INNOVATIVE RESEARCH GROUP

OPG
Customer Engagement

Understanding Customer Needs and Preferences

June 2019

Prepared for:

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Confidentiality

This Report and all of the information and data contained within it may not be released, shared or otherwise disclosed to any other party, without the prior, written consent of Torys LLP (Torys).

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Torys on behalf of its client Ontario Power Generation Inc. (Ontario Power Generation or OPG). The conclusions drawn and opinions expressed are those of the authors.

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1. Introduction

Innovative Research Group Inc. (INNOVATIVE) was engaged by Torys LLP on behalf of its client Ontario Power Generation Inc. (Ontario Power Generation or OPG) in the Spring of 2018 to help design, execute and document the results of OPG's customer engagement, as part of OPG's business planning process.

This is the first time that OPG has directly engaged customers across Ontario within the business planning process. Following the Ontario Energy Board's (OEB) guidelines for a "consumer-centric" approach to rate applications, as laid out in the *Renewed Regulatory Framework for Electricity (RRF)*[1] and the *Handbook for Utility Rate Applications (Handbook)*[2], the engagement focused on customer **needs** and **preferences.**

> **Needs** questions focus on understanding the gap between the services and experience customers want, and the services and experience customers are receiving.
>
> **Preferences** questions focus on customer views about the outcomes the utility should focus on, priorities among those outcomes, and trade-offs illustrated by choices on specific programs or the pacing and prioritization of investments.

The engagement program was designed to collect customer input for OPG's planning process, and the work was completed in two phases. **The first phase** took place over the Fall and Winter of 2018 and was focused on identifying customers' needs and preferences for outcomes. At the end of phase 1, customer feedback and key findings from this phase were made available to OPG planners to identify relevant business decisions.

The second phase was carried out in the Spring of 2019, with the objective to solicit customer feedback on a set of specific business choices – including their bill impacts – for OPG's 2022-2026 business plan. After reviewing the results of the first phase, planners selected examples of specific investment decisions that represented tradeoffs between the outcome priorities identified by customers. The second phase asked customers for their views on these business and investment decisions OPG must make for its 2022-2026 business plan. Customer feedback from this phase will be used in the preparation of OPG's detailed business plan.

The lack of customer lists presented a challenge for both phases of the engagement. While other regulated utilities have an inventory of customer information that they can use to target participants for their customer engagement activities, OPG serves all electricity customers in Ontario but has no direct access to, or information about, these customers. Because OPG has no direct relationship with electricity consumers, the barriers to participation in OPG's customer engagement were considerably higher than those of distributors. Before the beginning of Phase I, OPG approached the OEB and LDCs to see if it was possible to access customers directly through lists those organizations may have access to. However, OPG was ultimately unable to obtain customer lists or other methods of directly contacting confirmed customers. Nevertheless, OPG customer engagement reached almost 10,000 customers in total across both phases.

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[1] OEB Renewed Regulatory Framework for Electricity Sections 2.4.2, 5.0, and 5.0.4.
[2] Handbook for Utility Rate Applications (October 13, 2016)

The OEB does not specify how customer engagement should be conducted or how customer feedback should be received. However, it has encouraged utilities to use "both existing and new processes."[3] Accordingly, OPG's customer engagement was designed to employ multiple methods to collect customer feedback, including: an online workbook, focus groups, as well as telephone and online surveys.

Noteworthy customer engagement elements in this consultation included:

- Collecting customer input at different stages prior to OPG's business planning process.
- Updating and improving the tools of customer engagement throughout the process, incorporating customer feedback along the way.
- An extensive effort to encourage participation in the online exercise—in the absence of customer lists—resulting in over 7,000 completed online workbooks throughout both phases. This is in addition to the close to 3,000 customers who participated in the representative activities.
- Using examples of specific projects to identify customer preferences between bill impacts and customer-facing outcomes in a transparent fashion.
- The use of representative online surveys that allow for the presentation of visuals to illustrate technical examples, thus better enabling respondents to make informed decisions.
- Using online question formats that allowed the presentation of pros and cons within the question responses.

This document provides an overview of OPG's 2018/19 customer engagement process and a summary of the insights, focusing on the generalizable results of the representative surveys. Insights into customer needs, preferences and outcome priorities (Phase 1) come from two representative telephone surveys among residential and small business customers (conducted in December 2018/January 2019). Results for customer views on specific business decisions and investment tradeoffs are derived from two representative online surveys among residential and business customers (conducted in April 2019). A detailed description of the methodology can be found in Section 3. Detailed results can be found in the attached customer engagement appendices.

[3] Handbook for Utility Rate Applications, p. 12 (October 13, 2016)

2018/19 Customer Engagement Coverage

Activity	Residential	Business	Timeframe
2018: Focus on Needs and Preferences			
Engagement Focus Groups	42	37	Nov. 15 – 22
Online Workbook	2,862	75	Nov. 18 – Dec. 14
Telephone Survey	600	200	Dec. 5 – Jan. 8
Customers Engaged	**3,504**	**312**	
2019: Focus on Business Decisions and Trade-offs			
Engagement Focus Groups	35	28	April 1 – 4
Online Workbook	4,288	102	April 6 – May 6
Representative Online Survey	1,200	400	April 15 – 28
Customers Engaged	**5,523**	**530**	

2. Executive Summary

Customer Needs and Preferences

This consultation confirmed the assumption that most Ontarians know little about OPG and the energy system more broadly. This lack of familiarity became especially apparent in questions regarding participants' needs and expectations of OPG. While most participants were able to express their overall level of satisfaction with OPG's performance—more are satisfied than dissatisfied—many were unable to describe how they know if OPG is doing a good job for them or not.

Among those who have a view, there does not appear to be a gap between the performance that OPG delivers, and the performance that customers expect. There is, however, interest from customers in OPG raising awareness among Ontarians about who OPG is and what it does.

Outcome Priorities

Customers identified nine outcomes that they feel are important for OPG. Overall safety, safely disposing of nuclear waste, and reliability are the most important of these, but all nine are considered important in their own right.

When asked to rank all priorities by importance, relative to others, price, safe and environmentally friendly disposal of nuclear waste, minimizing OPG's environmental impact, and safety are identified as the top priorities for both residential and small business customers. While price moves to the top of the list, most customers pick outcomes other than price as their first priority.

Specific Business Decisions and Investment Trade Offs

Despite price concerns, customers are generally willing to consider paying more to invest in renewing aging equipment and proactively invest in system capacity.

- When making concrete investment decisions, customer choices reflect their initial importance rating of priorities with safety and reliability taking precedence over keeping the price down.
- Generally, small business customers are less willing to consider paying more to make these investments, while still being supportive of some level of investment, despite potential bill impacts.

Hydroelectric Stations

- Although customers were informed the provincial electricity system does not currently need additional capacity, most customers prefer to invest in hydro capacity and reliability now rather than to delay.

Nuclear Stations

- In specific choices, customers tend to place more priority on incremental safety, reliability and environmental benefits over price.

Rate Smoothing

- Customer concern about price is reflected in views on rate smoothing. Customers prefer at least a moderate level of smoothing to keep prices down.

2.1 Customer Needs

Core elements of Phase I were **"needs questions"**, which focus on understanding the gap between the services and experience customers want, and the services and experience customers receive.

The first step of understanding customer needs is related to **overall satisfaction**. When asked how satisfied they are with OPG's performance, the majority of respondents gave a positive answer (82% satisfaction among residential and 78% satisfaction among business customers). Many customers were unfamiliar with OPG prior to the engagement and answered this question based on the overview provided in the workbook.

Satisfaction with OPG's Performance	Residential N=600	Business N=200
Satisfied	82%	78%
Dissatisfied	10%	14%
Neutral/Don't know	8%	9%

As a follow up to the overall satisfaction question, participants were asked to state the reasons why they were satisfied, neutral, or dissatisfied with OPG's performance. Most respondents judged OPG's performance by its ability to satisfy two core needs: reliable and affordable energy supply.

2.2 Outcome Priorities

To better understand customer preferences, the consultation included questions that capture customer views on the outcomes that OPG should focus on, and what the priorities should be among those outcomes.

In the Phase I survey, respondents were first presented with a list of nine priorities and asked to rate each of these priorities by its level of importance. While all nine are considered important, **safety**, **safely disposing of nuclear waste** and **reliability** were identified as the most critical.

Extremely Important	Very Important	Important
✓ Ensuring safe and environmentally responsible disposal of nuclear waste ✓ Operating in a safe manner ✓ Ensuring reliable energy production for Ontario	✓ Operating in a transparent and accountable manner ✓ Producing low-cost power ✓ Protecting generation stations against physical and cyber threats and attacks ✓ Minimizing OPG's impact on the environment	✓ Making positive contributions to Ontario's economy ✓ Making positive contributions to local communities in which OPG operates

Customers were also asked to add priorities to the list that they considered missing, but most thought the list was complete. Many of those who made specific suggestions effectively repeated one of the priorities included in the list or mentioned issues outside of OPG's control (e.g. Ontario's energy supply mix).

After rating all priorities by level of importance, participants were asked to choose and rank their top three priorities. Overall, **affordability/price**, **safe and environmentally friendly disposal of nuclear waste**, **minimizing OPG's environmental impact**, and **safety** are identified as the top priorities for both residential and small business customers. When ranked relative to other OPG priorities, price moves to the top of the list, but a majority of participants chose other priorities.

Outcome Priorities	Residential and small business combined
1st	Producing low cost power
2nd	Ensuring safe and environmentally responsible disposal of nuclear waste
3rd	Minimizing OPG's impact on the environment
4th	Operating in a safe manner

2.3 Business Decisions and Investment Tradeoffs

Phase II of the engagement focused on specific business decisions and investment tradeoffs. All questions were presented in online surveys along with information required to develop an informed opinion.

2.3.1 Rate Smoothing

Before exploring individual investment decisions, customers were asked to express their general preferences for different rate smoothing scenarios. Before posing the question, the workbook explained the general concept of rate smoothing and presented three potential scenarios with varying degrees of smoothing. Rather than exploring detailed, specific rate smoothing scenarios, the question was presented as a basic trade-off between paying more now, but less over time, or paying less now, but more overall.

The most popular option, across all activities, is "Scenario B: Medium level of smoothing". However, there is no clear winner, as both residential and business customers are divided across all three options.

Rate Smoothing	Residential N=1,200	Business N=400
Scenario A: High Level of Smoothing	27%	25%
Scenario B: Medium Level of Smoothing	38%	45%
Scenario C: Low Level of Smoothing	15%	16%
Don't know/Missing	20%	14%

2.3.2 Investing in OPG's Hydroelectric Stations

Customers were asked to provide feedback on the pacing of two specific initiatives that are being proposed as part of investments in OPG's Hydroelectric Stations. The majority of customers support at least a moderate pace (either the moderate or faster pace option) for the overhaul program.

Overhauling Hydroelectric Stations	Residential N=1,200	Business N=400
Faster pace	34%	31%
Moderate pace	35%	44%
Slower pace	14%	12%
Don't know	18%	14%

For the Niagara Frequency Conversion Project, there is a clear preference for converting both units now, rather than delaying the conversion. This is true for both residential and business customers.

Niagara Frequency Conversion Project	Residential N=1,200	Business N=400
Convert both units now	56%	58%
Delay conversion	20%	25%
Don't know	23%	16%

2.3.3 Managing OPG's nuclear stations

The engagement also explored customers' willingness to pay more for an accelerated decommissioning process of the Pickering Station site that takes 25 years, compared to the current standard approach that would make the site available for other uses after 45 years.

While most customers were able to provide an opinion, many commented that they need more information about the future use of the site and/or the rate impact once the land was repurposed. The results from the representative surveys show that about 60% would be willing to pay something extra on their monthly bill for the faster approach, while approximately 30% would be unwilling and 11% don't know.

For some participants, this was a trade-off between price and safety, despite the assurance that both processes would be equally safe. The comments received during focus groups and garnered from open-ended questions in the online workbook suggest that safety was a particular concern for customers who opposed nuclear as a way of generating electricity.

Making the Pickering Station Site Available	Residential N=1,200	Business N=400
… willing to pay something	60%	56%
… not willing to pay more	29%	33%
Don't know	11%	11%

2.3.4 Investing in OPG's nuclear stations

Similarly, the questions about investing in OPG's nuclear stations were primarily trade-offs between price and safety. For the first two—Vapour Recovery System (VRS) improvement, and air compressor replacement at Darlington Station—a plurality opted for the more expensive option because of perceived safety benefits, as opposed to the lower-cost, option. While the question on air compressor replacement clearly produced a favoured option among residential customers ("Proactively replace all 19"), it essentially resulted in a tie for business customers.

Darlington VRS Improvement	Residential N=1,200	Business N=400
Improve existing VRS	32%	37%
Replace VRS	43%	45%
Don't know	25%	18%
Darlington Air Compressor Replacement		
Proactively replace all 19	49%	43%
Acquire 4 spare and replace later	31%	40%
Don't know	20%	17%

On the Darlington Crane Group Project question, views were evenly split between the two available options among residential customers. Business customers favoured the option that requires lower investments now and defers some of the costs to a later date.

Darlington Crane Group Project	Residential N=1,200	Business N=400
Refurbish all 20 major cranes	40%	36%
Refurbish the 14 critical ones	41%	46%
Don't know	20%	18%

2.3.5 Investing in technology to create efficiencies

Lastly, customers were asked to express their views on investments in technology as a way to save money, increase reliability and improve safety. Most customers are supportive of investments in new and innovative technologies if there is proof that these technologies will lead to guaranteed savings.

Efficiency Initiatives	Residential N=1,200	Business N=400
… make do with what it has	10%	11%
… only invest if savings guaranteed	51%	60%
… also invest in pilot projects	24%	19%
Don't know	15%	11%

3. About this Consultation

3.1 Methodology

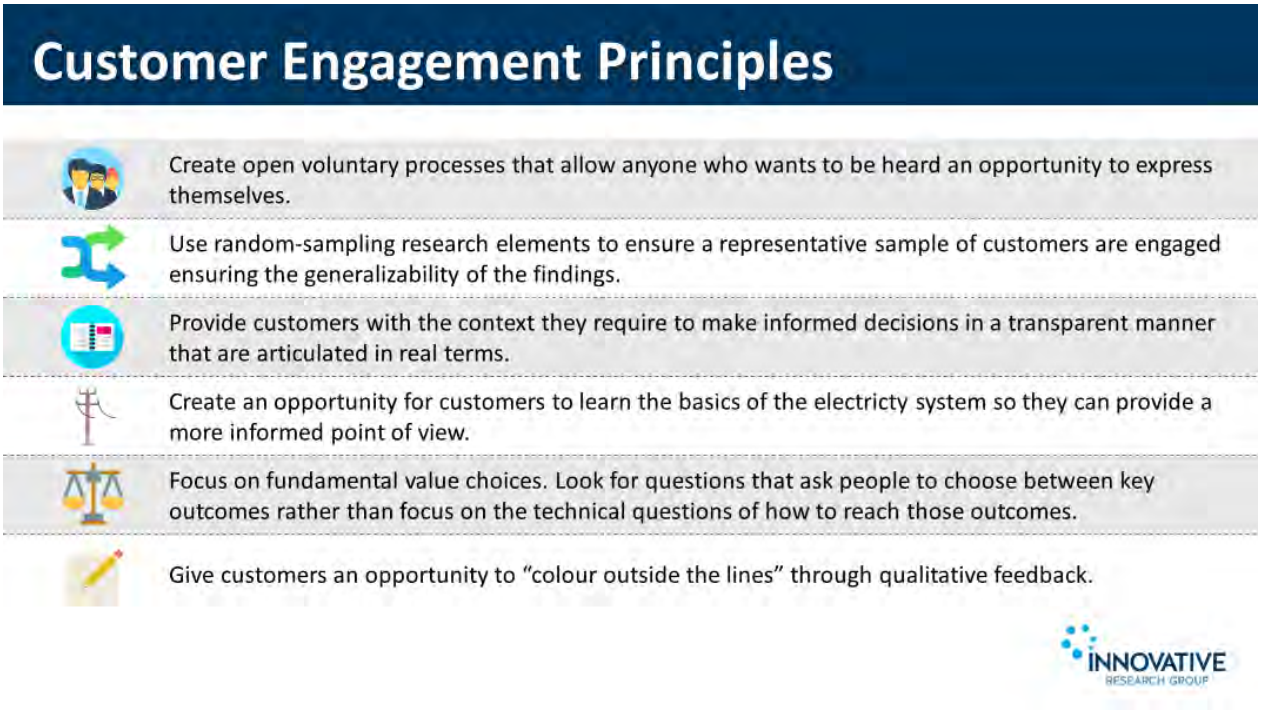
Engaging customers in meaningful consultation on electricity can be a challenge.

Often customers feel they do not know enough to contribute to a consultation because of their limited familiarity with the electricity system, including how the different components of generation, transmission and distribution work together. Few customers are familiar with electricity generation, and many have not even heard of OPG, since they don't receive a bill from the generator.

Others fear the combative nature of some public processes or prefer not to risk offending friends and neighbours by taking positions on issues that are sometimes controversial. With regard to generation, nuclear generation is a contested issue with deep emotional ties.

Moreover, many customers simply do not pay attention and remain unaware of particular consultations that they could participate in had they been aware.

Considering both the challenge of engaging a representative group of customers and the challenge of lack of knowledge, INNOVATIVE developed a process built on six key principles:



One cornerstone of this approach is to allow everyone who wants to have a say an opportunity to be heard. This is done through voluntary processes that are open for everyone to participate. However, voluntary processes can attract certain types of participants (e.g. more engaged citizens, special interest groups, etc.) and don't necessarily reflect the attitudes and opinions of a utility's broader customer base. Thus, another core element of any consultation process is obtaining feedback from a representative sample of customers to make sure every type of customer is heard.

To give everyone who wants to have a say the chance to express themselves, while giving a representative sample of customers the last word, there is a fixed sequence to these activities. Early activities, such as focus groups and voluntary online workbooks, provide plenty of options to "colour outside the lines" and shape the content of the consultation material. This allows the consultation to be responsive to customer input and ensures that the process covers what customers want to talk about.

The basic challenge for designing OPG's consultation was to get meaningful input from a wide variety of customers, many of whom begin with a very limited understanding of the electricity system, its governance, and the role of OPG—Ontario's largest electricity generator. To overcome this challenge, INNOVATIVE recommended a workbook-based consultation. The core idea behind this approach is to provide customers with choices based on basic values illustrated with trade-off among different outcomes. To provide meaningful feedback on those choices, workbooks create an opportunity for customers to learn the basics of the electricity system and provides the context needed to make informed choices.

In approaching the design of this engagement, INNOVATIVE and OPG considered the generator's unique position as a utility that serves every electricity customer in Ontario but has no direct access to customers. Moreover, because customers don't receive a bill from OPG, levels of awareness among electricity customers are very low. A key concern was how OPG could reach customers and motivate them to participate in this engagement, given the lack of customer lists and the company's limited visibility to customers.

The following sections provide a detailed overview of the various activities carried out during each phase of OPG's 2018-2019 customer engagement program.

3.2 Customer Engagement Process Overview (Phase 1)

Phase I (2018) of the engagement was designed to identify customer needs and preferences as they relate to the outcomes that the utility should focus on and prioritize. Given the priority placed on identifying customer preferences in the *Handbook*, the key priority for the first round was to develop a list of customer outcomes and to identify customer priorities among those outcomes for OPG's planning process.

Based on the engagement principles outlined in the introduction, INNOVATIVE worked with OPG to design and execute a multi-faceted engagement program that aligns with both OEB expectations and provides meaningful input for the utility's business planning.

3.2.1 Pre-Consultation

The first phase of this program was a **pre-consultation.** INNOVATIVE and OPG worked together to understand what was already known about customer needs and preferences, what topics should be addressed as well as how best to engage with these customers. This pre-consultation consisted of a variety of activities, including a review of existing customer feedback and research, meetings with various business departments of the utility, including project planning and regulatory, as well as a series of exploratory focus groups.

