capital budget in the miscellaneous category.

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 079

Reference:

Exhibit B-3-1, DSP Section 3.9, Attachment 1

Interrogatory:

For each relevant investment category in Appendix 2-AA, please provide the number of station transformers, overhead transformers, underground transformers, wood poles, overhead conductors, underground cable, cross arms and insulators replaced under each category for the period 2018 to 2022 and forecast for 2023 to 2027.

Response:

Hydro One does not internally report on specific number of assets replaced in each category listed in Appendix 2-AA. Reporting is focused on the objectives of the originating program or project. As an example, the reportable units for the new connections program are the number of connections. Hydro One can provide asset replacement counts for asset replacement programs as follows:

Asset Replacement	2018-2022	2023-2027
Station Transformers	AMPCO-077	D-SR-04
Distribution Wood Poles	AMPCO-093	D-SR-07
Crossarms	AMPCO-097	D-SR-08
Substandard Transformers	AMPCO-098	D-SR-08
Submarine Cable	AMPCO-102	AMPCO-102

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 080

Reference:

DSP Section 3.11, D-SA-01

Interrogatory:

a) Please complete the following table:

D-SA-01	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
# Joint Use Requests										
# Line Relocation Requests										
# Poles Replaced										

b) Please provide the capital contribution amounts for each of the years 2018 to 2022.

Response:

a) Hydro One understood the question to provide its count of the number of joint use and line relocation project requests, as well as the number of poles replaced under both programs. On this basis, Hydro One has provided actual figures. Given the unique and complex multi-year nature of some joint use and relocation projects, expenditure forecasts are not representative of future volumes; forecasts are based on historic expenditure levels, with adjustments for work volumes provided by Joint Use partners. However, many partners do not provide such information due to commercial sensitivities.

D-SA-01	**2018**	**2019**	**2020**	**2021 (YTD August)**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
# Joint Use Requests	509	1,715	1,901	1,843	N/A					
# Line Relocation Requests	473	935	1,570	1,691						
# Poles Replaced	N/A	N/A	911	942						

Historically, Hydro One did not track the number of pole replacements as part of this work; Hydro One only began tracking this measure towards the end of 2019.

b) Refer to interrogatory response D-Staff-185 part (d).

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 081

Reference:

DSP Section 3.11, D-SA-02

Interrogatory:

Please complete the following table on the basis of Gross Investment Costs:

D-SA-02	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
New Connections ($)										
Service Upgrades ($)										
Service Cancellations ($)										
Total										

Response:

Please refer to B3-SEC-148 (b).

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 082

Reference:

DSP Section 3.11, D-SA-02, Page 9, Table 3

Interrogatory:

Please provide the removals and capital contribution amounts for each of the years 2018 to 2022.

Response:

Please refer to interrogatory response B3-SEC-148 (b).

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 083

Reference:

DSP Section 3.11, D-SA-04

Interrogatory:

The AMI 1.0 system is experiencing increasing failure rates and is reaching its end of life.

a) Please provide the End of Life for the AMI 1.0 system.

b) Please provide the percentage of the system at end of life in 2016 compared to 2020.

c) Please provide the replacement rate for the period 2018 to 2022 compared to 2023 to 2027.

Response:

a) As discussed in B-3-1, Section 3.2, pp 85-86, the key components of the AMI system are meters, network equipment, and the Head End System (HES). AMI meters, given their number (1.4M devices) and dual function (accurately measuring customer electricity usage and providing the foundation of the mesh communication network) are the key determinant of the system's life expectancy. The expected service life of AMI 1.0 meters is approximately 15 years (see Exhibit B-3-1, Section 3.3, Subsection 3.3.5) although this service life is not guaranteed by the vendor. Given the above and given AMI 1.0 mass meter deployment began in 2007, the system will begin to reach end of life in 2022.

b) The percentage of meters at end of life in 2017 and 2020 was zero percent based on the expected 15-year service life (see above) although actual meter failures are increasing in advance of their expected service life (see B-3-1, Section 3.2, Figures 74 and 75).

c) AMI 1.0 replacement rate for the period 2018 to 2022 compared to 2023 to 2027 is shown in table below:

METERS	2018-2022	2023-2027
AMI 1.0 Replacement Rate	15.4%	34.0%

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 084

Reference:

DSP Section 3.11, D-SA-04

Interrogatory:

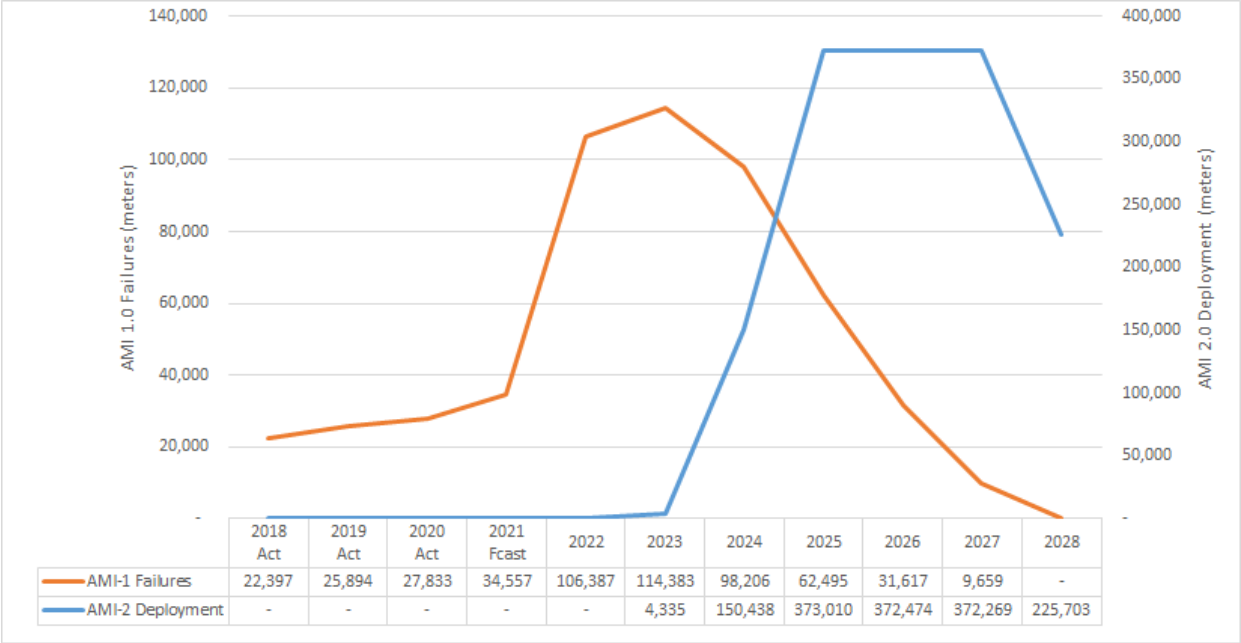
a) Page 4 Figure 1: Please add 2018 to 2021 data to Figure 1

b) Page 5: Please provide the estimated number of failed AMI 1.0 meters replaced over the 2018 to 2022 period.

c) Page 5: Please provide the number of meters to address sampling and reverification regulatory requirements for the period 2018 to 2022.

Response:

a) Figure 1 with 2018 to 2021 data



	2018 Act	2019 Act	2020 Act	2021 Fcast	2022	2023	2024	2025	2026	2027	2028
AMI-1 Failures	22,397	25,894	27,833	34,557	106,387	114,383	98,206	62,495	31,617	9,659	-
AMI-2 Deployment	-	-	-	-	-	4,335	150,438	373,010	372,474	372,269	225,703

b) The estimated number of failed AMI 1.0 meters replaced over the 2018 to 2022 period is shown in the table below.