3.2.2 Workbook Development

Based on the information gleaned from the pre-consultation phase, INNOVATIVE and OPG staff worked to develop a workbook that was to be used throughout both the qualitative and quantitative phases of the customer engagement. The key objective was to develop a workbook that provided meaningful, balanced and comprehensive information. A core challenge was finding the right balance between too little and too much information and presenting this information in a non-technical way that regular Ontarians can understand.

3.2.3 Customer Engagement

The core of OPG's customer engagement encompassed three elements, covering residential and small business customers across Ontario.

1. The **focus groups** provided customers an opportunity to "colour outside the lines" through qualitative feedback. This qualitative phase of the customer engagement was designed to provide customers with some education about OPG's role in Ontario's electricity system, and then to gather their feedback on OPG's proposed priorities and value framework going forward. The focus groups were formatted around the themes in the customer engagement workbook and were led by a professional moderator. The feedback gathered from these focus groups helped inform the subsequent phases of the customer engagement, including the online workbook and telephone surveys.

2. The **online workbook** created an open, voluntary process that allowed any Ontario resident who wanted to be heard an opportunity to express themselves. This online workbook, which was based on the earlier developed workbook, was accessible for one month (between November 18th and December 14th, 2018), and gave customers the opportunity to engage with an interactive platform to both educate and collect detailed feedback on needs, preferences and outcomes. OPG effectively promoted the online workbook using a social media campaign, which resulted in **2,937**

unique responses. Feedback gathered from the online workbook helped inform the design of the telephone surveys.

3. The **telephone surveys** used a random-sampling approach to ensure a representative sample of OPG customers were engaged to ensure the generalizability of the findings. The telephone surveys followed a stratified random sampling methodology. This is a method of sampling that involves the division of a "population" (in this case, the entire Ontario population) into smaller groups known as strata. In stratified random sampling, the strata are formed based on members' shared attributes or characteristics (for the residential survey: region, age and gender; for the small business survey: region and industry sector). A random sample from each stratum is taken in a number proportional to the stratum's size when compared to the customer population. These subsets of the strata are then pooled to form a random sample. **This element of the engagement provided low-volume customers the "final say" on the topics discussed with thousands of customers over the course of the consultation.**

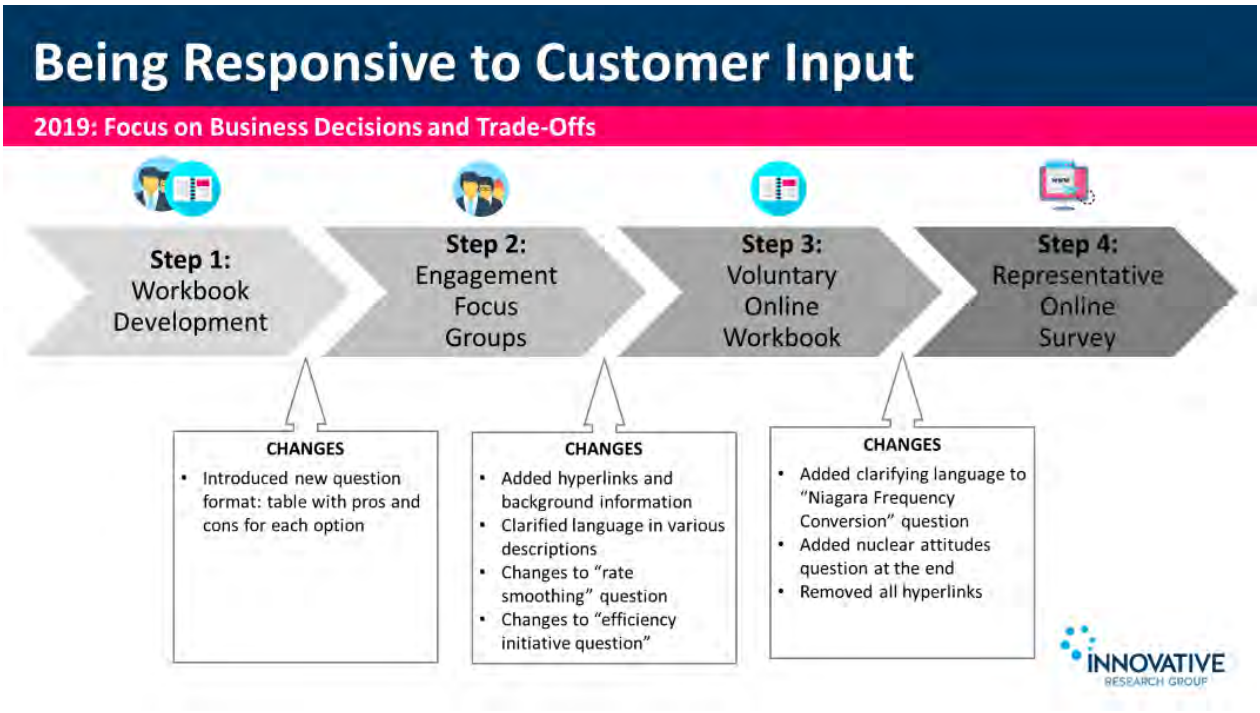
3.3 Customer Engagement Process Overview (Phase 2)

With OPG's planning further advanced, Phase II (2019) re-engaged with customers. This round of engagement was able to solicit customer feedback on specific investment decisions and explore trade-offs in relation to specific programs and the associated bill impacts, as well as the pacing of investments.

3.3.1 Workbook Development

Based on the insights gained in Phase I, INNOVATIVE and OPG staff worked with different business units to develop questions about identified business decisions with potential trade-offs that may impact customers. The core challenge was to translate these business decisions into consultation materials that a typical customer could understand. All consultation materials were combined into a workbook designed to provide meaningful feedback.

Again, great effort went into ensuring that the workbook provided an appropriate amount and substance of information in order to enable customers to express an informed opinion about OPG's business decisions. Throughout this phase, a new and innovative way to present technical questions with complex tradeoffs emerged. These questions were presented in a table format that showed pros and cons right next to the response options, rather than separately in the main text.



3.3.2 Customer Engagement

Similar to Phase 1, the 2019 customer engagement combined different methods to engage residential and business customers across the province.

1. The **focus groups** took place prior to the other engagement and, like in Phase 1, allowed customers to "colour outside the lines" through qualitative feedback. The groups were held in four different locations across Ontario, and participants were randomly recruited via telephone. The main activity in these groups was for participants to individually work through a print version of the workbook. Participants then had the opportunity to provide written comments and discuss each page of the workbook. The feedback gathered from these focus groups helped inform the subsequent phases of the customer engagement, including the online workbook and online surveys.
2. The **online workbook** represents the second qualitative component of OPG's 2019 customer engagement. It was launched after the completion of the focus groups and created an open, voluntary process that allowed any Ontario resident who wanted to be heard an opportunity to express themselves. This online workbook, which was a modified version of the print workbook used in focus groups, was accessible for one month (between April 6th and May 6th, 2019). Like the previous year, it offered an interactive platform to both educate customers about OPG and the electricity system and collect detailed feedback on specific business decisions. OPG effectively promoted the online workbook using a social media campaign, as well as through local newspapers, which resulted in **4,390** unique responses. Feedback gleaned from the online workbook helped inform the design of the representative online surveys.
3. The **online surveys** were a new element in OPG's 2019 customer engagement and replaced the telephone surveys that were conducted to obtain representative results during Phase 1. Given the large amount of information, which is complex and technical in nature, INNOVATIVE asked focus group participants for their preferred method of engagement. None of the participants thought the information could as effectively be presented on the telephone. They insisted that visuals were necessary to comprehend the material and come to informed opinions. Combined with the experience of the Phase 1 telephone survey, which proved to be challenging in the absence of customer lists, the decision was made to use online panels to conduct a representative survey.

   Great effort went into validating both the residential and business samples to ensure that they are representative of the broader population. The three biggest advantages of online surveys are: 1) the ability to use visuals to convey information, 2) giving respondents the opportunity to complete the survey at their own speed, and 3) the cost being a fraction of telephone surveys. The fact that online surveys are more cost effective enabled INNOVATIVE to double the sample size, compared to the telephone survey in Phase 1. **Again, this element of the engagement provided residential and business customers the "final say" on the topics discussed with thousands of customers over the course of the consultation.**

3.4 Customer Engagement Diagnostics

Customers also had the opportunity to provide feedback on OPG's engagement process, especially on how the generator is using customer feedback to inform its plan. When asked if OPG's customer engagement process seemed like the right approach of the wrong approach to building OPG's plan, a clear majority feel that it is the *right way*.

Feedback on Building OPG's Plan	Residential N=1,200	Business N=400
Right approach	76%	78%
Wrong approach	6%	11%
Not sure/Don't know	18%	11%

Participants approve of OPG's customer engagement strategy and those who completed the online survey tend to have a favourable impression of the workbook. Moreover, while most Ontarians have little knowledge to start, diagnostics show that the workbook delivers fundamentals and allows participants to express informed decisions.

Overall Impression of the Workbook	Residential N=1,200	Business N=400
Favourable	75%	77%
Unfavourable	15%	14%
Don't know	11%	9%

The workbook also found the right balance of information. A clear majority stated that the workbook contained "just the right amount" of information.

Volume of Information	Residential N=1,200	Business N=400
Too much	10%	10%
Just the right amount	78%	74%
Too little	12%	17%

3.5 Summary

OPG's 2018/19 Customer Engagement successfully overcame the hurdle of not having direct access to customer contacts via customer lists. In addition to the almost 3,000 randomly recruited customers who participated in the engagement, more than 7,000 customers fully completed the voluntary online workbook. OPG's social media campaign proved to be effective at raising awareness and motivating Ontarians to participate in the consultation.

This two-wave engagement was designed to support OPG's business planning process. An initial phase designed to provide insights in customer needs and preferences for outcomes at the start of OPG's business planning was completed in 2018. After reviewing the results of the first phase, planners selected examples of specific investment decisions that represented tradeoffs between the outcome priorities identified by customers. The second phase asked customers for their views on these business and investment decisions OPG must consider for its 2022-2026 business plan.

During the workbook development phase, a new question format was developed that presented business choices in a clear and concise table format. Rather than describing the pros and cons of each option in the descriptions, the tables displayed these options along with overall costs and bill impacts for residential/business customers, as well as pros and cons of each.

By moving to an online format for the second phase, the engagement allowed customers to complete the representative survey at their own speed and on their own schedule.

Specific attention has been paid to how Low-Income Energy Assistance Program (LEAP) qualified customers' opinions vary from the broader customer base. Reflecting their financial capacity, LEAP-qualified customers are less supportive of investments than the average customer but still generally support those proposed investments.

Participants generally support investing in OPG's regulated assets. Despite price concerns, customers are generally willing to consider paying more to invest in renewing aging equipment and proactively invest in system capacity and reliability. When making concrete investment decisions, customer choices reflect their initial importance rating of priorities with safety and reliability taking precedence over keeping the price down. Generally, small business customers are less willing to consider paying more to make these investments.

Participants had a favourable impression of the engagement. They felt the workbook found the right balance between too much and too little information. With more than 7,000 responses to the voluntary workbook, customers showed they are willing and able to invest their time and energy to contribute to the planning of their electricity system.

Filed: 2020-12-31
EB-2020-0290
Exhibit A2-2-1
Attachment 4
Page 20 of 421

INNOVATIVE RESEARCH GROUP

Online Survey Report - Residential
2019 Customer Engagement

ONTARIO POWER GENERATION

May 2019

STRICTLY PRIVILEGED AND CONFIDENTIAL

About This Report

This report presents the results from the **representative online survey** that was conducted among **residential customers**, as part of OPG's 2019 customer engagement process.

To provide context to how customer feedback was collected, this report contains the original workbook pages used in the survey.

Workbook Pages

Pages in this report that are taken from the online workbook are denoted by watermarks. Please note that some of these pages include graphs and charts; these do not represent data collected from the online survey, but were used to equip respondents with the facts and figures needed to provide informed opinions.

The workbook pages are shown in the order they were presented to respondents.

Results and Segmentation

The results are presented after the workbook page wherein a particular question was asked.

This report shows the overall results and breaks down a particular response of interest into key demographic and psychographic categories. In this report, segmentation is provided for **region**, **bill impact**, **LEAP qualification**, **consumer protection**, **support for nuclear**, and **bill size**.

These categories were chosen to identify vulnerable customers who are particularly affected by environmental factors outside of OPG's control, such as their financial well-being and confidence in regulatory agents. Attitudes towards nuclear power generation was included to account for pre-existing views.

Online Survey Methodology

Residential

Field and Design

This report contains the findings from an Innovative Research Group (INNOVATIVE) online survey conducted amongst Ontario residents between **April 18th and 25th, 2019.**

The survey was fielded among Ontarians who are **responsible for paying their electricity bill**. The sample was provided by Lucid, a leading online sample provider.

INNOVATIVE provides each panelist with a unique URL via an email invitation so that only invited panel members are able to complete the survey and panel members can only complete a particular survey once.

The sample has been weighted by age, gender and region using 2016 Statistics Canada Census data to reflect the actual demographic composition of the Ontario population.

This is a representative sample. Targets were set based on known characteristics of the population to ensure a proper reflection of the population. The sample is then weighted by these characteristics. However, since the online survey was not a random probability based sample, a margin of error can not be calculated. It is not statistically valid to apply margins of error to most online samples.

Note: *Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers. Caution interpreting results with small n-sizes.*

Residential Sample Validation

Residential

Targets for the residential sample were set based on region and age/gender. The sample was weighted to ensure it was representative across those known characteristics.

Region	Target	Unweighted N	Weighted N
Toronto	251	265	251
West Metro Belt	162	157	163
North/East Metro Belt	149	158	149
Southwest	138	142	138
South Central	172	167	172
East	152	155	152
Central	100	94	100
North	76	136	76
Total	**1200**	**1274**	**1200**

Age & Gender	Target	Unweighted N	Weighted N
Male 18-34	166	197	166
Male 35-54	200	191	200
Male 55+	212	213	212
Female 18-34	165	193	165
Female 35-54	214	235	214
Female 55+	243	245	243
Total	**1200**	**1274**	**1200**

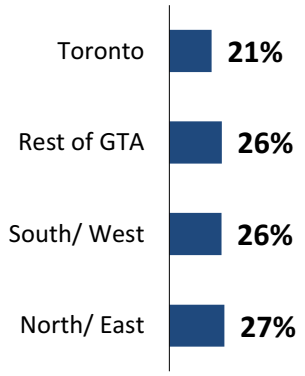
INNOVATIVE RESEARCH GROUP

Demographics

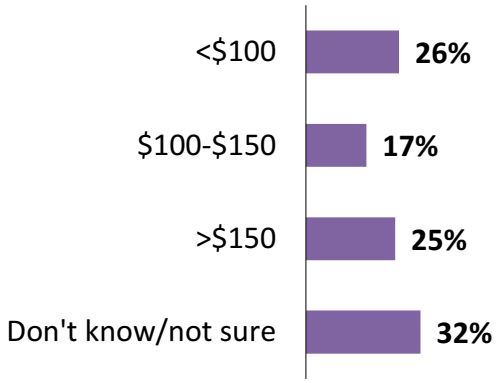
Respondent Profile

Residential

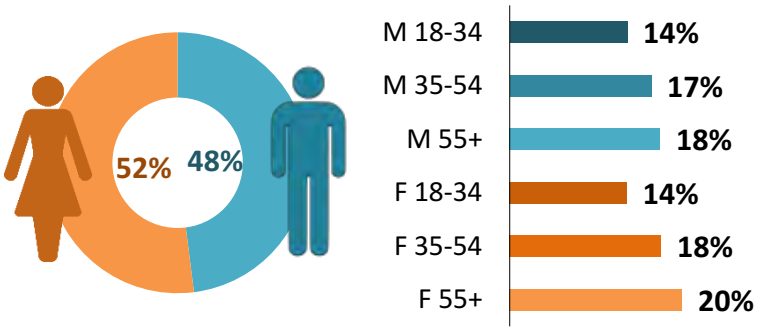
Region



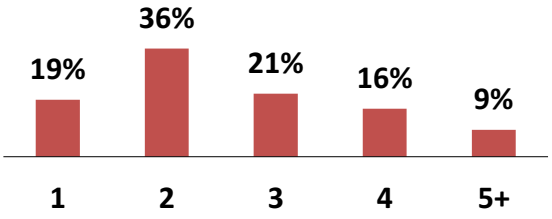
Bill Size



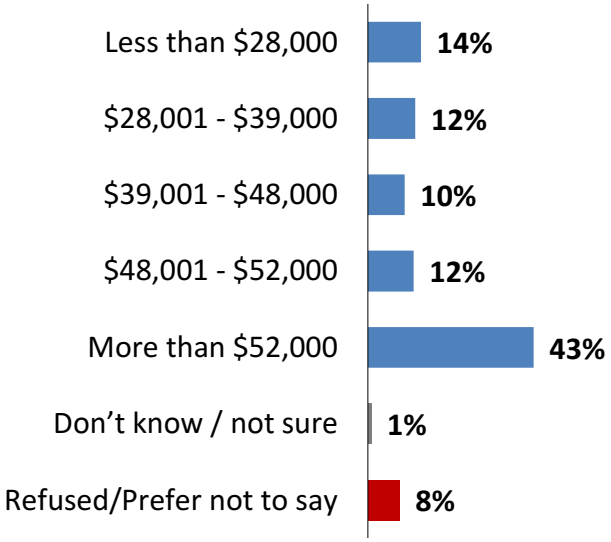
Age-Gender



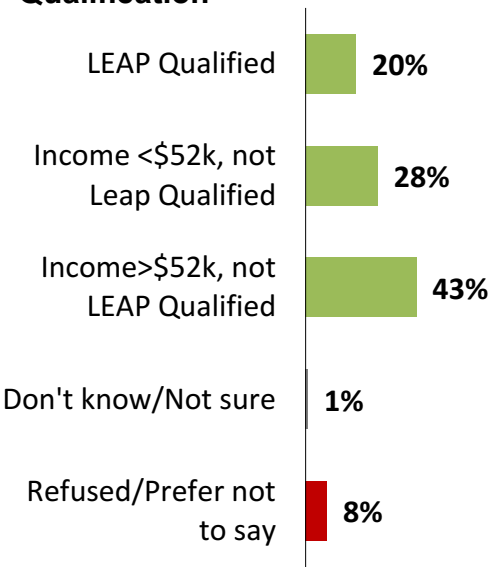
Household Size



Household Income



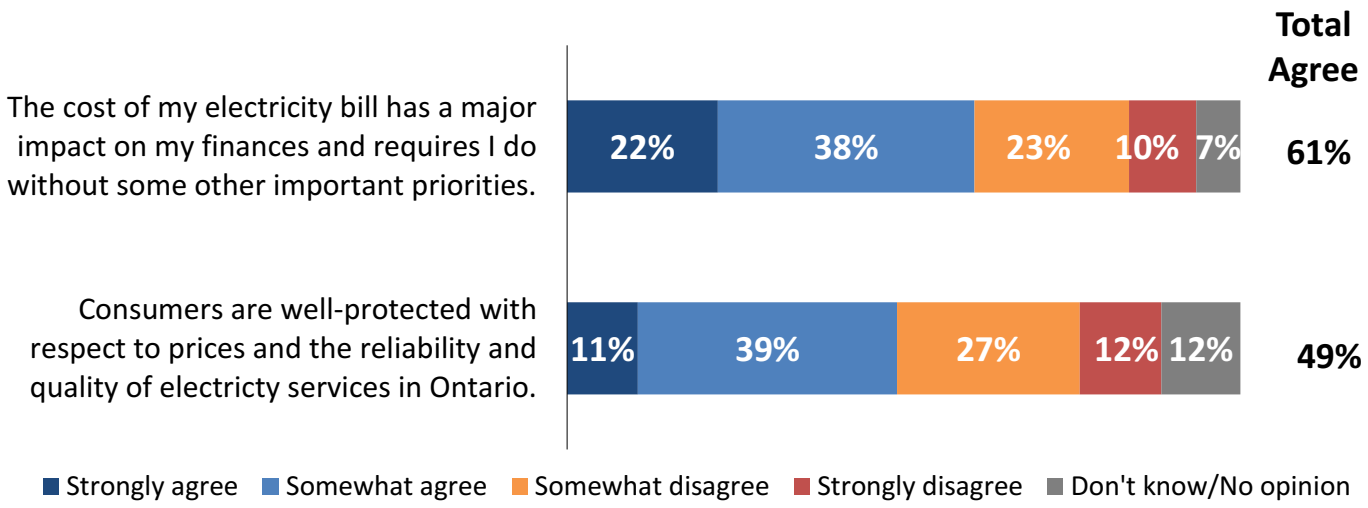
LEAP Qualification



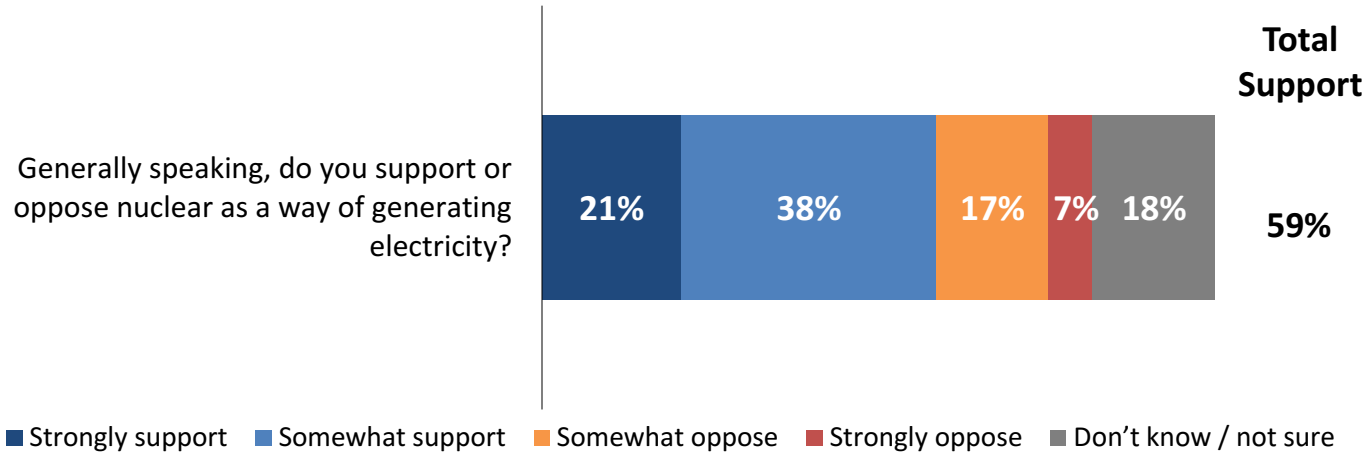
Segmentation

Residential

Q To what extent do you agree or disagree with the following statements?
[asked of all respondents, n=1,200]



Q Generally speaking, do you support or oppose nuclear as a way of generating electricity?
[asked of all respondents, n=1,200]



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Background Information

Electricity 101

Understanding OPG's Role in the Electricity System

Residential

Ontario's electricity system is owned and operated by provincial, municipal, and private corporations across the province. It is made up of three key components: **generation**, **transmission** and **distribution**.

Generation

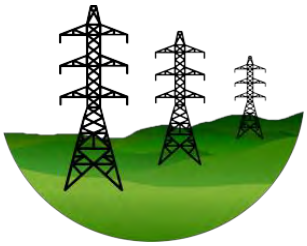
Where electricity comes from.

Ontario gets its electricity from a mix of energy sources. About half of our electricity comes from nuclear power. The remainder comes from a mix of hydroelectric, natural gas, wind and solar.

Most of Ontario's electricity generating stations are located in the southern part of the province close to where the demand for power is greatest. The majority of these power stations are owned and operated by **OPG**, a government owned company that generates about half of Ontario's electricity. The other half comes from multiple generators who have contracts with the grid operator to provide power from a variety of sources.

Transmission

Electricity travels across Ontario.



Once electricity is generated, it must be transported to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. The province has more than 30,000 km of transmission lines.

Local Distribution

Delivering power to homes and businesses in your community.

Your local utility is responsible for the distribution of electricity. This local distribution system includes transformer stations of various sizes and designs that decrease the voltage of the electricity so it can be used in your home or business.

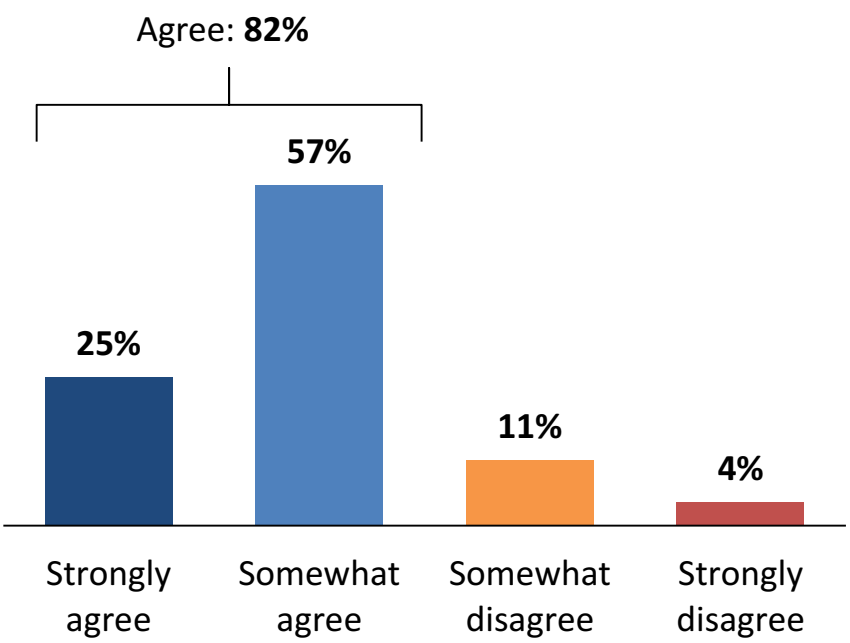
WORKBOOK PAGE

Electricity 101

Understanding OPG's Role in the Electricity System

Residential

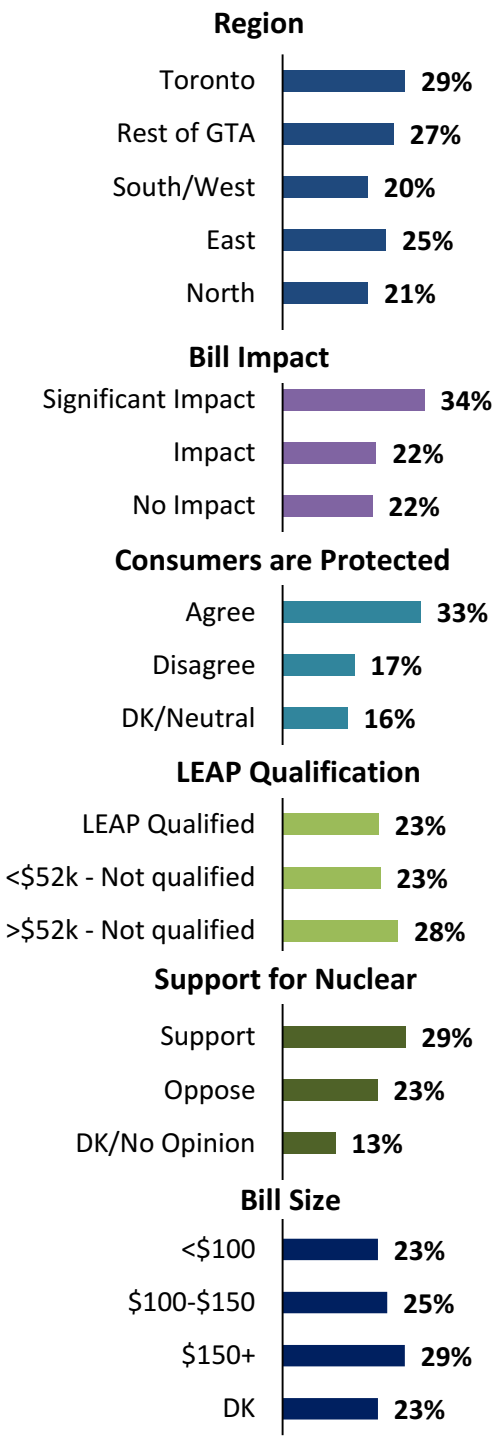
Q To what extent do you agree or disagree with the following statement?
I generally understand how the various parts of the electricity system work together.
[asked of all respondents, n=1,200]



Note: 'Don't know' (3%) not shown.

Segmentation

*Those who say "**Strongly agree**":*



INNOVATIVE RESEARCH GROUP

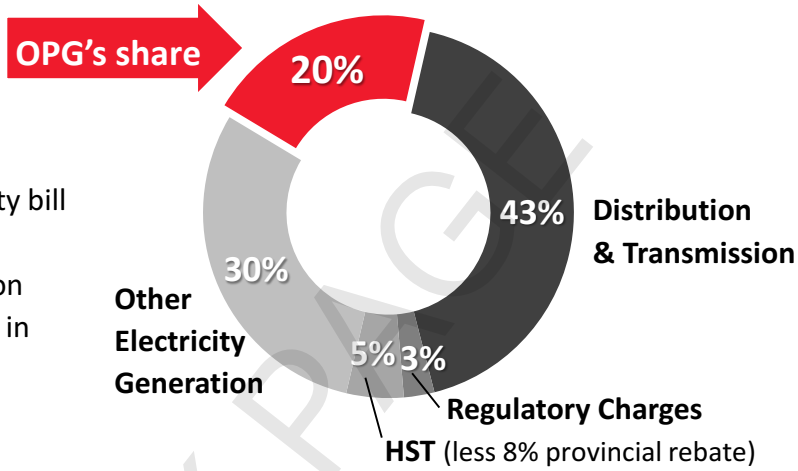
How much does electricity generation cost me?

Residential

How much of my bill goes to OPG?

For the typical residential customer:

- About half of the monthly electricity bill goes to pay for power generation.
- Historically, 20% of the monthly electricity bill goes to pay for OPG's power generation. However, OPG's share entirely depends on consumption and can be higher or lower in any given month.
- The rest of the bill goes to pay for other generators, transmission companies, distribution companies, regulatory agencies, and government taxes.

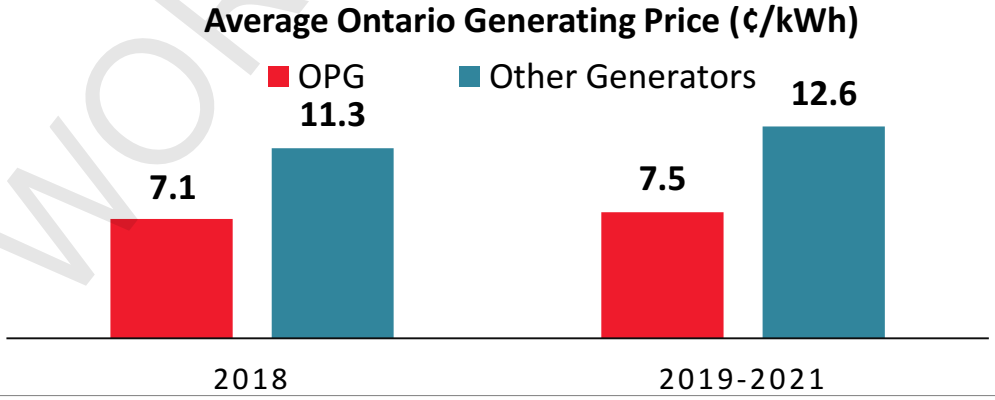


Who sets electricity rates?

The Ontario Energy Board sets the prices that OPG can charge its customers for most of the electricity it generates. OPG is the only "regulated" electricity generator in Ontario. For the other generators, electricity prices are set in their contracts.

How much does OPG's energy cost compared to others?

The electricity OPG generates costs you about 40% less than the average price paid to other generators in the province.



WORKBOOK PAGE

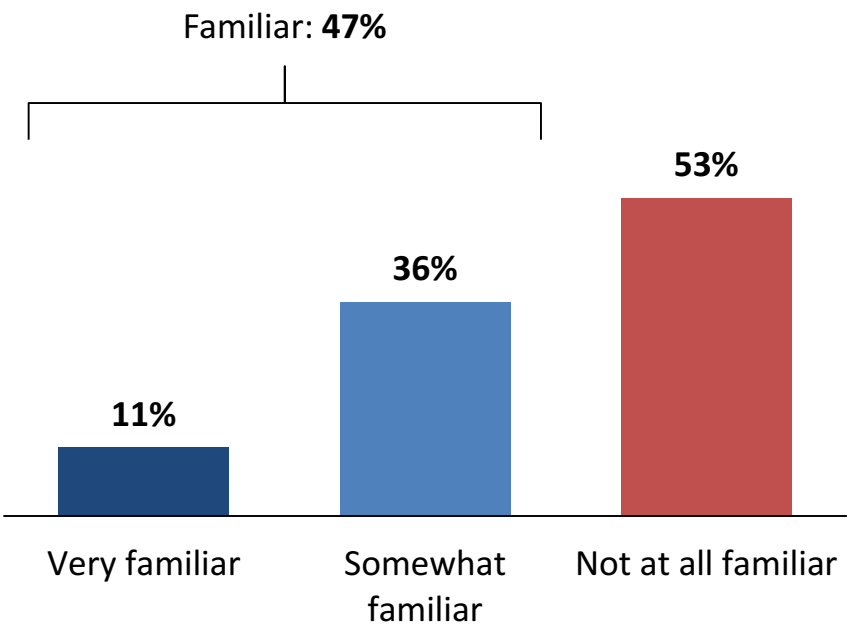
How much does electricity generation cost me?

Residential

Familiarity with OPG's Share of the Bill

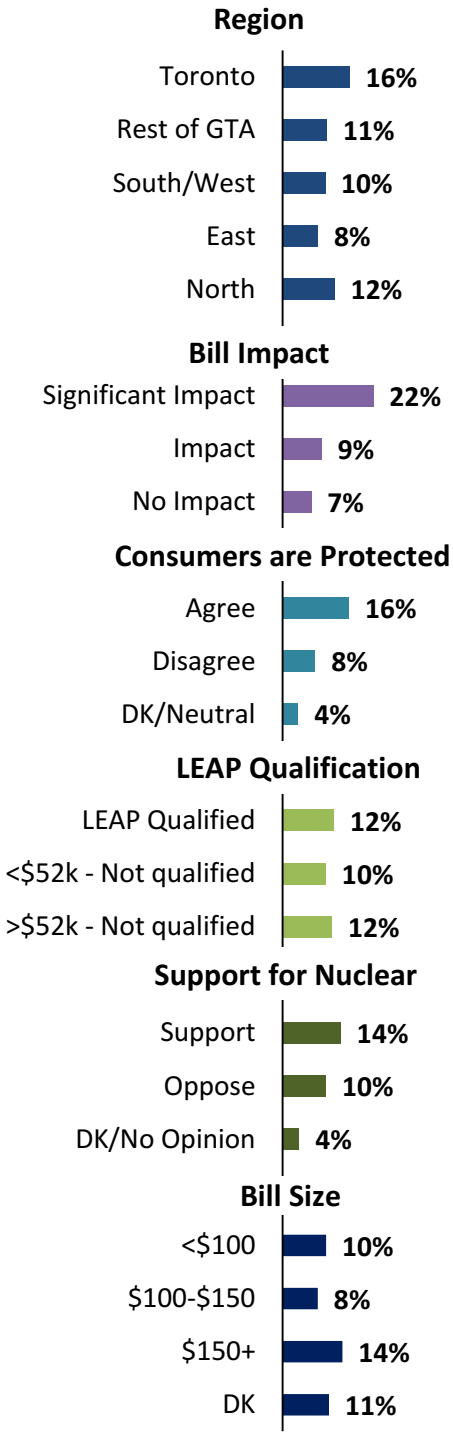
Q Before this workbook, how familiar were you with the percentage of your electricity bill that goes to OPG?

[asked of all respondents, n=1,200]



Segmentation

*Those who say "**Very Familiar**":*



INNOVATIVE RESEARCH GROUP

Who is OPG?

Residential

- Ontario Power Generation is owned by the Province of Ontario.
- It was established in 1999 to operate the electricity generation facilities of the utility that was previously known as Ontario Hydro.
- Today, OPG is one of the largest and most complex generating companies in North America with about 9,000 employees across the province.

OPG's regulated electricity comes from two sources:

Hydroelectric

More than one third of the electricity that OPG produces comes from hydroelectric facilities located across the province.

This renewable resource has fueled Ontario's economic growth since the beginning of the 20th century and it remains an important contributor of clean, low-cost power in the province.

Nuclear

OPG's two nuclear generating stations play a significant role in Ontario's energy mix. **Darlington** and **Pickering Stations** operate continuously to meet the minimum level of power demand for the province while emitting virtually no air pollution.

OPG began the refurbishment of Darlington Station in October 2016. The Darlington Refurbishment is a ten-year mega project that will extend the station's life by about another 30 years.

WORKBOOK PAGE

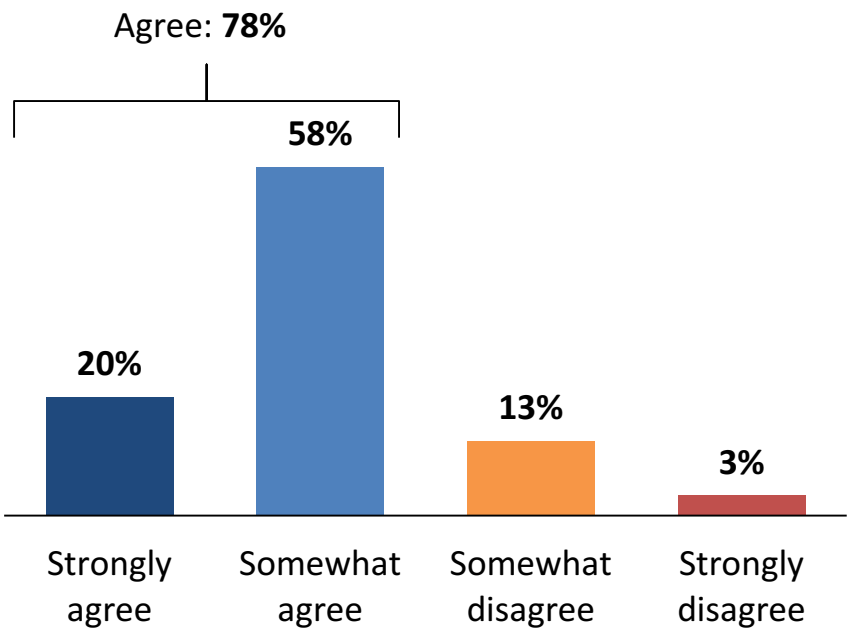
Who is OPG?

Residential

Q To what extent do you agree or disagree with the following statement?

I have a general understanding of who OPG is.

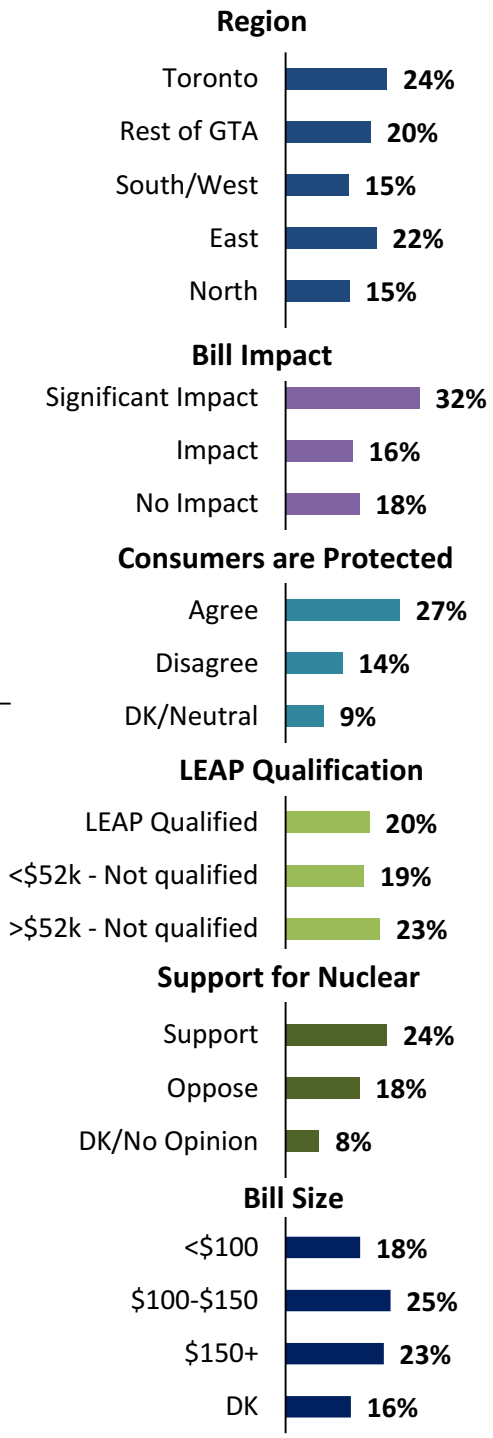
[asked of all respondents, n=1,200]



Note: 'Don't know' (6%) not shown.