Meters	2018 (Actual)	2019 (Actual)	2020 (Actual)	2021 (Forecast*)	2022 (Forecast**)
AMI 1.0 Failures	22,397	25,894	27,833	34,557	106,387

**Includes actuals to Q3 2021.*

***See response to B3-Staff-138 part b for basis of 2022 forecast.*

c) The number of meters to address sampling and reverification regulatory requirements for the period 2018 to 2022 is shown in the table below.

Meters	2018 Actual	2019 Actual	2020 Actual	2021 Forecast	2022 Forecast
Reverification	468	1159	594	784	1,018
Sampling	4789	1548	956	2,723	1,556
Total	**5,257**	**2,707**	**1,550**	**3,507**	**2,574**

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 085

Reference:

DSP Section 3.11, D-SR-04, Page 4, Figure 2

Interrogatory:

Please provide the number of transformer Class 1 and Class 2 failures in 2021.

Response:

In 2021, as of the end of Q3, there have been three Class 1 failures and twelve Class 2 failures.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 086

Reference:

DSP Section 3.11, D-SR-04, Page 8

Interrogatory:

a) Please provide the cost of Alternative 1 and Alternative 3.

b) Please estimate the number of transformers that would be replaced on a reactive basis under Alternative 1.

c) Please provide the forecast number of transformers replaced under Alternative 3.

Response:

a) Alternative 1:
Hydro One has never operated in the absence of an asset replacement program so it is unable to project the number of assets that would be replaced reactively without a program and is therefore unable to provide a cost for Alternative 1.

Alternative 3:
The cost for Alternative 3 for SR-04 is $205M over the 2023 to 2027 period.

b) Hydro One has never operated in the absence of a transformer replacement program and thus is unable to project the number of transformers that would be replaced on a reactive basis under Alternative 1

c) Alternative 3 would address 121 transformers under SR-04.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 087

Reference:

DSP Section 3.11, D-SR-04, Appendix A

Interrogatory:

a) Please add the following columns to Appendix A: Number of Transformers to be Replaced and Transformer Condition Rating.

b) Please provide Appendix A Planned for the years 2018 to 2022 and include the additional columns in part (a).

c) Please provide Appendix A Actual for the years 2018 to 2022 and include the additional columns in part (a).

d) Please identify the projects in part (b) that were not completed as planned and why.

e) Please provide the number of pad-mounted distribution station (PDS) forecasted over the 2023 to 2027 period.

f) Please provide the number of pad-mounted distribution station (PDS) completed over the 2018 to 2022 period.

Response:

a)

Project Name	Project ID	Project Description	Number of Transformers to be Addressed	Transformer Condition Rating	Net Capital Investment ($ Millions)				
					2023	2024	2025	2026	2027
Brookside DS	SR-04.1	Convert 44:8.32kV 5MVA station to PDS with 2x3MVA units	1	Poor	3.1	0.0	0.0	0.0	0.0
Chesterville Bran DS	SR-04.2	Convert 44:4.16kV 2MVA station to PDS with 2x3MVA units	1	Poor	0.1	0.0	0.0	0.0	0.0
Chesterville DS #2	SR-04.3	Convert 44:4.16kV 3MVA station to PDS with 3MVA unit	1	Poor	0.1	0.0	0.0	0.0	0.0
Cobalt DS	SR-04.4	Refurbish 44:12.5kV 3MVA station to 7.5MVA unit on new site with electronic reclosers	1	Poor	2.5	0.0	0.0	0.0	0.0
Craighurst DS	SR-04.5	Replace 44:8.32kV 5MVA transformer with 7.5MVA unit	1	Poor	0.9	0.0	0.0	0.0	0.0
Disputed Road RS	SR-04.6	Replace 27.6:27.6kV 25MVA transformer with 25MVA unit	1	Poor	2.9	0.0	0.0	0.0	0.0
Goodwood DS	SR-04.7	Refurbish 44:8.32kV 5MVA station to 7.5MVA unit	1	Poor	3.1	0.0	0.0	0.0	0.0
Kenora DS	SR-04.8	Replace 115:12.5kV 7.5MVA transformer with 7.5MVA unit	2	Poor / Poor	1.0	0.0	0.0	0.0	0.0
Killaloe DS	SR-04.9	Replace 44:12.5kV 6MVA transformer with 5MVA unit, electronic reclosers and SCADA	1	Poor	0.9	0.0	0.0	0.0	0.0
Millington DS	SR-04.10	Replace 44:8.32kV 5MVA transformer with 5MVA unit	1	Poor	1.0	0.0	0.0	0.0	0.0
Pointe Au Baril DS	SR-04.11	Replace 44:12.5kV 3MVA with 5MVA unit	1	Poor	1.4	0.0	0.0	0.0	0.0

Project Name	Project ID	Project Description	Number of Transformers to be Addressed	Transformer Condition Rating	Net Capital Investment ($ Millions)				
					2023	2024	2025	2026	2027
Snow Road DS	SR-04.12	Replace 44:12.5kV 3MVA transformer with 5MVA unit	1	Poor	0.9	0.0	0.0	0.0	0.0
Stratford DS	SR-04.13	Replace 27.6:8.32kV 3MVA transformer with 5MVA unit	1	Poor	0.4	0.0	0.0	0.0	0.0
Stratford Easthope DS	SR-04.14	Refurbish 27.6:8.32kV 3MVA station to 10MVA unit with SCADA	2	Poor / Poor	3.1	0.0	0.0	0.0	0.0
Wolsey Lake DS	SR-04.15	Replace 44:12.5kV 6MVA transformer to 7.5MVA unit with electronic reclosers	1	Poor	1.0	0.0	0.0	0.0	0.0
Alex Kenyon West DS	SR-04.16	Replace 44:4.16kV 2MVA transformer with 5MVA unit	1	Poor	0.1	0.9	0.0	0.0	0.0
Belmont DS	SR-04.17	Refurbish 27.6:8.32kV 3.6MVA station with 5MVA unit	1	Poor	1.8	1.3	0.0	0.0	0.0
Berwick DS	SR-04.18	Convert 44:8.32kV 3MVA station to PDS with 2x3MVA	1	Poor	0.6	0.3	0.0	0.0	0.0
Brighton Pinnacle DS	SR-04.19	Refurbish 44:4.16kV 5MVA with 5MVA unit, electronic reclosers and SCADA	1	Poor	0.5	2.6	0.0	0.0	0.0
Brockville Park DS	SR-04.20	Convert 44:4.16kV 5MVA station with breakers to PDS with 2x3MVA	2	Poor / Poor	0.0	1.1	0.0	0.0	0.0
Crozier DS	SR-04.21	Convert 44:25kV 2x6MVA station to PDS with 2x3MVA	2	Poor / Poor	0.0	1.0	0.0	0.0	0.0
Deseronto DS	SR-04.22	Replace 44:4.16kV 3MVA transformer with 5MVA unit, electronic reclosers and SCADA	1	Poor	0.1	1.0	0.0	0.0	0.0
Jellicoe DS #3	SR-04.23	Refurbish 115:12.5kV 1.5MVA station with 7.5MVA unit	1	Poor	0.0	3.2	0.0	0.0	0.0