Segmentation

*Those who say "**Strongly agree**":*



INNOVATIVE RESEARCH GROUP

Building OPG's Plan

Residential

The purpose of this consultation is to get your input as OPG prepares its plan.

This plan must satisfy OPG's mandate as stated in the Memorandum of Agreement with the Province.

The goals in OPG's plan must follow the policy direction set by Ontario's Ministry of Energy. This includes OPG's role in Ontario's Long-Term Energy Plan.

As required by the Ontario Energy Board, OPG must also consider the views of customers like you as it develops its plan.

How does OPG consider customers' views in its plan?

OPG has developed a five phase approach to gathering and responding to customer feedback:

✔ **1. Identify customer priorities:** In 2018 OPG asked customers from across Ontario about their needs and priorities for electricity generation.

✔ **2. Use customer feedback to guide development of plan:** Key findings from the initial customer engagement informed the planning process.

You are here

3. Collect customer feedback on specific decisions

Now OPG is returning to customers to get feedback on specific business choices it needs to make.

4. Preparing the detailed plan: Prepare detailed plan based on customer feedback.

5. Submit the plan to the Ontario Energy Board: File the plan, this workbook, and a summary report with the OEB where it will be examined by the OEB, consumer advocates, and other independent parties in a public hearing on OPG's regulated prices.

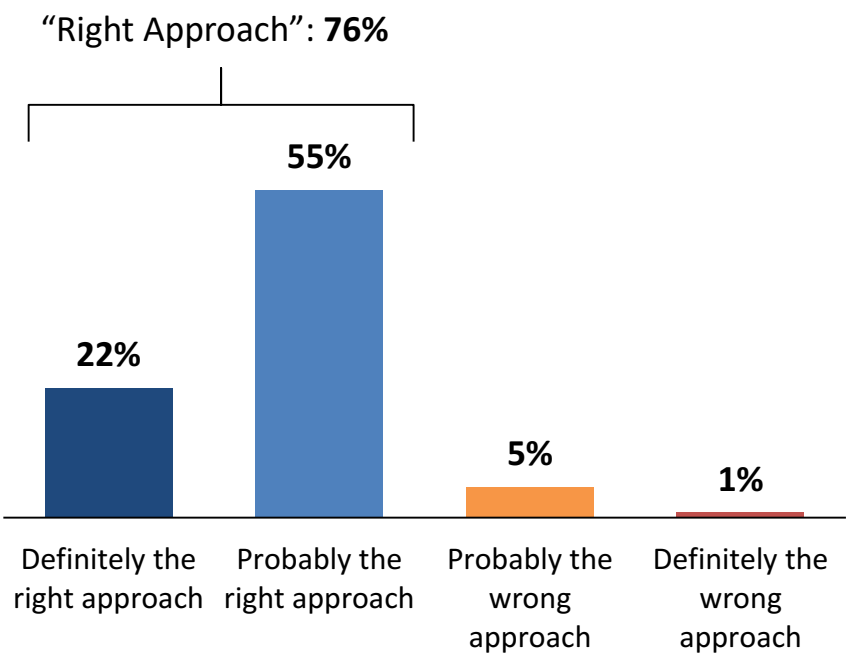
WORKBOOK PAGE

Building OPG's Plan

Residential

Q Does this seem like the right approach or the wrong approach to building OPG's plan?

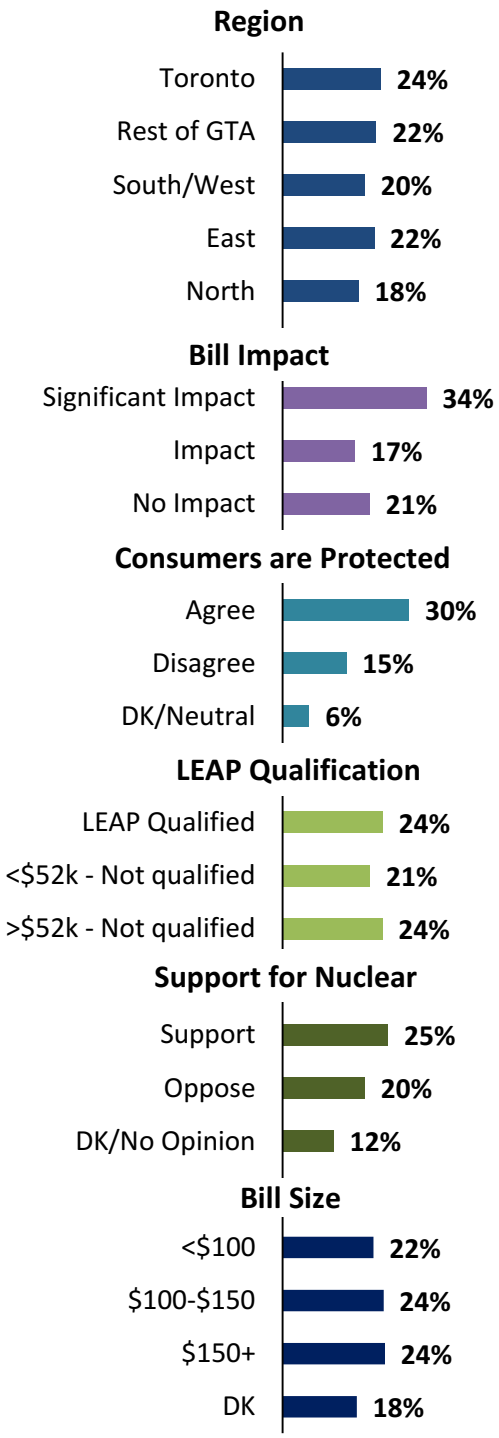
[asked of all respondents, n=1,200]



Note: 'Don't know' (4%) and 'Not sure' (14%) not shown.

Segmentation

*Those who say "**Definitely Right Approach**":*



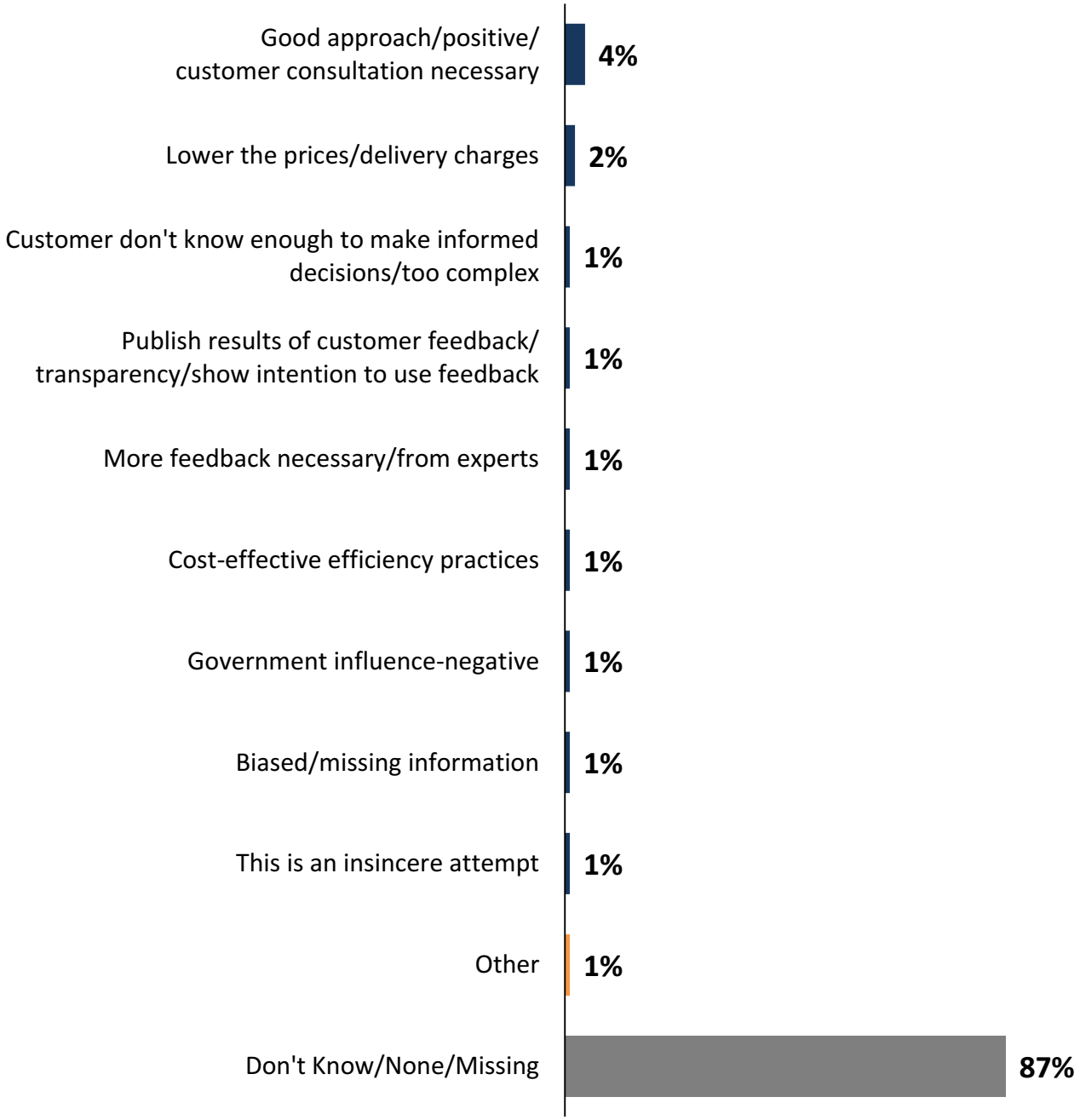
INNOVATIVE RESEARCH GROUP

Building OPG's Plan

Residential

Q Is there anything in particular you would change about this approach or any other comments you would like to make?

[asked of all respondents, n=1,200]



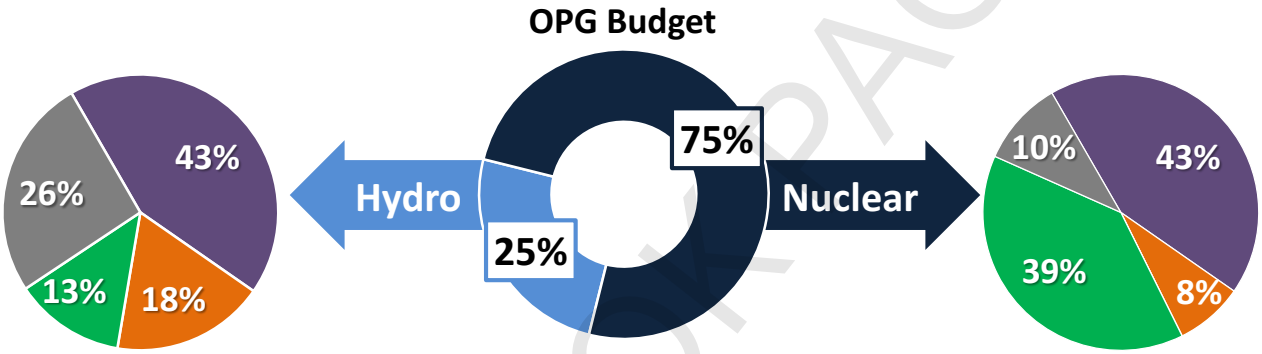
INNOVATIVE RESEARCH GROUP

Where does the money go?

Residential

The efficient and cost-effective operation of its facilities is one of OPG's key objectives established by government. OPG is also mandated to operate its generating assets safely and in accordance with all applicable safety and environmental regulations and standards. Any profits are either reinvested in the business or paid out to the Province of Ontario.

OPG manages separate budgets for hydroelectric and nuclear generation. The cost of OPG's Hydro business is $1.3 billion per year. The nuclear business costs a total of $3.2 billion per year.



Maintenance	Spending required to keep the existing stations and equipment working at the current level, including both normal daily costs and project investments.
Value Enhancing	Spending that would allow OPG to get more out of existing stations (e.g. refurbishment of Darlington Station), by reducing costs, improving efficiency, or increasing the amount of power generated.
Operating Expenses	Ongoing costs to run the business (e.g. nuclear and hydroelectric station operations, security, engineering, radiation protection services, and support functions such as leased real estate, IT services, finance, human resources, and procurement). More people are needed to run nuclear than hydroelectric stations, so operating expenses represent a larger share of the nuclear budget.
Taxes, Fuel, and Other	Income tax, property tax, corporate insurance, water usage taxes and uranium costs, as well as cost of nuclear station shutdown and handling and disposal of used nuclear fuels and other nuclear waste.

WORKBOOK PAGE

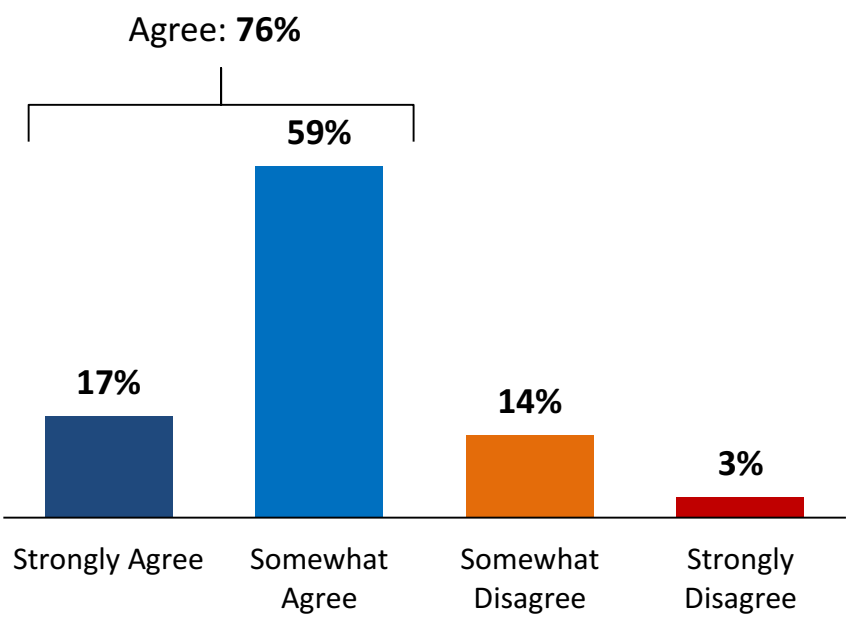
Where does the money go?

Residential

Q To what extent do you agree or disagree with the following statement?

I have a general understanding of how OPG spends the rates I pay.

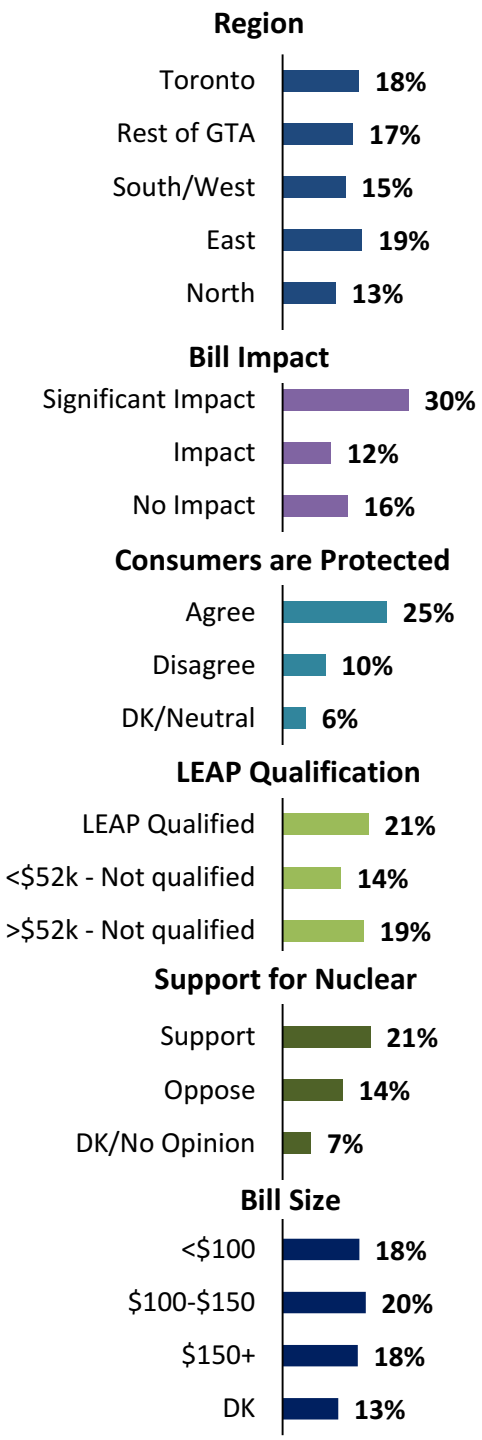
[asked of all respondents, n=1,200]



Note: 'Don't know' (7%) not shown.