Project Name	Project ID	Project Description	Number of Transformers to be Addressed	Transformer Condition Rating	Net Capital Investment ($ Millions)				
					2023	2024	2025	2026	2027
Lily Lake DS	SR-04.24	Refurbish 44:8.32kV 2MVA station with 7.5MVA unit on new site	1	Poor	0.2	1.6	0.0	0.0	0.0
Owen Sound DS #2	SR-04.25	Convert 44:8.32kV 2MVA station to PDS 3MVA unit on new site with electronic reclosers	1	Poor	0.2	2.3	0.0	0.0	0.0
Richardson RS	SR-04.26	Replace 44:44kV 25MVA station with 25MVA unit with SCADA	1	Poor	2.8	0.3	0.0	0.0	0.0
Ringwood DS	SR-04.27	Replace 44:8.32kV 5MVA transformer with 7.5MVA unit	1	Poor	0.0	1.0	0.0	0.0	0.0
Schreiber Winnipeg DS*	SR-04.28	Refurbish 115:12.5kV 6MVA station with 7.5MVA unit	2	Good / Good	0.0	3.2	0.0	0.0	0.0
Shelburn Andrew DS	SR-04.29	Convert 44:4.16kV 5MVA station to PDS 3MVA unit	1	Poor	0.0	3.2	0.0	0.0	0.0
Simcoe Ireland DS	SR-04.30	Refurbish 27.6:8.32kV 5MVA station with 5MVA unit	1	Poor	2.8	0.3	0.0	0.0	0.0
St.Thomas Union DS	SR-04.31	Replace 27.6:8.32kV 5MVA transformer with 5MVA unit	1	Poor	0.0	1.5	0.0	0.0	0.0
Stouffvil 10 Line DS	SR-04.32	Replace 44:8.32kV 5MVA transformer with 5MVA unit	1	Poor	0.1	1.0	0.0	0.0	0.0
Thamesville North DS	SR-04.33	Refurbish 27.6:8.32kV 5MVA station with 7.5MVA unit	1	Poor	0.0	3.2	0.0	0.0	0.0
Thorold Allanport DS	SR-04.34	Replace 27.6:4.16kV 5.4MVA transformer with 5MVA unit, electronic reclosers and SCADA	1	Poor	0.0	1.5	0.0	0.0	0.0

Project Name	Project ID	Project Description	Number of Transformers to be Addressed	Transformer Condition Rating	Net Capital Investment ($ Millions)				
					2023	2024	2025	2026	2027
Thorold Ormond DS	SR-04.35	Refurbish 27.6:4.16kV 5.4MVA transformer with 5MVA unit, electronic reclosers and SCADA	1	Poor	2.3	0.8	0.0	0.0	0.0
Thorold Turner DS	SR-04.36	Refurbish 27.6:8.32kV 3.6MVA station with 5MVA unit, electronic reclosers and SCADA	1	Poor	2.8	0.3	0.0	0.0	0.0
Uxbridge DS #2	SR-04.37	Refurbish 44:8.32kV 5MVA transformer with 7.5MVA unit	1	Poor	2.6	0.5	0.0	0.0	0.0
Williamstown RS	SR-04.38	Replace 44:44kV 25MVA transformer with 25MVA unit	1	Poor	2.6	0.5	0.0	0.0	0.0
Woodland Beach DS	SR-04.39	Refurbish 44:8.32kV 5MVA station with 7.5MVA unit	1	Poor	1.5	1.6	0.0	0.0	0.0
Young JCT RS	SR-04.40	Replace 27.6:27.6kV 15MVA with 15MVA unit	1	Poor	0.1	0.6	0.0	0.0	0.0
Black Corners DS	SR-04.41	Replace 44:8.32kV 5MVA transformer with 7.5MVA unit, electronic reclosers with SCADA	1	Poor	0.0	0.1	0.8	0.0	0.0
Brighton Division DS	SR-04.42	Convert 44:4.16kV 3MVA station to PDS 2x3MVA unit with electronic reclosers and SCADA	1	Poor	0.0	0.0	3.0	0.0	0.0
Brunelle DS	SR-04.43	Refurbish 44:8.32kV 5MVA station with 7.5MVA unit	1	Poor	0.0	2.9	0.3	0.0	0.0
Burford DS	SR-04.44	Convert 27.6:8.32kV 3.6MVA station to PDS 2.5MVA with additional real estate	1	Poor	0.0	0.0	1.5	0.0	0.0
Castleton DS	SR-04.45	Replace 44:8.32kV 5MVA transformer with 5MVA unit	1	Poor	0.0	0.1	0.8	0.0	0.0

Project Name	Project ID	Project Description	Number of Transformers to be Addressed	Transformer Condition Rating	Net Capital Investment ($ Millions)				
					2023	2024	2025	2026	2027
Devlin DS**	SR-04.46	Refurbish 44:12.5kV 2MVA station with 7.5MVA unit	2	Poor / Good	0.0	0.0	3.2	0.0	0.0
Drumbo DS	SR-04.47	Replace 27.6:8.32kV 2MVA transformer with 5MVA unit	1	Poor	0.0	0.1	0.5	0.0	0.0
Emo DS	SR-04.48	Refurbish 44:12.5kV 3MVA station with 7.5MVA unit	2	Poor / Poor	0.0	0.0	3.2	0.0	0.9
Forest Jefferson DS	SR-04.49	Convert 27.6:8.32kV 3.6MVA station to PDS 2x3MVA unit	1	Poor	0.0	0.4	1.8	0.0	0.0
Forest McNab DS	SR-04.50	Convert 27.6:4.16kV 5.6MVA station to PDS 2x3MVA unit with electronic reclosers	1	Poor	0.0	0.4	1.8	0.0	0.0
Guthrie DS	SR-04.51	Convert 44:8.32kV 3MVA station to PDS 3x3MVA unit	1	Poor	0.0	0.2	1.6	0.0	0.0
Kemptville West DS	SR-04.52	Replace 44:8.32kV 5MVA 7.5MVA unit with electronic recloser and SCADA	1	Poor	0.0	0.0	0.9	0.0	0.0
Shedden DS	SR-04.53	Replace 27.6:8.32kV 3.6MVA transformer with 7.5MVA unit	1	Poor	0.0	0.0	1.0	0.0	0.0
Thorold Front DS	SR-04.54	Replace 13.8:4.16kV 5.4MVA 5MVA unit with electronic recloser and SCADA	1	Poor	0.0	0.0	1.0	0.0	0.0
Vanastra DS	SR-04.55	Refurbish 27.6:8.32kV 3.6MVA station to 7.5MVA unit with electronic recloser and SCADA	1	Poor	0.0	0.8	2.2	0.0	0.0
Cameron DS	SR-04.56	Replace 44:12.5kV 6MVA transformer with 7.5MVA unit	1	Poor	0.0	0.0	0.0	1.0	0.0
Espanola DS	SR-04.57	Replace 44:12.5kV 6MVA transformer with 7.5MVA unit	1	Poor	0.0	0.0	0.1	0.8	0.0

Project Name	Project ID	Project Description	Number of Transformers to be Addressed	Transformer Condition Rating	Net Capital Investment ($ Millions)				
					2023	2024	2025	2026	2027
Grand Valley DS #2	SR-04.58	Replace 44:12.5kV 3MVA transformer with 7.5MVA unit, electronic reclosers and SCADA	1	Poor	0.0	0.1	0.8	0.1	0.0
Lucan Market DS 8kV	SR-04.59	Replace 27.6:8.32kV 3.6MVA transformer with 5MVA unit	1	Poor	0.0	0.0	0.1	0.8	0.0
Nakina DS	SR-04.60	Refurbish 44:12.5kV 3MVA station to 7.5MVA unit with electronic reclosers and SCADA	2	Poor / Poor	0.0	0.0	0.3	3.0	0.0
Red Rock DS	SR-04.61	Refurbish 115:12.5kV 6.24MVA station to 7.5MVA unit	2	Poor / Poor	0.0	0.1	0.9	3.2	0.0
Russell DS	SR-04.62	Replace 115:8.32kV 6MVA transformer with 7.5MVA	3	Poor / Poor / Poor	0.0	0.0	0.0	1.2	0.0
Shabaqua DS	SR-04.63	Refurbish 115:25kV 6MVA and 25:12.5kV 2MVA station with 115:25kV 7.5MVA unit	2	Poor / Poor	0.0	0.0	0.3	4.6	0.0
Thedford DS	SR-04.64	Replace 27.6:8.32kV 3.6MVA transformer with 5MVA	1	Poor	0.0	0.0	0.1	0.8	0.0
Virginiatown DS	SR-04.65	Convert 44:4.16kV 2MVA station to PDS 3MVA unit on greenfield site	1	Poor	0.0	0.0	0.2	2.9	0.0
Washago DS	SR-04.66	Refurbish 44:8.32kV 5MVA transformer with 7.5MVA unit	1	Poor	0.0	0.0	0.0	3.3	0.0
Wellington DS	SR-04.67	Replace 44:8.32kV 5MVA transformer with 5MVA with SCADA	1	Poor	0.0	0.0	0.1	0.8	0.0
Aguasabon DS	SR-04.68	Refurbish 13.8:12.5kV 6MVA transformer with 12.5MVA unit	1	Poor	0.0	0.0	0.0	0.0	3.3

Project Name	Project ID	Project Description	Number of Transformers to be Addressed	Transformer Condition Rating	Net Capital Investment ($ Millions)				
					2023	2024	2025	2026	2027
Colborne DS #2	SR-04.69	Replace 44:8.32kV 3MVA station with 7.5MVA unit and electronic reclosers	1	Poor	0.0	0.0	0.0	0.3	1.1
Coldstream DS	SR-04.70	Replace 27.6:8.32kV 5MVA with 5MVA unit	1	Poor	0.0	0.0	0.1	0.8	0.2
Dack DS	SR-04.71	Convert 44:12.5kV 3MVA station to PDS 3MVA unit	2	Poor / Poor	0.0	0.0	0.0	0.2	1.1
Ennismore DS	SR-04.72	Replace 44:8.32kV 5MVA transformer with 5MVA unit	1	Poor	0.0	0.0	0.0	0.1	0.0
Haycroft DS	SR-04.73	Replace 27.6:8.32kV 5MVA transformer with 7.5MVA unit	1	Poor	0.0	0.0	0.0	0.0	0.6
Hinchinbrooke DS	SR-04.74	Replace 115:12.5kV 7.2MVA transformer with 7.5MVA unit	2	Poor / Poor	0.0	0.0	0.0	0.1	1.0
Holland Centre RS	SR-04.75	Replace 44:44kV 15MVA transformer with 44MVA unit	1	Poor	0.0	0.0	0.0	0.6	0.3
Hornepayne DS	SR-04.76	Refurbish 44:4.16kV 10MVA station with 15MVA	2	Poor / Poor	0.0	0.0	0.0	2.2	1.1
Kimberley DS	SR-04.77	Replace 44:8.32kV 5MVA transformer with 7.5MVA unit	1	Poor	0.0	0.0	0.0	0.1	1.2
Longlac East DS	SR-04.78	Refurbish 44:12.5kV 3MVA station to 7.5MVA unit	1	Poor	0.0	0.0	0.0	0.3	2.9
Maxville Prince DS	SR-04.79	Refurbish 44:4.16kV 2MVA station with 5MVA unit	1	Poor	0.0	0.0	0.0	0.1	0.8
McGregor DS	SR-04.80	Replace 27.6:8.32kV 5MVA transformer with 7.5MVA unit	1	Poor	0.0	0.0	0.1	0.6	0.3
Napanee DS #2	SR-04.81	Convert 44:8.32kV 5MVA station to PDS 2x3MVA units with electronic reclosers and SCADA	1	Poor	0.0	0.0	0.0	0.1	1.0

Project Name	Project ID	Project Description	Number of Transformers to be Addressed	Transformer Condition Rating	Net Capital Investment ($ Millions)				
					2023	2024	2025	2026	2027
Picton Disraeli DS	SR-04.82	Replace 44:4.16kV 5MVA with breakers to 5MVA unit with electronic reclosers and SCADA	1	Poor	0.0	0.0	0.0	0.4	0.5
Picton DS	SR-04.83	Replace 44:8.32kV 5MVA transformer with 7.5MVA unit, electronic reclosers and SCADA	1	Poor	0.0	0.0	0.0	0.1	1.0
Port Lambton DS	SR-04.84	Replace 27.6:8.32kV 5MVA transformer with 7.5MVA unit	1	Poor	0.0	0.0	0.1	0.6	0.3
Rainy River DS***	SR-04.85	Convert 44:8.32kV 3MVA station to PDS 3MVA unit	2	Poor / Good	0.0	0.0	0.0	0.3	0.8
Reach Road RS	SR-04.86	Replace 44:44kV 25MVA transformer with 25MVA unit	1	Poor	0.0	0.0	0.1	1.0	0.5
Rondeau DS	SR-04.87	Convert 27.6:8.32kV 3MVA station to PDS 3x2.5MVA unit with additional real estate	1	Poor	0.0	0.0	0.1	0.6	0.2
Rutherglen DS	SR-04.88	Convert 44:12.5kV 2MVA station to PDS 3MVA unit	1	Poor	0.0	0.0	0.0	0.2	3.3
Sleeman DS	SR-04.89	Refurbish 44:12.5 3MVA and 44:25kV 6MVA to 44:12.5 5MVA and 44:25kV 12.5MVA unit	3	Poor / Poor / Poor	0.0	0.0	0.0	0.3	4.7
Springvale DS	SR-04.90	Replace 27.6:8.32kV 5MVA transformer with 5MVA unit	1	Poor	0.0	0.0	0.0	0.1	1.0
Stardale DS	SR-04.91	Replace 44:8.32kV 5MVA station to 7.5MVA with electronic reclosers and SCADA	1	Poor	0.0	0.0	0.0	0.0	0.1
Whitedog DS	SR-04.92	Refurbish 13.8:12.5kV 2MVA station with 5MVA unit	1	Poor	0.0	0.0	0.0	0.2	2.9

*Schreiber Winnipeg DS T1 and R1: The R1 regulator failed causing a fire that damaged the station structure. Station refurbishment is required in order to address the damaged station structure and address the failed regulator with a new transformer equipped with an Under Load Tap Changer.

**Devlin DS T1 and R1: The T1 transformer in poor condition is being replaced with a new transformer that includes regulation through an Under Load Tap Changer (ULTC) thereby making the R1 regulator redundant.

***Rainy River T1 and R1: The R1 regulator is in poor condition and is to be replaced with a transformer that includes regulation through a ULTC.

b)

Year	Station Name	# Of Transformers Planned to be Addressed	Transformer Condition	Planned Cost ($M)
2018	Creemore DS	1	Poor	11.75
2018	Sowerby DS	1	Transformer condition was not the driver[1]	
2018	Bobcaygeon Anne DS	1	Transformer condition was not the driver[1]	
2019	Burford DS	1	Poor	18.65
2019	Hurondale DS	2	Poor / Poor	
2019	Thorold Allanport DS	1	Poor	
2019	Brigden DS	1	Poor	
2019	Blenheim DS	1	Poor	
2019	Ostrander DS	1	Poor	
2019	Arnprior Airport DS	1	Transformer condition was not the driver[2]	
2019	Arnprion McLachin DS	1	Poor	
2019	Meaford Vincent DS	1	Poor	
2020	Drumbo DS	1	Poor	14.18
2020	Clarence DS	2	Poor / Poor	
2020	Eugenia RS	1	Poor	
2020	La Salle RS	1	Poor	
2020	Rutherglen DS	1	Poor	

2020	Adams Point DS	1	Poor	
2020	Woodland Beach DS	1	Poor	
2020	Owen Sound DS #2	1	Poor	
2020	Vanastra DS	1	Poor	
2021	Forest Jefferson and McNab DS Padmounts	2	Poor / Poor	21.27
2021	Stratford East Hope DS	1	Poor	
2021	Anderdon RS	1	Poor	
2021	Colpoys Bay DS	1	Poor	
2021	Jellicoe DS #3	1	Fair[4]	
2021	Cornell RS	1	Poor	
2021	Disputed Road RS	1	Poor	
2021	Rondeau Jct RS	1	Poor	
2021	Dack DS	1	Poor	
2021	Kenora DS	1	Poor	
2021	Lily Lake DS	1	Poor	
2021	Lake Vernon DS	1	Poor	
2021	Washago DS	1	Poor	
2021	Ufford DS	1	Poor	
2021	Guthrie DS	1	Poor	
2021	Cobalt DS	1	Poor	
2021	Barrys Bay DS #1	2	Poor / Good[3]	
2021	Island Grove DS	1	Poor	
2021	New Sarum RS	1	Poor	
2021	Hawley DS	2	Poor/ Poor	
2021	Thorold Ormond DS	1	Poor	
2021	Thorold Turner DS	1	Poor	
2021	Rondeau DS	1	Poor	
2022	Thorold Front DS	1	Poor	27.58
2022	Shedden DS	1	Poor	
2022	Stratford DS	1	Poor	
2022	Brighton Pinnacle DS	1	Poor	
2022	Cameron DS	1	Poor	
2022	Perth North DS	1	Poor	
2022	Richardson RS	1	Poor	
2022	Williamstown RS	1	Fair[4]	
2022	Port Dover St Andrews DS	1	Poor	
2022	Simcoe Ireland DS	1	Poor	