Segmentation

*Those who "**Strongly Agree**":*



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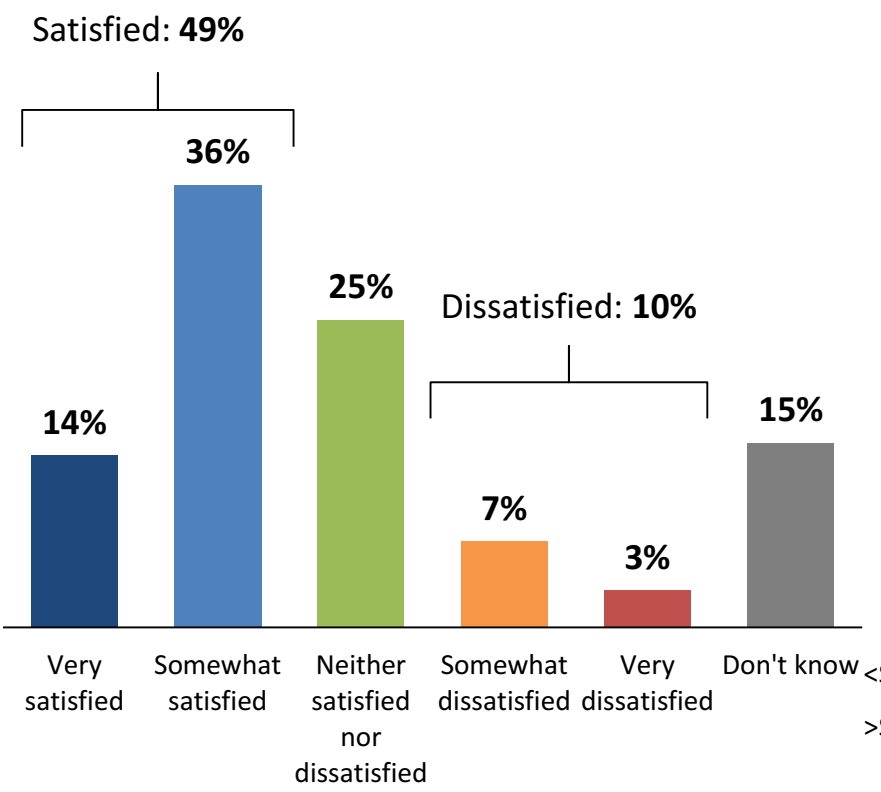
Satisfaction with OPG

Satisfaction with OPG

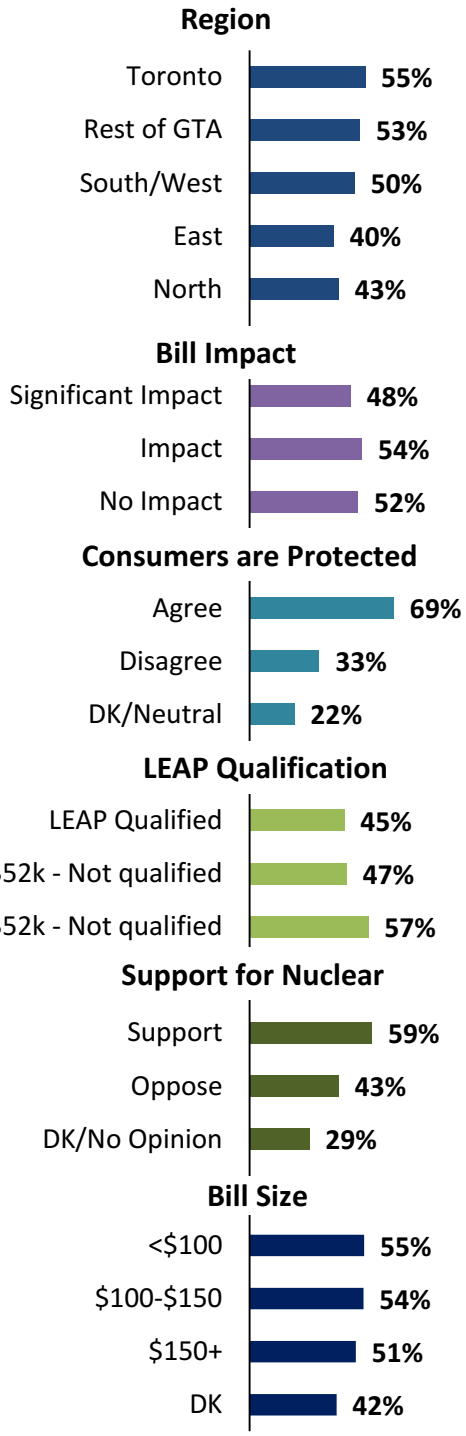
Residential

Q Now that you've read a bit more about OPG and how it fits into Ontario's electricity system, how satisfied are you with OPG's performance?
[asked of all respondents, n=1,200]



Segmentation

*Those who say "**Satisfied**":*

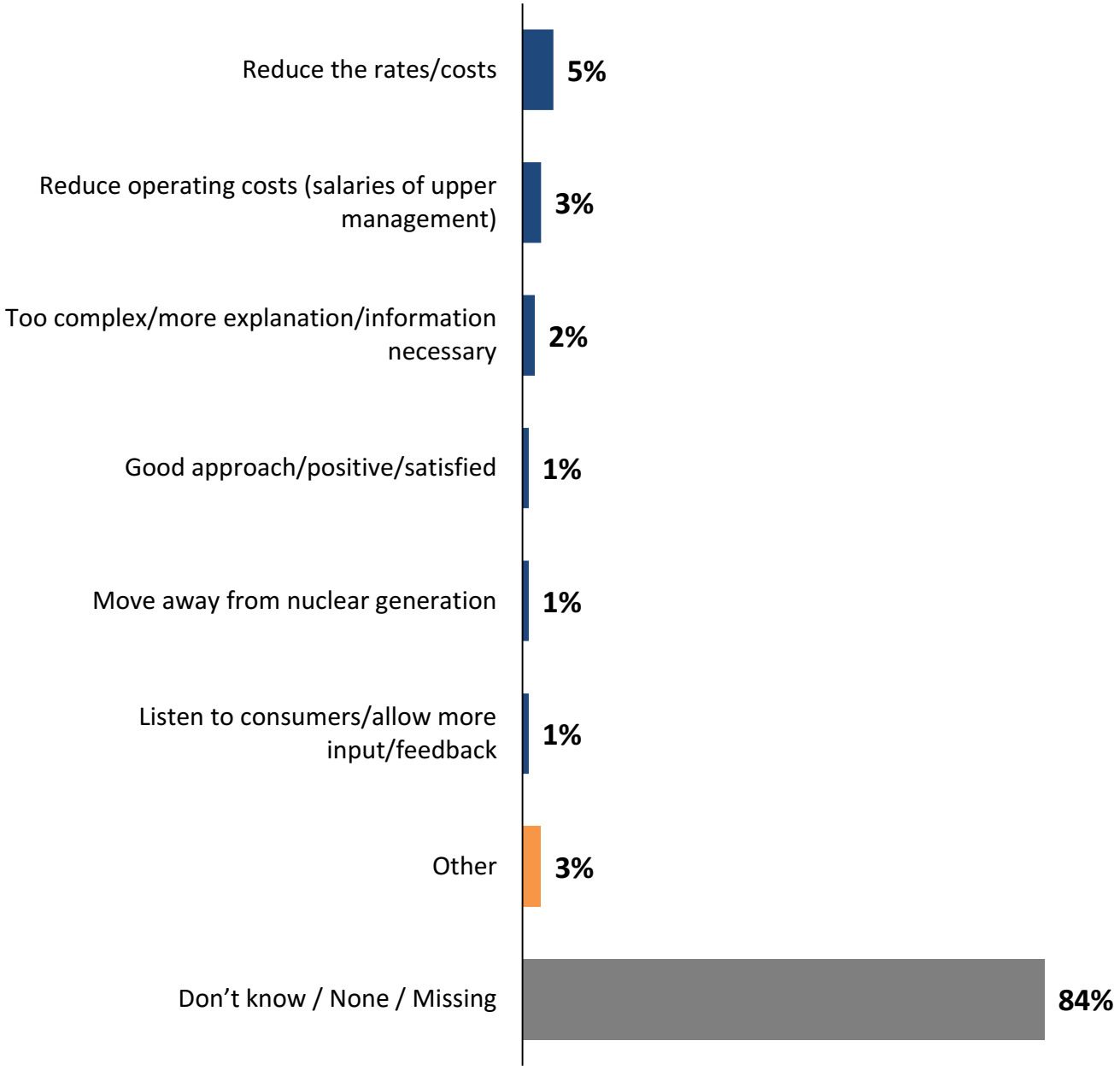


INNOVATIVE RESEARCH GROUP

Suggestions for Improvement

Residential

Q Is there anything in particular that OPG could do better for you?
[asked of all respondents, n=1,200]



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Making Choices

Rate Smoothing Options

Residential

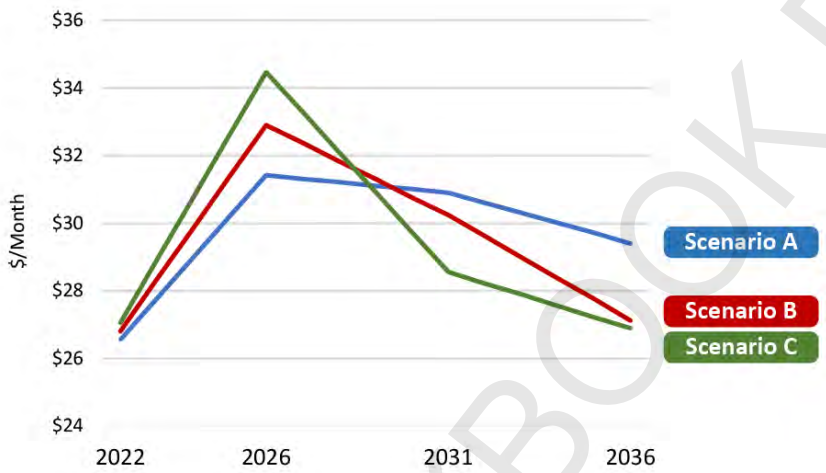
Although it takes years of construction before a major generating station is ready to produce electricity, consumers only pay for those costs once a station is completed and operating. This can create "spikes" in electricity prices. To avoid those spikes, OPG is legally required to propose some form of "rate smoothing" in its next application to the OEB.

OPG wants to hear from you how much rate smoothing you would like to see—a little or a lot?

What does rate smoothing mean?

Rate-smoothing spreads costs over a longer period, avoiding spikes in electricity rates in particular years. OPG can smooth-out increases in its rates by borrowing money to pay for some costs, instead of collecting the cost from customers. However, OPG must pay interest on that borrowed money, which is eventually paid through electricity prices.

The basic trade-off is: Would you prefer paying more now, but less over time? Or less now, but more overall? The chart below shows three example rate smoothing scenarios:



This smoothing only applies to OPG's share of the bill, based on a period of time until 2036. The typical customer bill is based on a typical household monthly consumption (750kWh) and on the OEB "Bill Calculator" for estimating monthly electricity bills.

Q9. Which of the rate smoothing options presented above would you prefer?

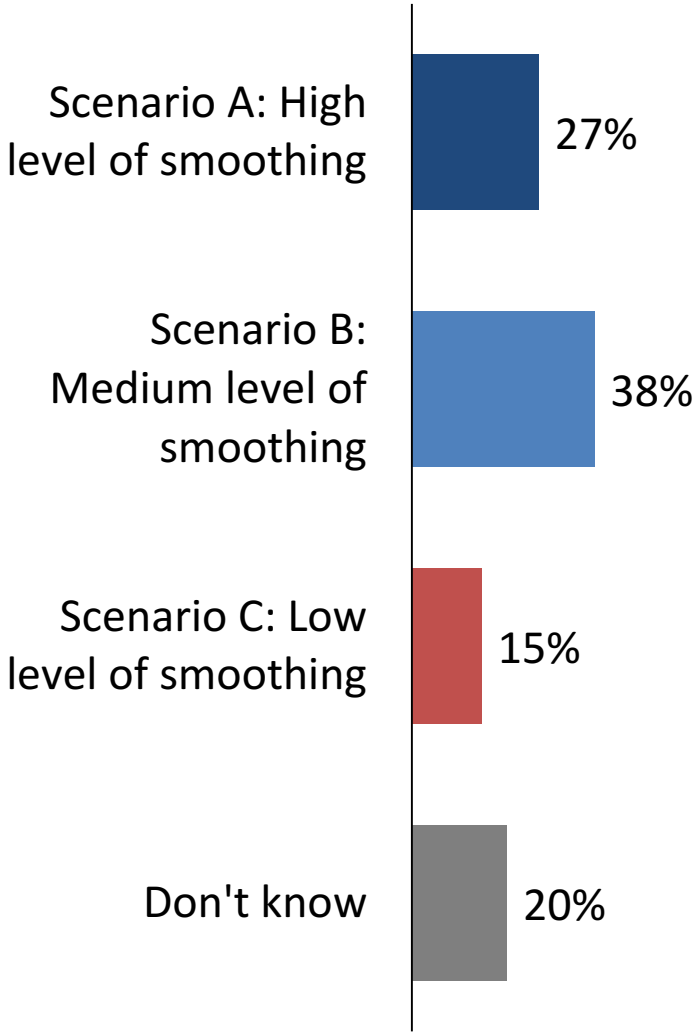
	Scenario	Bill increase	Interest cost
☐	Scenario A: High level of smoothing	Produces the steadiest bills.	Highest total interest costs (approx. $500M higher than Scenario B and approx. $1B higher than Scenario C).
☐	Scenario B: Medium level of smoothing	Produces steadier bills than Scenario C, but less steady bills than Scenario A	Total interest costs that are approx. $500M less than Scenario A, but approx. $500M higher than Scenario C.
☐	Scenario C: Low level of smoothing	Produces higher bills in the 2020s, but lower bills in the 2030s.	Lowest total interest costs of the three scenarios (approx. $500M lower than Scenario B and approx. $1B lower than Scenario A).
☐	Don't know		

WORKBOOK PAGE

Rate Smoothing Options

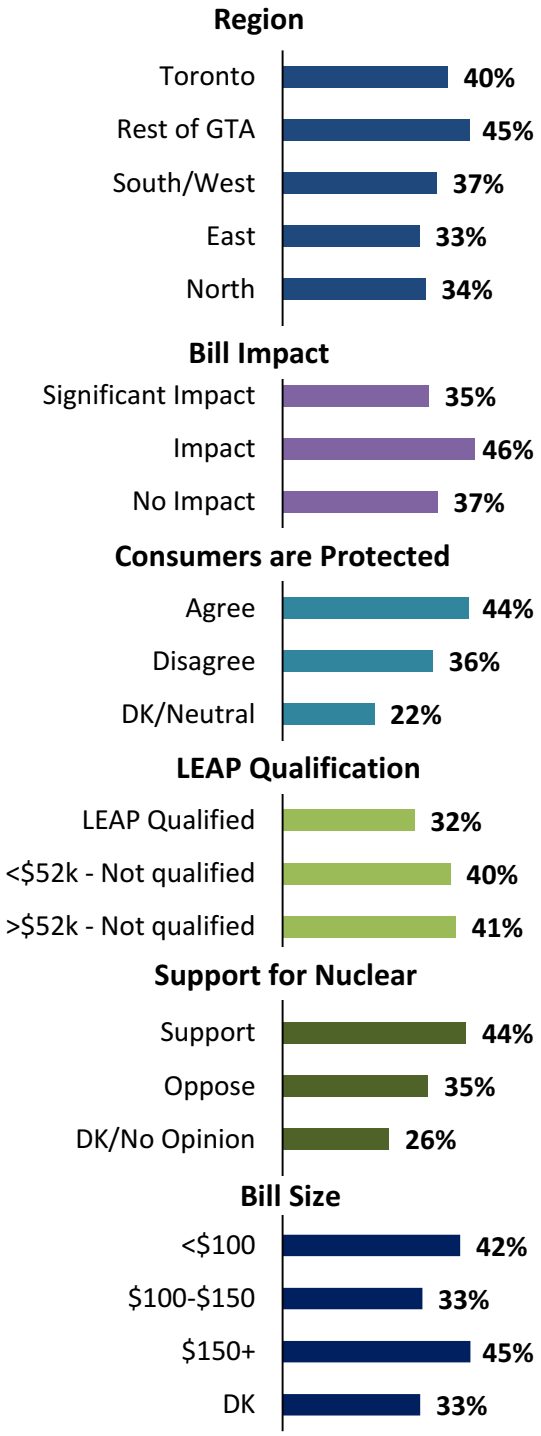
Residential

Q Which of the rate smoothing options presented above would you prefer?
[asked of all respondents, n=1,200]



Segmentation

*Those who say "**Scenario B**":*



INNOVATIVE RESEARCH GROUP

Investing in OPG's Hydroelectric Stations

Residential

How does OPG typically invest in its Hydroelectric Stations?

Every year, OPG invests in maintaining its Hydroelectric Stations across the province.
It also invests to increase the amount of electricity produced at some existing hydroelectric stations.

When making investment decisions, OPG has certain options but needs to remember some basic facts:

- Hydroelectric stations use water to generate very low-cost, low-emissions electricity. If these facilities aren't operating, other, more expensive or less clean generation methods may be needed.
- Hydroelectric generation equipment consists of large, custom-made parts. Ordering and installing replacement parts requires significant lead time.
- **Ontario currently has an energy surplus**. However, the province is likely to need more power in about 5 years.
- That means, increasing the capacity of existing hydroelectric stations is not absolutely necessary in the short term. However, because the system is currently not strained, now could be a good time to do the work on long-term projects that require hydroelectric stations to shut down while the work is underway.
- Doing the work sooner, rather than later, would reduce the risk of equipment failure and make the total cost more predictable, and possibly lower. However, doing the work now would also mean making major investments now and raising rates rather than delaying the costs.

For the 2020-2026 period, OPG must make decisions about the timing and pace of investments in its Hydroelectric Stations.

BOOK PAGE

Overhauling Hydroelectric Stations

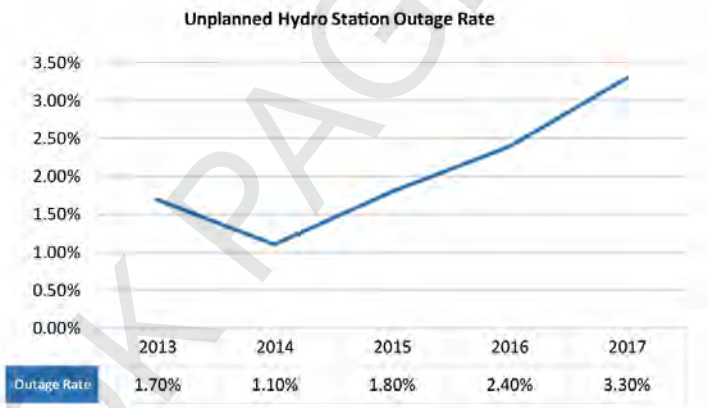
Residential

OPG must periodically take its Hydroelectric Stations out of service to do major maintenance and repair work. Whenever OPG takes its generators off-line, it is called an "outage." Outages can be planned in advance, or they can happen because of unexpected equipment issues.

The graph below shows how often OPG has had to take generators off-line unexpectedly. When OPG has to do unplanned maintenance work, it is generally more expensive than work that is planned in advance.

As shown in this graph, the frequency of these unplanned outages has been increasing at OPG's Hydroelectric Stations since 2014.

OPG believes it can reverse this trend and restore these outages to historic levels by increasing the pace of major maintenance projects (called "overhauls") at its Hydroelectric Stations.



Q11. In the 2020 to 2026 period, OPG plans to increase the number of overhauls it does each year. OPG must also decide on the right *pace* for that overhaul program. Which approach would you prefer?

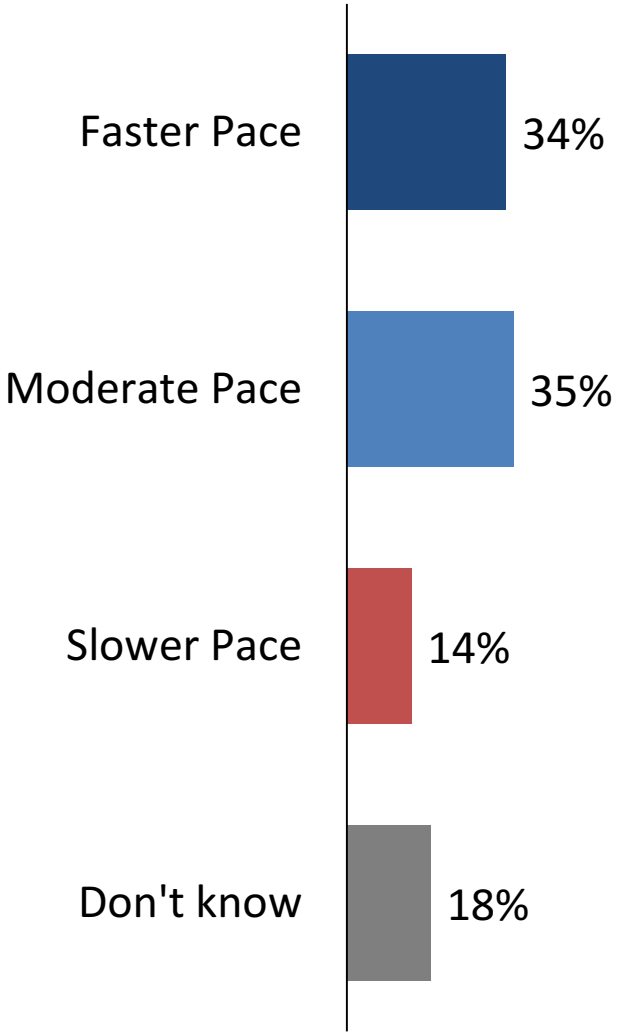
	Options	Pros	Cons
☐	**Faster pace** Average investment: **$86M** per year Bill impact*: **33 cents** per month	Most reliable hydroelectric generation at the fastest pace; good timing for major repairs	Higher investment costs in the short-term than other approaches
☐	**Moderate Pace** Average investment: **$72M** per year Bill impact*: **27 cents** per month	More reliable hydroelectric generation; repairs come at a reasonable time; lower investment costs in the short-term than in the faster pace	Less reliable hydroelectric generation; lower investment in overhauls will lead to higher costs and bills in the future
☐	**Slower Pace** Average investment: **$57M** per year Bill impact*: **22 cents** per month	Lower investment costs in the short-term than other approaches	Least reliable hydroelectric generation; lower investment in overhauls will lead to higher costs and bills in the future
☐	**Don't know**		

WORKBOOK PAGE

Overhauling Hydroelectric Stations

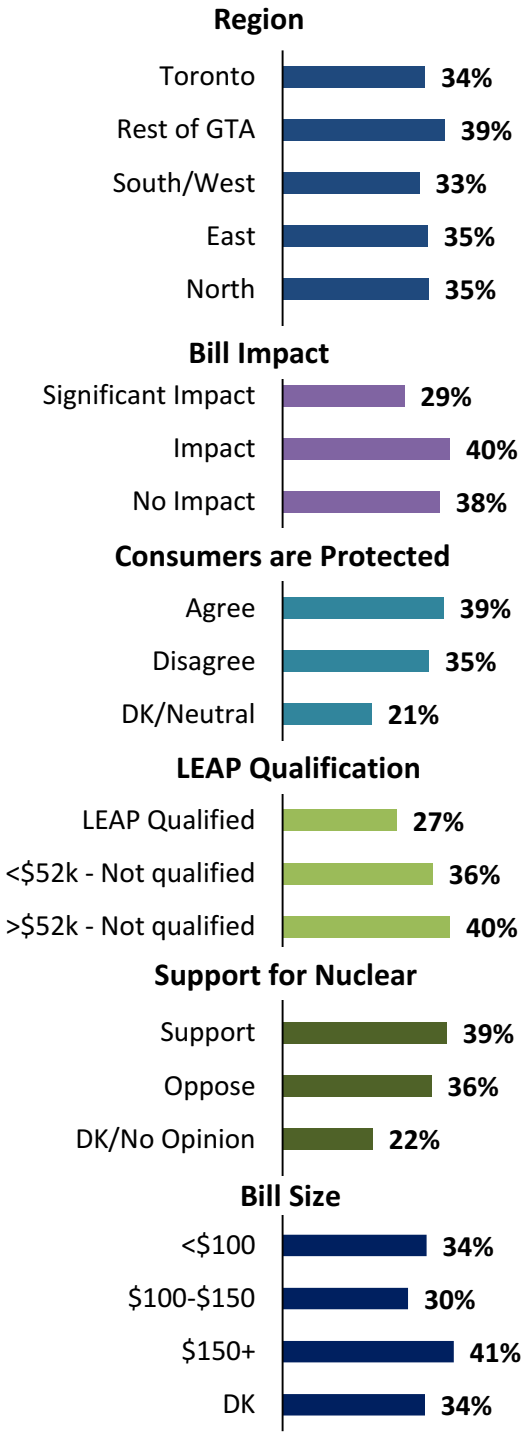
Residential

Q In the 2020 to 2026 period, OPG plans to increase the number of overhauls it does each year. OPG must also decide on the right pace for that overhaul program. Which approach would you prefer?
[asked of all respondents, n=1,200]



Segmentation

*Those who say "**Moderate Pace**":*



INNOVATIVE RESEARCH GROUP

Niagara Frequency Conversion Project

Residential

This is a project where the timing is flexible.

OPG's Sir Adam Beck I Station was the first hydroelectric station at Niagara Falls.

When the station started operating in 1922, North America's electric grid ran at a frequency of 25 Hz. In the 1950s, the grid converted to the 60 Hz standard that is still used today.

OPG converted most of the "units" at the Sir Adam Beck I station to the new standard, but kept two units on the old 25 Hz standard to power steel plants and other large industrial customers who continued to use the old frequency. The last of these customers were converted to the new standard in 2009. Since that time, the two 25 Hz units have been disconnected, because they are incompatible with the modern grid.

While in previous years, there was no room in the transmission system for more 60 Hz power, the system has recently been expanded. OPG has to decide whether to proceed with the project now or later. Regardless of the timing, both units will be converted together, because there are savings associated with converting both at the same time.

Q13. OPG is planning to convert the two 25 Hz units to the modern 60 Hz standard, and it needs to decide when to do the work. Which of the following options do you prefer?

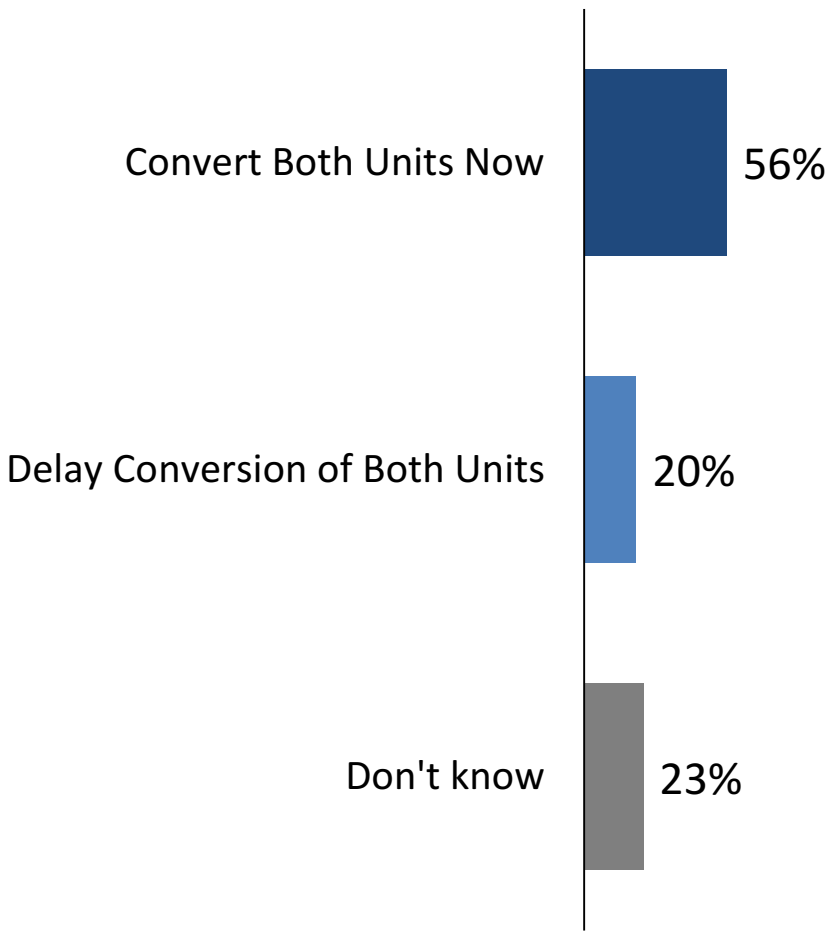
	Options	Pros	Cons
☐	**Convert both units now**	Increase the amount of power that can be generated at the station; access to unused capacity sooner, allowing more flexibility in the system while nuclear stations undergo refurbishment; additional power could help offset reduced production when Pickering Station is closed	Replacement costs of approximately $120 million would occur now, resulting in 10 cents more on a typical customer's monthly bill. The new power will be added while the provincial system may still have a surplus of power.
☐	**Delay conversion of both units**	Replacement costs would be deferred in the short-term. Depending on the provincial demand for electricity in the early 2020s, the delayed approach may better align with the needs of the grid.	Potentially higher total replacement costs; less opportunity to offset energy production while nuclear stations undergo refurbishment; additional power may not be available to offset reduced production when Pickering Station is closed
☐	**Don't know**		

WORKBOOK PAGE

Niagara Frequency Conversion Project

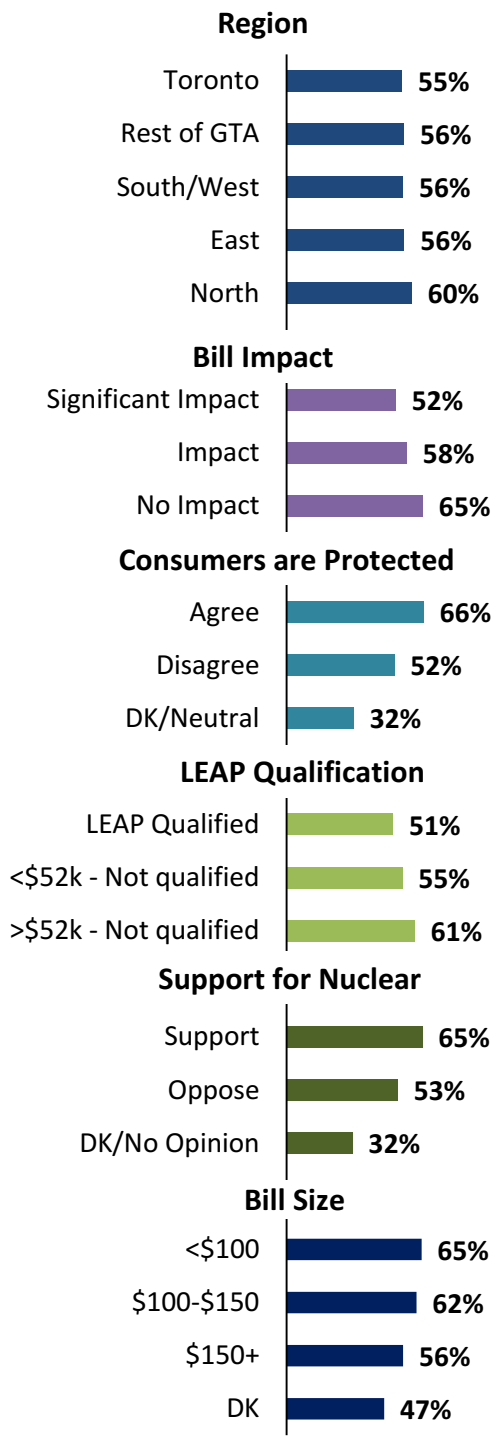
Residential

Q OPG is planning to convert the two 25 Hz units to the modern 60 Hz standard, and it needs to decide when to do the work. Which of the following options do you prefer? [asked of all respondents, n=1,200]



Segmentation

*Those who say "**Convert Now**":*



INNOVATIVE RESEARCH GROUP

Making the Pickering Station Site Available for Other Uses

Residential

What is Pickering Station?

Pickering Nuclear Generating Station is located on the shore of Lake Ontario, just east of Toronto.

The station has served Ontario for almost five decades, and currently provides approximately 14% of the province's electricity – enough to power a city of 1.5 million people. Pickering Station is also a major employer and contributes approximately $1.5 billion to Ontario's GDP each year.

Pickering Station will soon be reaching the end of its life and is scheduled to shut down in 2024.

Making the Pickering Station site available for other uses

Pickering Station occupies a large, valuable site on the shores of Lake Ontario on the east side of the GTA, which encompasses approximately 500 acres of land and 250 acres of water lots.

After the station shuts down, the site will be returned to a state that allows it to be used for many different purposes. The current **standard approach** to get there takes about **45 years**.

OPG has done some research that indicates the total time to safely shut down a nuclear station could be reduced to about **25 years**. That would allow the site to be put back to use for other purposes sooner.

This public benefit would come at a cost though. Early OPG estimates suggest the cost of accelerated shut-down at Pickering Station would be about $500 million to $1.5 billion. This may result in a typical customer paying about $1 to $3 more on their monthly bill over the remaining operating life of Pickering Station.

Repurposing Pickering

OPG has held a public consultation to gather information and ideas from the community to develop a long-term plan for redeveloping available site lands during and after shutting down Pickering Station.

What is involved in safely shutting down a nuclear site?

- De-energizing the nuclear systems and components
- Removing irradiated nuclear fuel and water from the reactor core
- Monitoring the site for approximately 30 years after removal to allow nuclear radiation fields to decay naturally
- Dismantling the reactor and removing radioactive components
- Safely demolishing the site structures

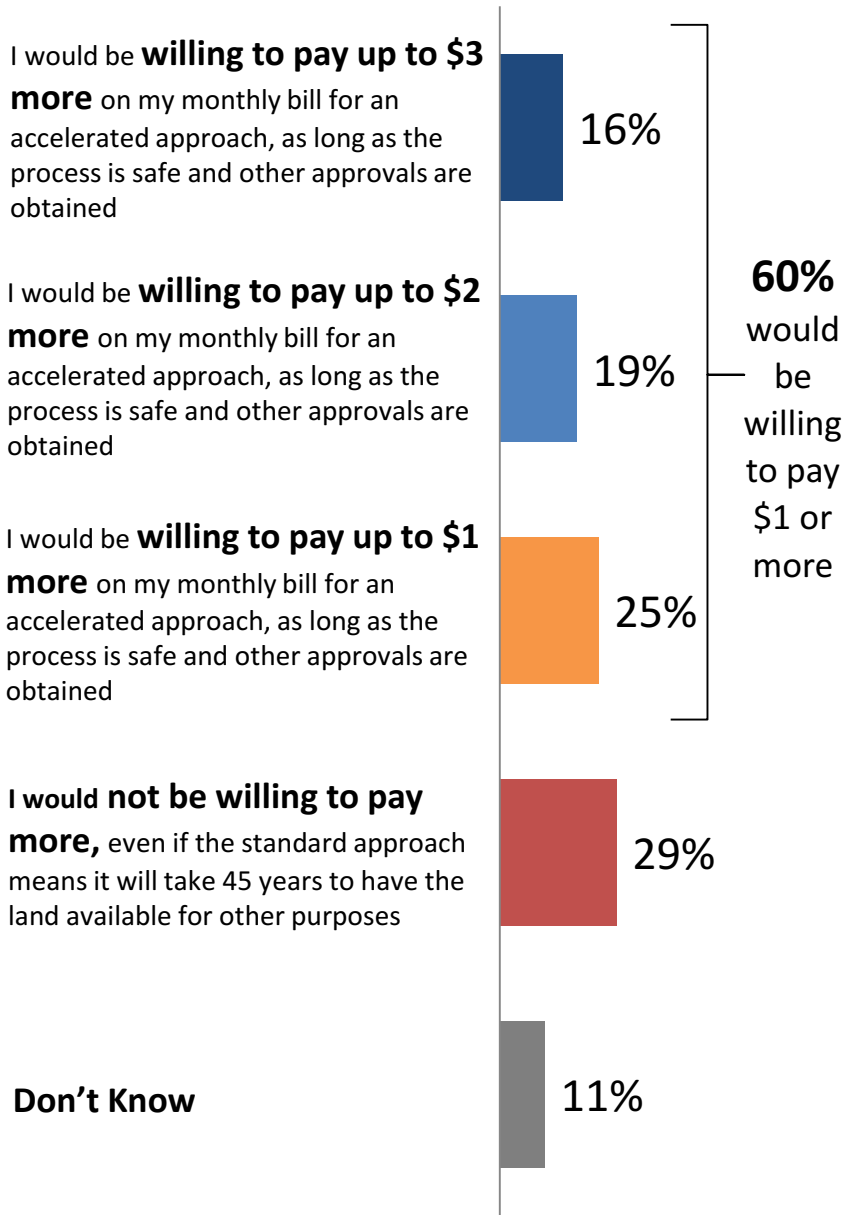
WORKBOOK PAGE

Making the Pickering Station Site Available for Other Uses

Residential

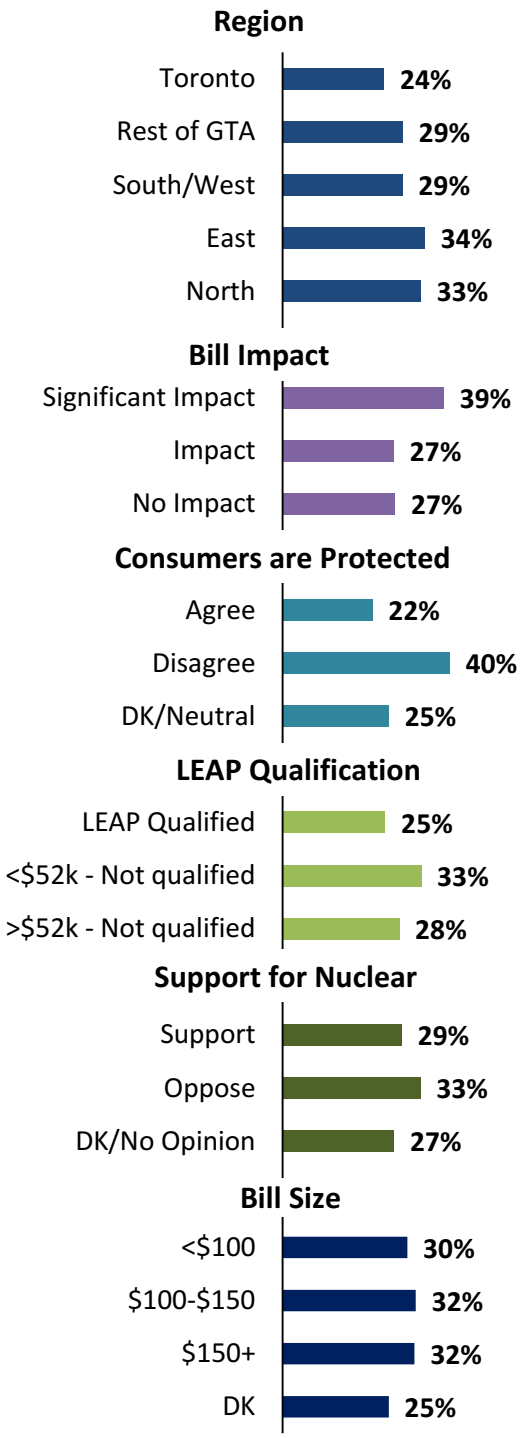
Q Would you be willing to pay more on your monthly bill until the end of Pickering Station's operations, to reduce the shut-down period to approximately 25 years and have the land available for other purposes sooner?

[asked of all respondents, n=1,200]



Segmentation

*Those **not willing to pay more**:*



INNOVATIVE RESEARCH GROUP

Darlington Vapour Recovery System Improvement

Residential

This project is to improve the efficiency and reliability of the Vapour Recovery System (VRS) at Darlington Station.

What is the VRS?

This is one of the systems responsible for controlling the tritium emissions at the station.

The VRS requires improvement or replacement, as its efficiency and reliability are challenged by changing external factors, such as:

- Rising lake temperatures affect the system's air-water coolers, leading to higher radiation doses from tritium to workers and higher tritium emissions to the environment. However, both remain well within the regulatory limit.
- The Darlington Refurbishment Program requires the presence of more personnel at the station than the VRS was originally designed for.
- Some components within the VRS have no back-up, which makes it impossible to maintain them without impacting operations or emissions.

To address these challenges, OPG has two options. Both options deliver tritium levels well below the regulatory standard.

What does the VRS do?

- Recover water containing tritium to minimize losses
- Minimize radiation doses to workers in the reactor
- Minimize tritium emissions to the environment

What is tritium?

Tritium is a radioactive form of hydrogen that is a by-product of nuclear power generation.

Darlington Station's airborne tritium emissions are well within the regulatory limits (less than 1% of what is legally allowed).

Historically, the station has also performed better than average when compared to other nuclear plants with the same technology worldwide.