2022	Goodwood DS	1	Poor	
2022	Moosonee DS	3	Transformer condition was not the driver[1]	
2022	Tory Hill DS	1	Poor	
2022	Aguasabon DS	1	Poor	
2022	Devlin DS	2	Poor / Good[3]	
2022	Emo DS	1	Poor	
2022	Russell DS	3	Good / Good / Poor[3]	
2022	Whitedog DS	1	Fair[4]	
2022	Uxbridge DS #2	1	Fair[4]	
2022	Shelburne DS	1	Fair[4]	
2022	Nottawaga DS	1	Fair[4]	
2022	Eels Lake RS	1	Fair[4]	
2022	Commanda DS	1	Fair[4]	
2022	Tralee DS	1	Transformer condition was not the driver[1]	
2022	Haliburton DS	1	Transformer condition was not the driver[1]	
2022	Kirkfield DS	1	Poor	

[1]Station Refurbishment was driven due to poor station structures or sub standard design which necessitated addressing the transformer.
[2]Station Refurbishment was driven due to load growth expected in the area.
[3]At least one of the transformers or regulating units in poor condition is being replaced with a new transformer that includes regulation through a ULTC thereby making the regulator redundant.
[4] These transformers were expected to be in poor condition by the time they were to be addressed.

c)

Year	Station Name	# Of Transformers Addressed	Transformer Condition	Total Cost ($M)
2018	Creemore DS	1	Poor	11.75
2018	Sowerby DS	1	Transformer condition was not the driver[1]	
2018	Bobcaygeon Anne iMDS	1	Transformer condition was not a driver[1]	
2019	Hurondale PDS	2	Poor / Poor	16.54
2019	Brigden DS	1	Poor	
2019	Blenheim DS	1	Poor	
2019	Ostrander DS	1	Poor	
2019	Madsen DS	1	Poor	
2019	Meaford Vincent iMDS	1	Poor	
2019	Arnprior Airport iMDS	1	Transformer condition was not the driver [2]	
2019	Arnprior McLachin iMDS	1	Poor	
2019	Brockville Cedar iMDS	1	Transformer condition was not the driver[1]	
2020	Chatham Raleigh DS	1	Poor	8.69
2020	Joyceville DS	1	Poor	
2021	Ufford DS	1	Poor	8.09
2021	Gorrie DS	1	Poor	
2021	Hawley DS	2	Poor / Poor	
2021	Adams Point PDS	1	Poor	
2022	No Planned Stations to be In-Serviced. Forecasted spend for 2022			3.18

[1]Station Refurbishment was driven due to poor station structures or sub standard design which necessitated addressing the transformer.

[2]Station Refurbishment was driven due to load growth expected in the area.

d) Please see I-03-B3-Staff-141

e) Hydro One Distribution is forecasting 21 PDS type stations over the filing period.

Year	# of PDS type stations
2023	4
2024	6
2025	5
2026	1
2027	5

f) Between 2018-2021, a total of 7 PDS type stations were placed in-service

Year	# of PDS type stations
2018	1
2019	3
2020	2
2021	1
2022	0

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 088

Reference:

DSP Section 3.11, D-SR-05

Interrogatory:

a) Page 4: Please provide the number of storms plus Force Majeure events for the years 2016 to 2021.

b) Page 4 Figure 2: Please add the numerical values to the chart for each year.

c) Page 5: Please provide the number of Trouble Calls by year for the years 2016 to 2021.

d) Page 5: Please provide the number of assets replaced over the period 2018 to 2021 under D-SR-05.

D-SR-05 Asset Replacement	2018	2019	2020	2021
Wood poles				
Transformers				
Insulators				
Conductors				
Cross Arms				
Reclosers				
Switches				
Submarine Cables (km)				
Regulators				
Other (specify)				
Total				

e) Please explain how transformer costs are allocated between ISD SR-04 and ISD SR-05.

Response:

a)

	2016	2017	2018	2019	2020
Number of FM Events	3	6	5	2	2
Number of FM Days	9	16	23	5	9
Number of Storm Days	30	34	31	34	41
Number of FM+Storm Days	39	50	54	39	50

b)

($ in millions)	2016	2017	2018	2019	2020
D-SR-05	$77.8	$87.0	$132.9	$97.6	$119.2

c)

	2016	2017	2018	2019	2020	2021 Q3
Trouble Calls	43,939	40,205	39,788	40,505	43,242	32,146

d) Please see interrogatory response B3-SEC-150 (d)

e) ISD SR-04 involves the planned replacement of station transformers and ISD SR-05 involves the emergency replacement of distribution lines assets.

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 089

Reference:

DSP Section 3.11, D-SR-05, Page 6

Interrogatory:

Hydro One proposes to increase the 5-year spend on this project by $60 million compared to 2018-2022 ($551.7 M - $491.8 M).

The forecast expenditures for this demand program are projected from historical costs and trends. Storm response expenditures are based on an inflation-adjusted average of annual expenditures since 2005, with "outlier" years of unusually high expenditures (i.e. due to more severe storms) removed from the forecast – namely, 2006, 2013, and 2018. The expenditures for other categories of activities are guided by an inflation adjusted three year historical average.

Please provide the above calculation to further explain the drivers for the $60 million increase in proposed spending.

Response:

When adjusting for inflation the 2018-2022 and 2023-2027 periods are consistent, and there is not a $60 million increase in proposed spending. For the calculation on how the forecast was developed, please refer to interrogatory response B3-Energy Probe-033.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO INTERROGATORY - 090

Reference:

DSP Section 3.11, D-SR-07, Page 3

Interrogatory:

Poor condition poles include a subset of 17,000 red pine poles.

a) Please provide the quantity of red pine poles.

b) Please provide the number of red pine poles replaced over the 2018 to 2022 period.

c) Please provide the forecast number of red pine poles to be replaced over the 2023 to 2027 period.

Response:

a) There are currently 17,000 red pine poles that were not treated to CSA standards.

b)

	2018	2019	2020	2021 Q3
Red Pine Poles Replaced	1,166	1,437	1,720	1,774

For 2022, the design and scheduling of the pole replacement program is still in progress.

c) There are approximately 11,000 poles of this type planned for replacement in the 2023- 2027 period.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 091

Reference:

DSP Section 3.11, D-SR-07, Page 3

Interrogatory:

With respect to the Test and Treat program that commenced in 2020:

a) Please provide the number of poles tested in 2020 and 2021 to date.

b) Please provide the number and percentage of poles in 2020 and 2021 that did not result in a poor condition rating.

Response:

a)

	2020	2021 Q3 YTD
Poles Test and Treated	10,884	24,491

b)

	2020	2021 YTD
Number of Poles in Good Condition	9,369	22,777
% of Poles Tested in good condition	86%	93%

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 092

Reference:

DSP Section 3.11, D-SR-07, Page 5

Interrogatory:

Figure 3 provides the number of pole caused interruptions excluding FM for the years 2011 to 2020.

a) Please provide the number of poles that failed by year that were in poor condition.

b) Please provide the number of poles that failed that were beyond ESL.

c) Please provide the average age of pole failures by year.

Response:

a) This value is unavailable as the condition of poles is not captured when they are replaced under trouble or storm conditions.

b) and c) see table below. This data is available from 2017 onwards, however, it is not possible to separate the FM outages from the outages that occurred during normal operations.

Year	b) Number beyond ESL at Time of Failure	c) Average Age at Time of Failure
2017	145	43.0
2018	340	43.3
2019	288	44.5
2020	403	45.7

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 093

Reference:

DSP Section 3.11, D-SR-07, Page 8

Interrogatory:

Table 1 provides the planned volumes for the years 2023 to 2027.

a) Please provide the planned volumes for the years 2018 to 2022.

b) Please provide the actual volumes for the years 2018 to 2021.

Response:

a) The following table contains the plan that formed part of the EB-2017-0049 DRO filed in response to the OEB Decision and Order on March 7, 2019. Hydro One's EB-2017-0049 DRO did not outline any planned units for test and treat or refurbishment.

	2018	2019	2020	2021	2022
Pole Replacement	5,982	6,970	8,158	9,333	9,266

b) The following table contains the year end actuals accomplishments for 2018-2020 and the 2021 Q3 actual accomplishments, categorized as per Table 1 in D-SR-07. As described in Exhibit B-3-1, Section 3.9.2.2, system renewal investments including pole replacements were required to be deferred over the 2018-2022 period due to increased spending in non-discretionary areas such as System Access.

	2018	2019	2020	2021 Q3
Test and Treat	N/A	N/A	10,884	24,491
Pole Refurbishment	N/A	N/A	96	642
Pole Replacement	5,982	3,984	4,519	5,062

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 094

Reference:

DSP Section 3.11, D-SR-07, Page 11

Interrogatory:

Please complete the following table on the basis of Gross Investment Cost:

D-SR-07	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Test and Treat										
Pole Refurbishment										
Pole Replacement										
Removals										
Total										

Response:

D-SR-07

($M)	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
Test and Treat	0.0	0.0	1.3	7.5	7.7	8.0	8.2	8.3	8.5	8.7
Pole Refurbishment	0.0	0.0	0.0	4.0	8.2	5.9	6.0	6.1	6.2	6.3
Pole Replacement	59.0	50.3	48.2	71.9	52.5	108.7	111.6	113.3	115.9	117.7
Removals	-7.0	-6.0	-5.9	-10.0	-8.2	-14.7	-15.1	-15.3	-15.7	-15.9
Total	**52.0**	**44.3**	**43.6**	**73.4**	**60.1**	**107.9**	**110.6**	**112.4**	**114.9**	**116.8**

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 095

Reference:

DSP Section 3.11, D-SR-07, Page 11

Interrogatory:

a) Please provide the cost of Alternative 1 and Alternative 3.

b) Please estimate the number of wood poles that would be replaced on a reactive basis under Alternative 1.

Response:

a) The costs are provided below. For alternative 1, the planned pole sustainment program would be eliminated and all poles would be addressed reactively when they fail.

	2023	2024	2025	2026	2027
Alternative 1 D-SR-07 Net Dollars ($M)	0	0	0	0	0
Alternative 3 D-SR-07 Net Dollars ($M)	163.0	167.2	169.9	173.7	173.7

b) Hydro One has never operated in the absence of a pole replacement program so it is unable to project the number of poles that would be replaced reactively without a pole replacement program.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 096

Reference:

DSP Section 3.11, D-SR-08, Page 4

Interrogatory:

Figure 1 provides the Number of Interruptions Attributed to Cross-arm Failures (Excluding FM Events).

Please complete the following table:

D-SR-08	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
# interruptions											
Total Customer Impact (CMI)											
# assets in poor condition											
# interruptions due to assets in poor condition											

Response:

D-SR-08	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
# interruptions	58	54	52	57	94	54	78	104	86	107	N/A
Total Customer Impact (CMI)	9.0M	5.9M	4.1M	7.2M	15.4M	4.4M	7.7M	7.9M	6.7M	3.8M	N/A
# assets in poor condition	22,200	25,200	29,300	30,500	34,000	31,500	28,800	26,900	25,300	24,800	N/A
# interruptions due to assets in poor condition	N/A										

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 097

Reference:

DSP Section 3.11, D-SR-08, Page 7

Interrogatory:

Table 1 provides the Number of Cross Arms to be Replaced in the Plan Period.

Please provide the number of cross arms replaced over the period 2018-2022.

Response:

Year	2018	2019	2020	2021	2022
Cross Arms Replaced	0	700	755	1730	1730

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 098

Reference:

DSP Section 3.11, D-SR-08, Page 8

Interrogatory:

Table 2 provides the Number of Transformers to be Replaced over the Plan Period.

Please provide the number of transformers replaced over the period 2018-2022.

Response:

Year	2018	2019	2020	2021	2022
Transformers Replaced	0	19	65	231	231

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 099

Reference:

DSP Section 3.11, D-SR-08, Page 9

Interrogatory:

Table 4 provides the Number of Sentinel Lights to be Replaced or Removed in the Plan Period.

Please provide the number of sentinel lights to be replaced or removed over the 2018-2022 period.

Response:

Year	2018	2019	2020	2021	2022
Lights Replaced/Removed	2,114	1,797	2,264	3,196	2,858

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 100

Reference:

DSP Section 3.11, D-SR-08, Page 4

Interrogatory:

Please complete the following table on the basis of Gross Investment costs:

D-SR-08	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Cross Arms Replaced										
Transformers Replaced										
Nests Addressed										
Sentinel lights replaced/removed										
Removals										
Net Investment Cost										

Response:

D-SR-08	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Cross Arms Replaced	0.0	1.9	2.2	4.5	4.6	4.7	4.8	4.9	5.0	5.1
Transformers Replaced	0.0	1.5	2.5	6.0	6.1	6.2	8.8	7.8	2.3	0.7
Nests Addressed	0.1	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Sentinel lights replaced/removed	1.7	1.8	2.2	3.3	3.0	2.8	2.6	2.4	2.2	2.0
Removals	-0.5	-0.6	-0.9	-1.6	-1.6	-1.6	-1.9	-1.8	-1.2	-1.0
Net Investment Cost	1.4	4.9	6.3	12.4	12.3	12.4	14.5	13.5	8.6	7.1

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 101

Reference:

DSP Section 3.11, D-SR-08, Page 12

Interrogatory:

a) Please provide the cost of Alternative 3.

b) Please provide the total cross arms replaced under Alternative 3.

Response:

a) Total net cost from 2023 to 2027 is $45.1M for Alternative 3

b) 18,250 cross arms are replaced under Alternative 3

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 102

Reference:

DSP Section 3.11, D-SR-09, Page 3

Interrogatory:

The Submarine Cable Replacement Program is expected to replace or refurbish all submarine cables with currently known defects and additional cables that become damaged or exposed over the planning period.

a) Please provide the data on the submarine cables replaced or refurbished for the 2018-2022 period.

b) Please provide the data on the submarine cables to be replaced or refurbished for the 2023-2027 period.

Response:

a)

Year	2018	2019	2020	2021	2022
Cables Replaced/Refurbished	25.1 km	235	298	400	400

Note:
For 2018, the number of kilometres of submarine cable replaced is reported. From 2019 onwards, the reporting unit for the submarine cable program was changed to the number of cable installations replaced or refurbished.

b)

Year	2023	2024	2025	2026	2027
Cables Replaced/Refurbished	400	400	400	400	400

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 103

Reference:

DSP Section 3.11, D-SR-11, Page 12, Appendix A

Interrogatory:

Please complete the following table:

D-SR-11	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Planned Line Rebuild (km)										
Planned Line Relocation (km)										
Total										

a) Please provide the total km of actual line rebuild for the period 2018 to 2021.

b) Please provide the total km of actual line relocation for the period 2018 to 2021.

c) Please provide the total number of poles replaced for the period 2018 to 2022.

d) Please provide the forecast number of poles to be replaced for the period 2023 to 2027.

e) Please provide the average quantity of conductors and insulators per km of line.