Historic and Target Airborne Tritium Emissions at Darlington Station	
2014	
2015	
2016	
2017	
2018	
2019-21	
2026	

Legend	
	Best performers (top 25 percent)
	Worst performers (bottom 25 percent)

WORKBOOK PAGE

Darlington Vapour Recovery System Improvement

Residential

Q17. OPG needs to decide whether to improve the existing system or replace the system with a higher capacity system. In either case, OPG expects to be within the top 25% of nuclear generators with the same reactor technology for airborne tritium emissions. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Improve existing VRS**	Improve vapour removal capability of the VRS, leading to lower tritium levels in containment and confinement, lower doses to workers, and lower emissions to the environment	Improvement costs of approximately $30 million, resulting in 2 cents more on a typical customer's monthly bill; OPG's performance results may not be as favourable as in OPG's alternative option but will still be well below regulatory standards
☐	**Replace VRS with a higher capacity system**	Larger dryers can take more tritium out, resulting in even lower emissions and radiation compared to the above option; OPG's performance results will be more favorable compared to the above option and will continue to be well below the regulatory standards	Replacement costs of approximately $65 million, resulting in 4 cents more on a typical customer's monthly bill
☐	**Don't know**		

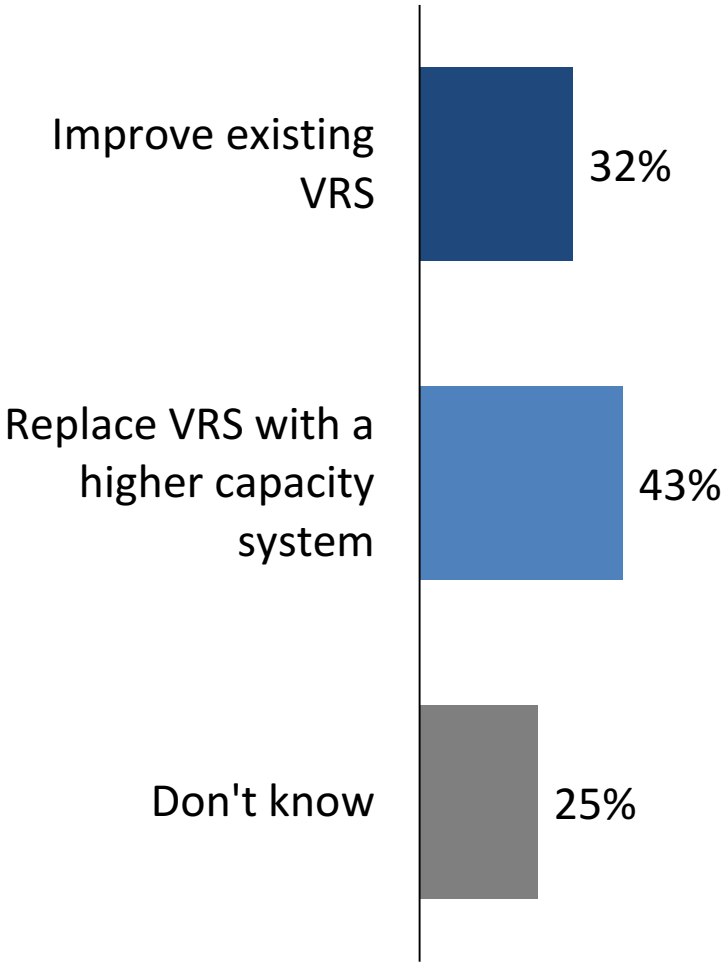
WORKBOOK PAGE

Darlington Vapour Recovery System Improvement

Residential

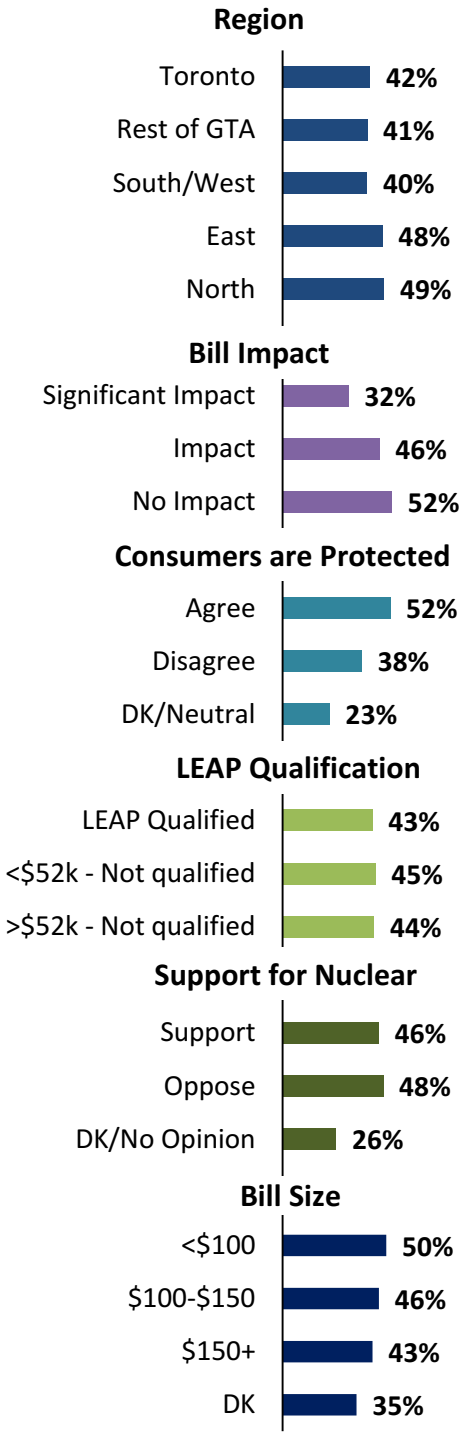
Q

OPG needs to decide whether to improve the existing system or replace the system with a higher capacity system. In either case, OPG expects to be within the top 25% of nuclear generators with the same reactor technology for airborne tritium emissions. Which of the following options do you prefer? [asked of all respondents, n=1,200]



Segmentation

*Those who say "**Replace VRS**":*



INNOVATIVE RESEARCH GROUP

Darlington Air Compressor Replacement

Residential

This project is to replace the 19 air compressors used to supply compressed air at Darlington Station. The current compressors have been in-service for over 30 years and their current condition is rated as fair.

The equipment manufacturer no longer makes parts for the model of compressor in use at Darlington Station. Eventually, OPG will have to replace all 19 compressors. However, the company has a choice in how quickly it does the replacement.

The table below shows what compressed air is used for at Darlington Station and what happens if compressors fail.

Purpose	What the system does	Risks if compressors fail
Service Air	This system supplies air-powered tools and hoists throughout the station.	Service air unavailability would impact the operation of tools and hoists needed to maintain station equipment. This could result in additional outages as back-up solutions are implemented.
Breathing Air	This system supplies air for worker protection from radioactive contamination in the reactor vault. Breathing air is used for air-supplied masks for airborne contamination and for plastic suits, which protect against airborne, liquid and surface contamination.	Unavailability of breathing air compressors would restrict the ability of operators and maintenance personnel to work in areas of high contamination. This could result in impacts on production due to inability to operate or maintain equipment in these areas.
Instrument Air	This system supplies very dry high pressure air that is used to operate valves in various systems throughout the station.	Instrument air unavailability would affect the operation of valves with important process and safety functions in the station. While these valves are designed to fail in their safe position upon loss of instrument air, increasing unreliability of the instrument air due to failure of compressors would result in operational upsets up to and including additional forced outages and costs.

WORKBOOK PAGE

Darlington Air Compressor Replacement

Residential

Darlington Air Compressor Replacement

Q19. OPG needs to decide whether to proactively replace all of the air compressors or purchase some spares and replace as the existing compressors fail. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Proactively replace all 19 air compressors**	Improved reliability of air compressors; reduced probability of forced outages or extensions to planned outages; reduced worker tritium doses; reduced maintenance complexity by standardizing on one make and model of air compressor; reduced spare parts inventory requirements by standardizing on one make and model of air compressor	Replacement costs of approximately $30 million, resulting in 2 cents more on a typical customer's monthly bill
☐	**Acquire 4 spare air compressors initially and replace as in-service compressors fail. Acquire and replace compressors until all 19 are replaced.**	Initial costs of approximately $5 million, resulting in no noticeable bill increase in the short run; other replacements will be deferred to a later date	Added costs to replace compressors as they fail over time; long-term costs likely higher, totalling up to $50 million; increased chance of unplanned or extended planned outages; potential impact on worker radiation doses; potential risk that replacement parts will not be available later in replacement cycle, resulting in increased maintenance complexity and spare parts inventory requirements
☐	**Don't know**		

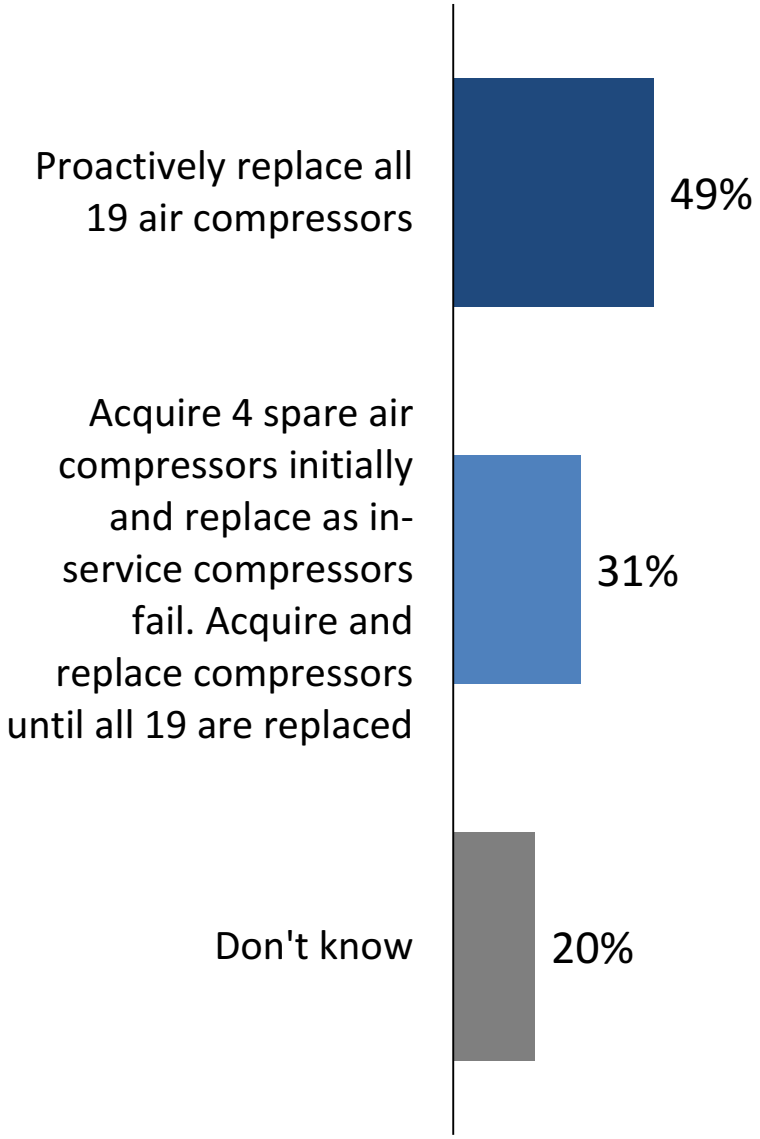
WORKBOOK PAGE

Darlington Air Compressor Replacement

Residential

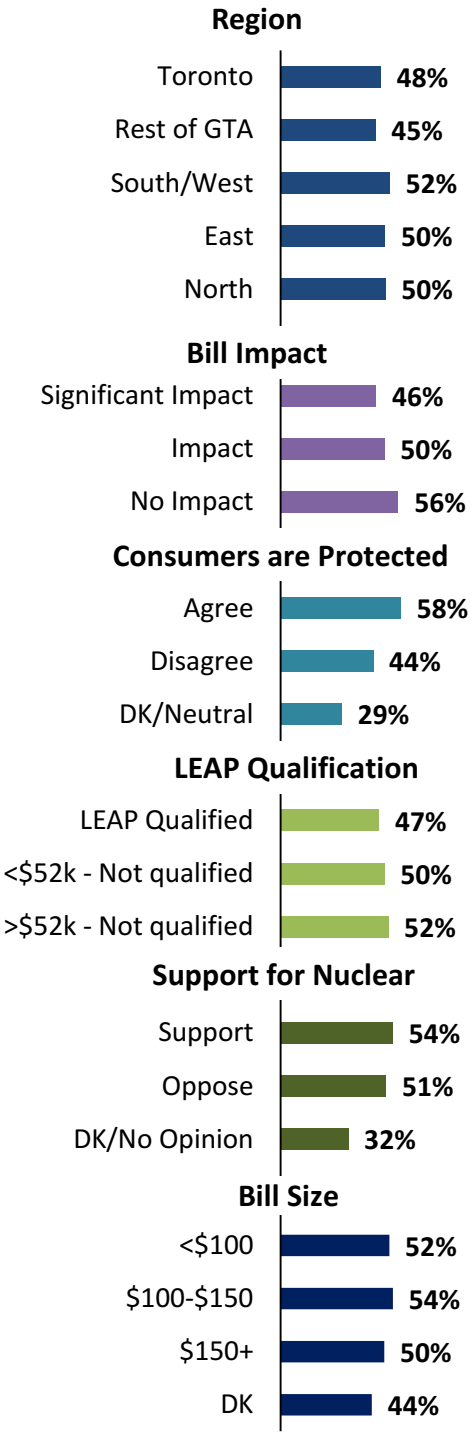
Q

OPG needs to decide whether to proactively replace all of the air compressors or purchase some spares and replace as the existing compressors fail. Which of the following options do you prefer?
[asked of all respondents, n=1,200]



Segmentation

*Those who say "**Proactively Replace**":*



INNOVATIVE RESEARCH GROUP

Darlington Crane Group Project

Residential

This project is to refurbish the 20 major cranes at Darlington Station, with capacities up to 200,000 kg, that are used to support operations, maintenance and refurbishment activities. The function of these cranes is to safely lift and move material, equipment and irradiated fuel.

These cranes have been in-service since the 1980's. A third party assessment of station cranes concluded that the cranes are in fair to poor condition and will require refurbishment to provide reliable service until the end of Darlington Station's commercial service.

Experience from other utilities indicates that major cranes such as these are refurbished when they have been in-service for 30 years.

The work involved with refurbishing the cranes includes:

- Controls upgrade including addition of remote pendant
- Inspection of rails
- Replacement of motors, gear boxes, brakes and wire ropes

Q27. OPG needs to decide whether to refurbish all of the cranes or only the 14 most critical ones. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Refurbish all 20 major cranes**	Ensure reliable operation to end of Darlington Station's commercial service; eliminate risk of mechanical failure that could result in dropped loads and damage to surrounding equipment; ensure improved availability of replacement parts and manufacturer service support	Refurbishment costs of approximately $75 million, resulting in 5 cents more on a typical customer's monthly bill
☐	**Refurbish the 14 critical cranes now and the other 6 later**	Same as Option 1 for the 14 refurbished cranes; reduced immediate refurbishment costs of approximately $65 million ($10 million lower than Option 1), resulting in 4 cents more on a typical customer's monthly bill	Reliability of the 6 non-refurbished cranes is likely to decrease with time; spare parts necessary to maintain the 6 non-refurbished cranes may not be available in the future; potential risk of damage to the facility if failure results in a load being dropped
☐	**Don't know**		

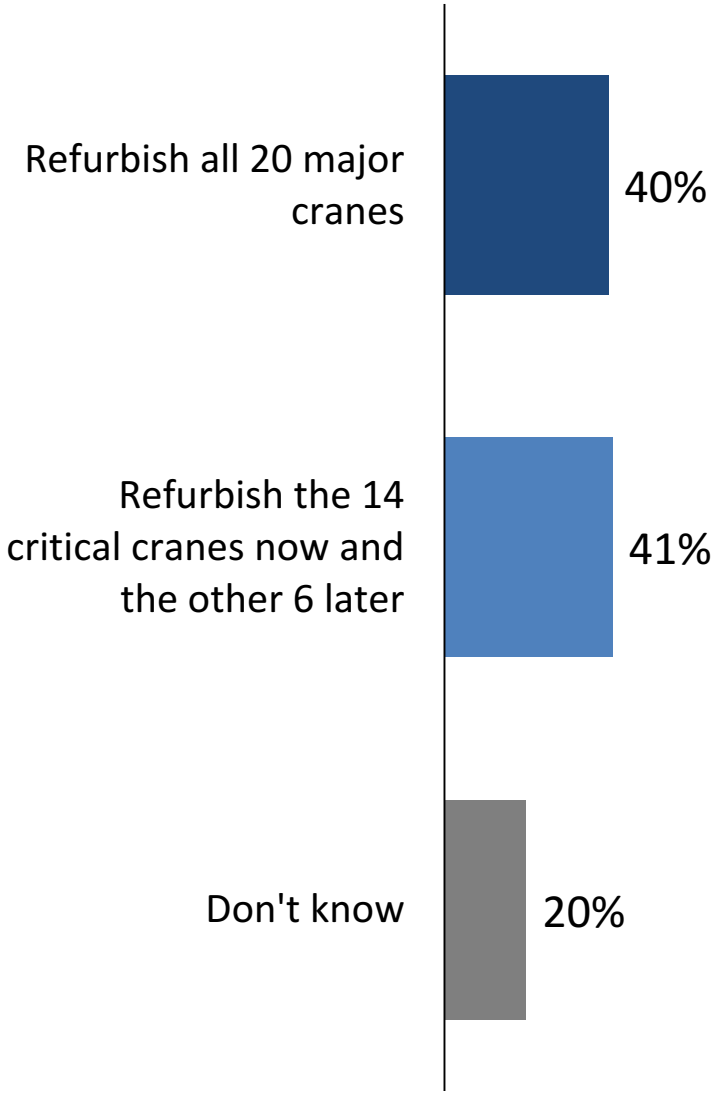
WORKBOOK PAGE

Darlington Crane Group Project

Residential

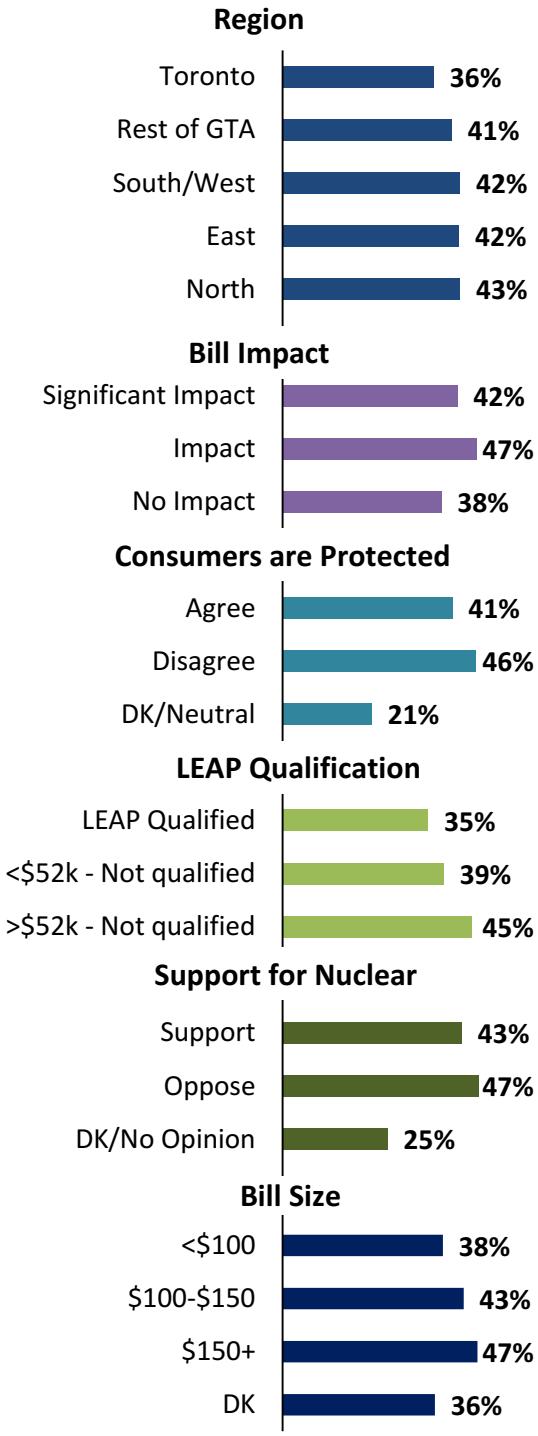
Q

OPG needs to decide whether to refurbish all of the cranes or only the 14 most critical ones. Which of the following options do you prefer?
[asked of all respondents, n=1,200]



Segmentation

*Those who say "**Refurbish 14 now and 6 later**":*



INNOVATIVE RESEARCH GROUP

Investing in Technology to Create Efficiencies

Residential

Efficiency Initiatives

OPG is also developing initiatives that will reduce costs and create efficiencies throughout the company. OPG expects that these investments will **increase the reliability of its stations**, **improve safety**, and allow it to plan its **work more efficiently**.