Response:

For this response it was assumed the reference to SR-11 was incorrect and that the intent was to reference SR-10 as SR-11 does not have a page 12.

Planned line work is as follows:

D-SR-10*	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
Planned Line Rebuild (km)	25	1	11	11	26	0	10	1	10	40
Planned Line Relocation (km)	30	8	47	66	83	41	23	56	17	10
Planned Line Rebuild/ Relocation (km) projects < $1M**	12	3	12	7	7	49	52	55	57	60
Total	67	12	70	84	116	90	85	112	84	110

**kms of overhead distribution line rebuilds/relocations only include work that is part of ISD D-SR-10.*

***For projects less than $1M, km accomplishments are not tracked and the values provided are estimated.*

a) and b) actual line work is as follows:

D-SR-10	**2018**	**2019**	**2020**	**2021**
Actual Line Rebuild (km) *	25	21	22	6
Actual Line Relocation (km) *	30	4	2	0
Total	55	25	24	6

**kms of overhead distribution line only include material investments that were part of the ISD D-SR-10, as km accomplishments for projects less than $1M are not tracked.*

c) & d) The number of pole replacements is not tracked by projects completed under this investment.

e) The quantity of conductors and insulators per km of line are not tracked by projects completed under this investment. For information on Hydro One's Distribution Lines assets, see B-3-1 Section 3.2.3.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 104

Reference:

DSP Section 3.11, D-SR-11, Page 12, Appendix A

Interrogatory:

a) Please provide Appendix A Planned for the years 2018 to 2022.

b) Please provide Appendix A Actual for the years 2018 to 2022.

c) Please identify the projects in part (a) that were not completed as planned and why.

Response:

For this response we assumed the reference to SR-11 was incorrect and that the intent was to reference SR-10 as SR-11 does not have a page 12.

a) Below is a summary of planned investments for the years 2018 to 2022 based on the Draft Rate Order (EB-2017-0049) made in response to the March 7, 2019 decision on the 2018 to 2022 Distribution Revenue Requirements for Hydro One Networks Inc.

Year	Project Name	Total Net Planned ($M)
2018	Brockville TS 24M2 Feeder Rehab Phase 5	8.1
	City of Owen Sound Line Refurbish - PH 2	
	Projects <$1M	
2019	Sidney TS M7 Reconductor and Relocate	6.9
	Dymond TS M3 Rebuild - Stage 1	
	Otonabee TS 128M28 Phase 3 - Part 1	
	Projects <$1M	
2020	Palmerston TS M1 Relocation	16.6
	Muskoka TS M1 Relocation - Part 1 of 5	
	Manitoulin TS M25 - Relocate Line	
	G3K Towerline Relocate - Part 1	
	Otonabee TS 128M28 Phase 3 – Part 2 of 2	
	Wanstead TS M4 Bridgen Rebuild Stage 2	
	Projects <$1M	

2021	Wallace TS M6 Madawaska Relocate	22.0
	Douglas Point TS 44kV U/G Cables	
	Muskoka TS M1 Relocation - Part 3 of 5	
	Muskoka TS M1 Relocation - Part 2 of 5	
	Dymond TS M3 Rebuild - Stage 2	
	Owen Sound TS M24 Refurbishment - Stage 2	
	Cobden TS M6 Relocation	
	Havelock TS M2 Rebuild Part 2	
	Duart TS M5 Relocation	
	Margach DS F3 Line Relocate (SD 3201)	
	Projects <$1M	
2022	Gardiner TS M14 Relocation	33.8
	Morrisburg TS M23 Relocate	
	Napanee TS M2 Relocate	
	Kent TS M16 Relocation	
	Fergus TS M8 Relocation Eden Mills	
	Tillsonburg TS M4 Relocation	
	Muskoka TS M1 Relocation - Part 4 of 5	
	Val Caron DS - Maple Elms Street Rebuild	
	Weston Lake DS F1 – Kukatush Line Section Relocate	
	Town of Schreiber Rebuild Phase 2	
	Owen Sound TS M24 Refurbishment - Stage 3	
	Aguasabon DS F1 F2 - Terrace Bay Town Rebuild	
	Brant TS M22 Relocation Line Relocate	
	Dobbin TS 20M4 M6 M8 Reconstruction-Ackinson Rd	
	G3K Towerline Refurbishment - Part 2	
	Havelock TS M2 Rebuild Part 1	
	Longueuil TS M23 Relocate	
	Minden TS 87M2 Feeder Relocation Phase 2 Line Relocate	
	Muskoka TS M3 Relocate	
	Norfolk M3 Tillsonburg M10 Tie Relocation	
	Palmerston TS M3 Relocation	
	Projects <$1M	

b) Below is a summary of actuals incurred in the year 2018-2021 and forecasted values for 2022.

Year	Project Name	Total Net Actuals ($M)
2018	Brockville TS 24M2 Feeder Rehab Phase 5	8.1
	City of Owen Sound Line Refurbish - PH 2	
	Projects <$1M	
2019	Dymond TS M3 Rebuild - Stage 1	8.2
	Otonabee TS 128M28 Phase 3 - Part 1	
	Turkey Point - Vittoria DS F2 Relocation	
	Wanstead TS M4 Oil Springs	
	Projects <$1M	
2020	Haldimand-Jarvis TS M6 Lakeshore Rebuild	14.1
	Murillo DS F2 assets upgrade and acquisition	
	Crysler DS F2 Future Proof Pilot Project	
	Dryden Wilde DS F2-Dryden Downtown East	
	Otonabee TS 128M28 Phase 3 – Part 2 of 2	
	Wanstead TS M4 Brigden Rebuild Stage 2	
	WPF - Muskoka TS M9 Section Reconductor	
	Projects <1M	
2021 Q3	Lake TS M4M6 Rebuild	9.5
	Dryden Town Rebuild Ph. 4 -Dryden Downtown East	
	Allanburg TS M7 Rebuild	
	Brant TS M22 Relocation	
	Woodstock OPC Conversion-NorthEast 4kV	
	Projects <$1M	
2022	Fairchild TS - M12 LV Cable Replacement	13.7
	Underground Cable Injection Program	
	Virginiatown DS - HWY 66 Rebuild	
	Projects <$1M	

c) Please see response to B3-Staff-146.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 105

Reference:

DSP Section 3.11, D-SR-11, Page 12, Appendix A

Interrogatory:

With respect to Underground Cable injection, please provide the km and cost for the period 2018 to 2022.

Response:

Refer to interrogatory response B3-SEC-121 for the kilometer and cost details for the 2018 to 2022 period.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 106

Reference:

DSP Section 3.11, D-SR-12, Page 10

Interrogatory:

Figure 5 illustrates the failure rates of meters by their age.

Please discuss if Figure 5 is based on actual Hydro One meter data. If not, please provide Figure 5 based on Hydro One data.

Response:

D-SR-12, Figure 5, 2020 Failures by Age (Residential Meters), is based on actual Hydro One meter data.

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B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 107

Reference:

DSP Section 3.11, D-SR-12, Page 33

Interrogatory:

Please provide the cost of Alternative 1.

Response:

Alternative 1, the status quo option of continuing to reactively replace individual AMI 1.0 meters with AMI 1.0 meters, was not costed as it was assessed not to be feasible or viable based on a combination of several factors set out in D-SR-12 Section F pp. 33-34 including:

1. The labour costs of individually replacing meters on a reactive basis when they fail is costly and inefficient relative to mass replacing meters, particularly in Hydro One's low-density service territory (see B-3-1, Section 3.3, Attachment 6);

2. Hydro One's average AMI 1.0 meter acquisition costs are higher than comparator utilities, partly because of contracted prices for low volume individual meter replacement that did not incorporate economies that would be expected with bulk mass meter purchase (see B-3-1, Section 3.3, Attachment 6).

3. The field work to replace the projected volume of individual failed meters in a timely manner would be unmanageable and result in unacceptable regulatory non-compliance risk with billing reliability provisions of the Distribution System Code.

4. The primary meter failure mode identified in the Accelerated Life Test (ALT) study (complete meter communication failure) poses considerable risk of impacting multiple otherwise reliable meters given the interdependency of meters to communicate in a mesh network.

5. Sample testing meters that are beyond end-of-life poses considerable risk of having to replace tens of thousands of meters with obsolete technology should a sample fail (see D-SR-12 Section B.4).

6. The deteriorating physical condition of meters (LCD failures, electrolyte leakage, transformer failures, cracked solder joints) poses an increasing risk of further non-compliance with the good repair and maintenance provisions of the *Electricity Gas and Inspection* and *Weights and Measures* Acts.

7. Replacing failed AMI 1.0 meters with AMI 1.0 meters would, in essence, involve placing obsolete equipment into service at the time it is installed which is not a prudent investment for customers. In this regard, AMI 1.0 meters are experiencing multiple conditions of technological obsolescence including short-notice product de-listings and related effort to qualify replacement products, unavailability of parts, and reduced vendor support for 15-year-old technology. Additionally, and importantly, by relying on first generation meters, Hydro One would not be able to take advantage of advancements in AMI technology since 2007 including improved network reliability and coverage; additional features (remote disconnect/reconnect functionality, enhanced security); and AMI platform enhancements (enhanced meter memory and network capacity, future interoperability, distributed intelligence). A modern AMI 2.0 system would not only achieve core functionality to ensure regulatory compliance, but also can improve operations, enhance system visibility and control, and support analytics in response to evolving customer expectations, technological innovation, and a changing policy landscape (e.g., global trends in carbon reduction initiatives in response to climate change). This is particularly relevant to AMI given its considerable long service life and given it is not economic nor practical to retrofit meters in-situ in the future given the cost of visiting, removing, retrofitting, resealing, and re-installing 1.4M meters as well as upgrading thousands of network devices.

Taken together, the above factors make evident that the status quo of replacing failed AMI 1.0 meters on a reactive basis beyond their expected 15-year service life is not viable, not economically prudent, poses significant regulatory and customer service risk, and limits Hydro One's ability to plan for and address foreseeable customer needs.

B3 - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 108

Reference:

Exhibit B4

EB-2019-0082, Exhibit JT 2.19

Interrogatory:

Hydro One provides the vehicle utilization rate (transmission) for the years 2015 to 2018.

in $ millions, u.o.s.	2015	2016	2017	2018	
Operating Cost	133.1	133.2	133.7	135.7	Ⓐ
Utilization, *in millions of hours*	6.2	6.2	5.8	5.7	Ⓑ
Utilization Rate	**21.4**	**21.3**	**23.0**	**24.0**	Ⓐ÷Ⓑ

a) Please add the years 2019 to 2021 to the table.

b) Please provide the same table for distribution for the years 2015 to 2021.

Response:

a) Please see the table below.

in $ millions, u.o.s	**2019**	**2020**	**2021 Forecast**
Operating Cost	138.2	144.1	149.7
Utilization, *In millions of hours*	5.4	5.6	5.6
Utilization Rate	**25.6**	**25.7**	**26.9**

b) Hydro One's vehicle Utilization Rate is the same for transmission and distribution.

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E - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 109

Reference:

Exhibit E-6-1

Interrogatory:

a) For each of the years 2018 to 2021, please provide monthly data on the following: Hire, Retirements Other Exits and Vacancies for transmission and distribution.

b) Please summarize Hydro One's assumptions regarding vacancy levels in the current application.

Response:

a) The following tables show the monthly data on Hire, Retirements and Other Exits. Hydro one does not capture information on vacancies.

2018

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Headcount	**5268**	**5263**	**5505**	**5564**	**5511**	**5566**	**5532**	**5519**	**5512**	**5566**	**5553**	**5553**
Hires	9	10	261	28	17	14	12	8	9	31	16	3
Retirements	32	9	14	19	18	8	38	18	14	6	16	14
Other Exits	21	9	9	9	7	6	14	9	7	7	20	0

2019

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Headcount	**5513**	**5639**	**5624**	**5614**	**5613**	**5593**	**5578**	**5546**	**5540**	**5529**	**5524**	**5524**
Hires	11	3	3	10	8	4	12	17	7	9	10	21
Retirements	26	6	7	4	19	8	42	16	18	11	6	4
Other Exits	17	13	15	8	10	10	9	8	8	8	11	3

2020

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Headcount	**5540**	**5728**	**5726**	**5725**	**5716**	**5710**	**5704**	**5674**	**5675**	**5674**	**5675**	**5682**
Hires	25	6	9	4	2	9	8	10	12	16	19	10
Retirements	20	11	8	6	9	10	37	12	18	15	8	7
Other Exits	8	6	4	10	3	3	3	7	4	9	4	12

2021

	Jan	Feb	Mar	April	May	June	July	Aug	Sept
Headcount	**5694**	**5810**	**5825**	**6016**	**6017**	**6020**	**6099**	**6039**	**6038**
Hires	14	13	35	18	25	15	11	19	18
Retirements	22	12	5	9	25	10	65	20	20
Other Exits	11	4	7	10	8	10	15	14	9

Notes:

- Headcount taken on 1st of each month.
- Month over month headcount differential also impacted by movement between employee types, leaves of absence, unfilled vacancies, etc.

b) Please see Interrogatory Response E-Staff-255.

E - ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO
INTERROGATORY - 110

Reference:

Exhibit E-6-1

Interrogatory:

a) Please complete the following table for transmission and distribution:

	2018 Forecast	2018 Actual	2019 Forecast	2019 Actual	2020 Forecast	2020 Actual	2021 Forecast	2021 Actual (to date)
Total Number of Hours Worked (Excluding Overtime)								
Total Number of Hours of Overtime								
Total Hours								

b) Please complete the following table for transmission and distribution:

	2022 Forecast	2023 Forecast	2024 Forecast	2025 Forecast	2026 Forecast	2027 Forecast
Total Number of Hours Worked (Excluding Overtime)						
Total Number of Hours of Overtime						
Total						

c) Please identify the months with the highest overtime and why for transmission and distribution.

Witness: LILA Sabrin

Response:

a) Hydro One is unable to provide forecast overtime hours for Transmission and Distribution. Forecast overtime hours are subject to variability due to demand nature of overtime, and thus cannot be reasonably predicted. Rather, Hydro One monitors overtime usage throughout the year, and tracks usage based on overtime spend (which is based on sliding scale of overtime).

The following are the total hours worked and total overtime hours:

	2018 Actual	OT as proportion of hours worked	2019 Actual	OT as proportion of hours work	2020 Actual	OT as proportion of hours worked	2021 YTD
Total Number of Hours Worked (excl overtime)	15,956,958		16,427,215		16,606,102		12,644,151
Total Number of Hours of Overtime	1,362,040	7.9%	1,135,922	6.5%	1,264,438	7.1%	857,567
Total Hours	17,318,998		17,563,137		17,870,540		13,501,717

The number of hours worked (excluding overtime) is a measure of the annualized weekly working hours, aligned to the actual FTEs in Exhibit E-06-01.

b) See response to part a) above. Forecasted overtime spend, based on historical spend for forecast years can be found in Exhibit E-06-01 Attachment 2A.

c) Based on historical data, the months with the highest overtime are typically in the spring (May), or in the late fall (October to December).

Distribution demand OT usage will fluctuate based on weather events, which tend to be more severe in the late spring and the latter part of the year.

For Transmission, higher OT usage typically coincides with outage windows for major projects, which is impacted by the changes in the operating environment and inclement weather. Overtime enables productive and efficient completion of work within these constrained windows.