Over the 2020 to 2026 period**, OPG is considering investing between $30 million and $60 million on these initiatives. OPG expects that these investments will save or avoid $50 million to $100 million in costs.**

Increased use of data and innovative technology

- OPG is actively looking for areas where better data and innovative technological solutions can deliver value for money. For example, OPG is in the process of creating a **Monitoring & Diagnostic Centre**, which will use advanced sensors and data analysis to improve the performance and reliability of OPG's nuclear generating equipment.
- OPG is also planning to use new technologies to improve safety and efficiency at its nuclear stations. As an example, OPG is testing a program to use drones to monitor the radiation levels around its nuclear plants.
- In order to operate and maintain its hydroelectric stations in the most cost-effective manner, OPG is looking to invest in technologies that would allow these stations to be monitored for safety and maintenance requirements remotely and proactively identify maintenance needs.

OPG will only invest in technologies that would deliver value for money. OPG would only proceed with new technologies that are expected to more than pay for themselves.

WORKBOOK PAGE

Q29. Which of the following statements best reflects your own point of view?

- ☐ Option 1: OPG should make do with what it has and only replace technology as it breaks down
- ☐ Option 2: OPG should only invest in new and innovative technologies if there is proof that these technologies will lead to guaranteed savings
- ☐ Option 3: OPG should pursue Option 2 and also invest money in pilot projects in cases where no previous evidence of guaranteed savings exists, but where the company sees a good chance that it would lead to savings
- ☐ Don't know

Investing in Technology to Create Efficiencies

Residential

Q Which of the following statements best reflects your own point of view?

[asked of all respondents, n=1,200]

Option 1: Make do with what OPG has and only replace technology as it breaks down — 10%

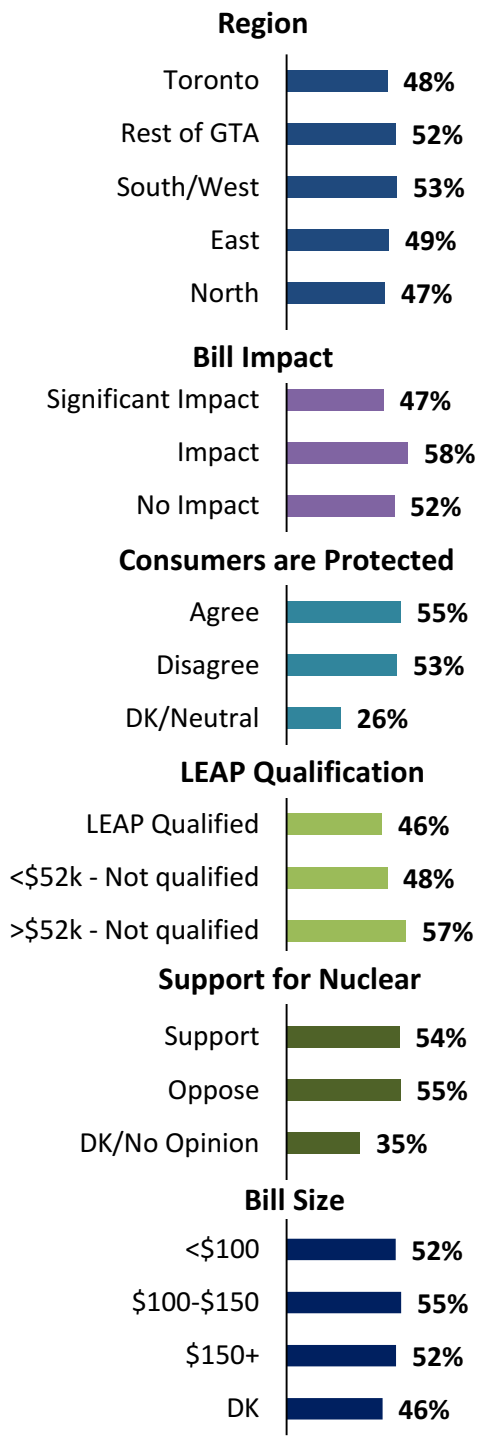
Option 2: Only invest in new and innovative technologies if lead to guaranteed savings — 51%

Option 3: Option 2 and also invest money in pilot projects — 24%

Don't Know — 15%

Segmentation

*Those who say "**Option 2**":*



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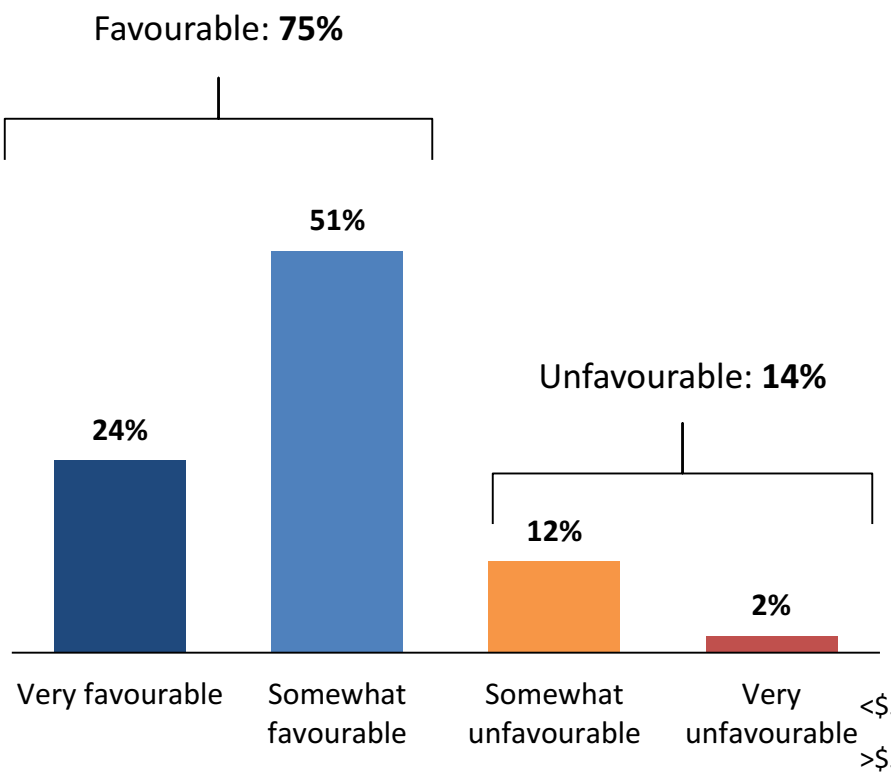
Workbook Diagnostics

Overall Impression of the Workbook

Residential

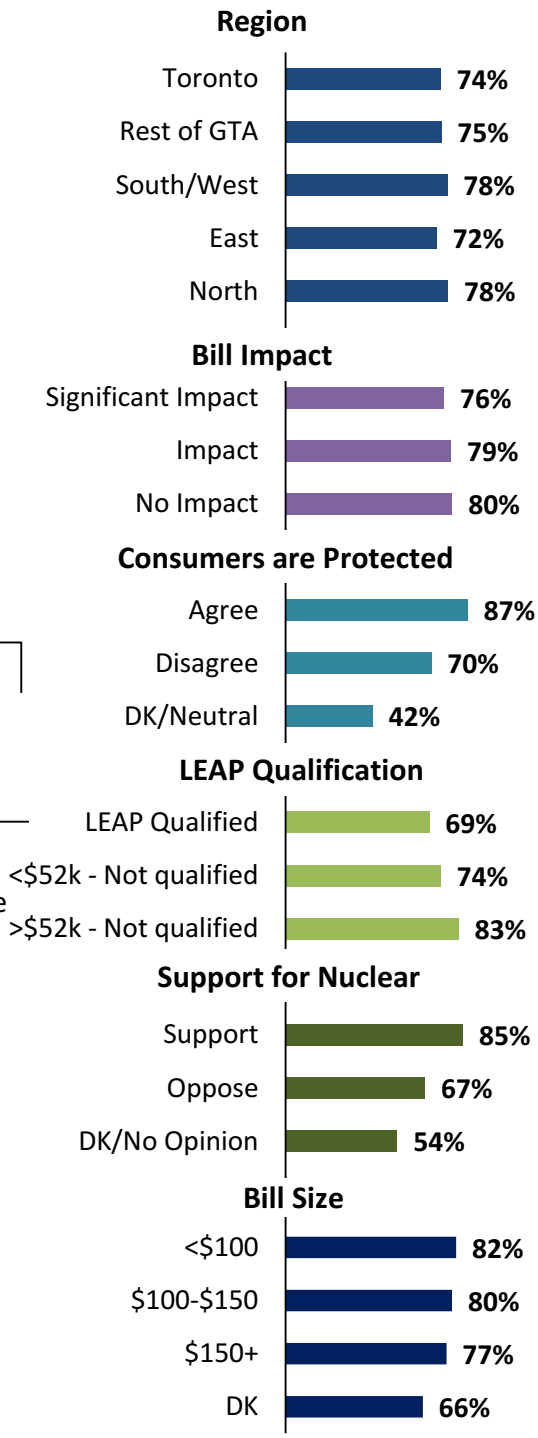
Q Do you have a favourable or unfavourable impression of the workbook?
[asked of all respondents, n=1,200]



Note: 'Don't know' (11%) not shown.

Segmentation

*Those who say "**Favourable**":*

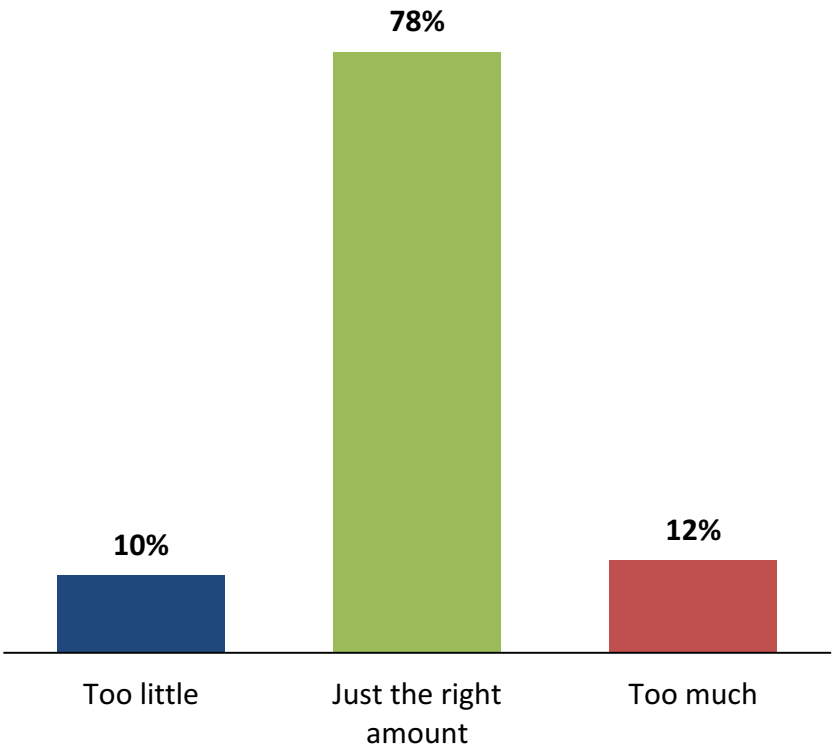


INNOVATIVE RESEARCH GROUP

Volume of Information

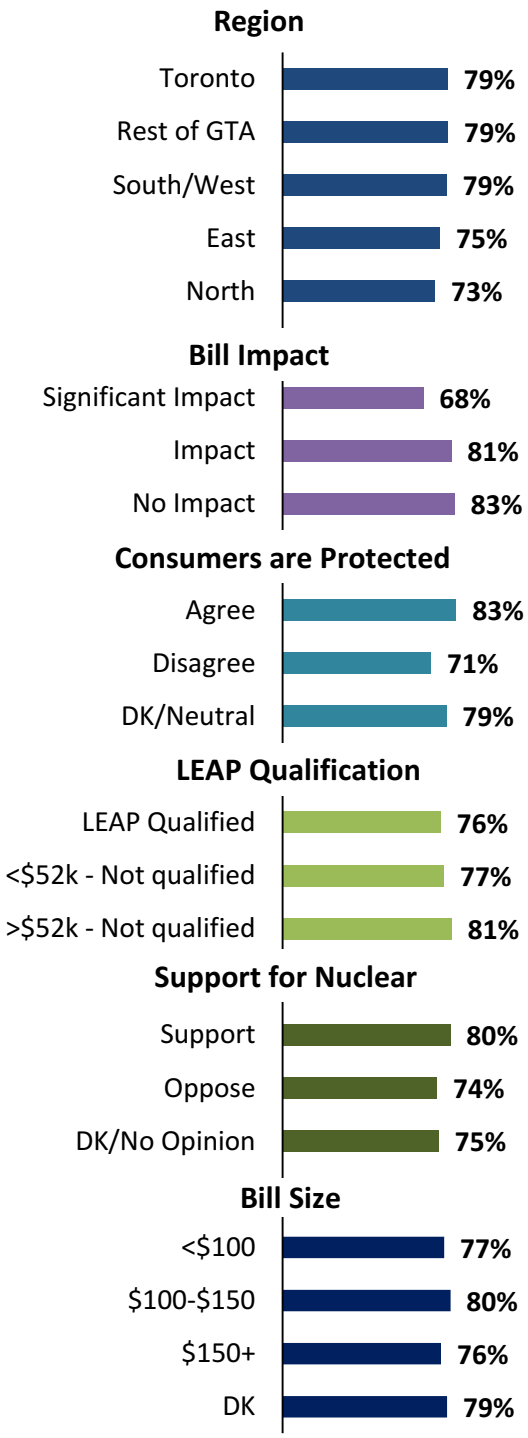
Residential

Q Did OPG provide too much information, not enough, or just the right amount?
[asked of all respondents, n=1,200]



Segmentation

*Those who say "**Just the right amount**":*



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Filed: 2020-12-31
EB-2020-0290
Exhibit A2-2-1
Attachment 4
Page 65 of 421

INNOVATIVE RESEARCH GROUP

Online Survey Report - Business
2019 Customer Engagement

ONTARIO POWER GENERATION

May 2019

STRICTLY PRIVILEGED AND CONFIDENTIAL

About This Report

This report presents the results from the **representative online survey** that was conducted among **business customers**, as part of OPG's 2019 customer engagement process.

To provide context to how customer feedback was collected, this report contains the original workbook pages used in the survey.

Workbook Pages

Pages in this report that are taken from the online workbook are denoted by watermarks. Please note that some of these pages include graphs and charts; these do not represent data collected from the online survey, but were used to equip respondents with the facts and figures needed to provide informed opinions.

The workbook pages are shown in the order they were presented to respondents.

Results and Segmentation

The results are presented after the workbook page wherein a particular question was asked.

This report shows the overall results and detailed results by electricity consumption class. It also breaks down a particular response of interest into key firmographic and psychographic categories. In this report, segmentation is provided for **region**, **bill impact**, **business protection**, and **support for nuclear.**

These categories were chosen to identify vulnerable customers who are particularly affected by environmental factors outside of OPG's control, such as their financial well-being and confidence in regulatory agents. Attitudes towards nuclear power generation was included to account for pre-existing views.

Online Survey Methodology

Business

Field and Design

This report contains the findings from an Innovative Research Group (INNOVATIVE) online survey conducted amongst Ontario businesses between **April 24th and 28th, 2019.**

The survey was fielded among Ontarians who are **responsible for electricity related issues in their organization** (i.e. dealing with electrical utility companies, understanding and selecting electricity-related equipment, or managing electricity use). The sample was provided by Dynata, a leading online sample provider.

INNOVATIVE provides each panelist with a unique URL via an email invitation so that only invited panel members are able to complete the survey, and panel members can only complete a particular survey once. Targets were set based on region and industry sector. The sample is then weighted by these characteristics.

This is a representative sample. However, since the online survey was not a random probability based sample, a margin of error cannot be calculated. It is not statistically valid to apply margins of error to most online samples.

Note: *Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers. Caution interpreting results with small n-sizes.*

Business Sample Validation

Business

Targets for the small business sample were set based on region and industry sector. The sample was weighted to ensure it was representative across those known characteristics.

Region	Target	Unweighted N	Weighted N
GTA	200	243	200
Rest of Ontario	200	167	200
Total	**400**	**410**	**400**

Industry Sector	Target	Unweighted N	Weighted N
Business/Commerce	139	232	139
Public/Culture	144	90	144
Resources/Construction/ Manufacturing	117	84	117
Total	**400**	**406**	**400**

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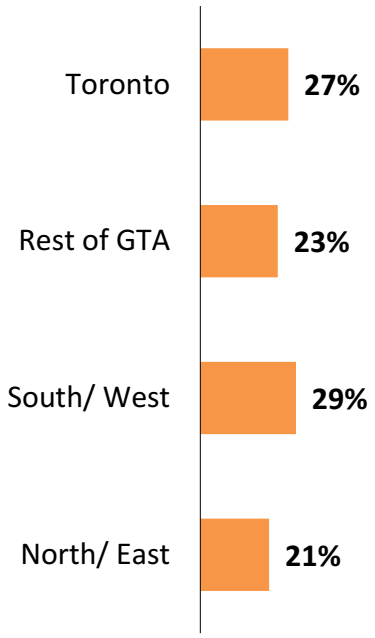
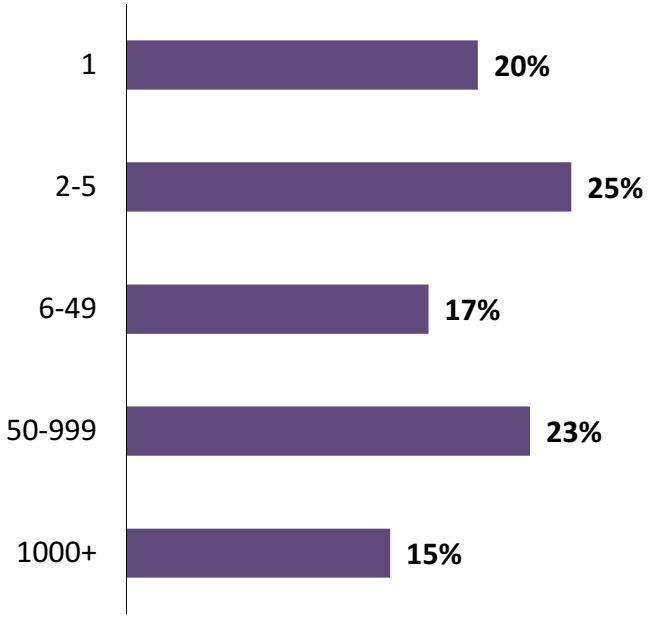
Firmographics
Respondent Profile

Business

Region

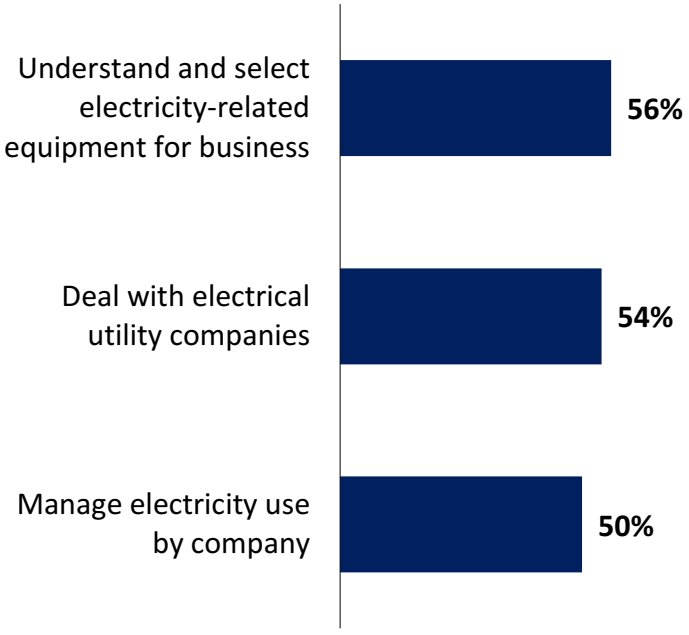


Number of Employees

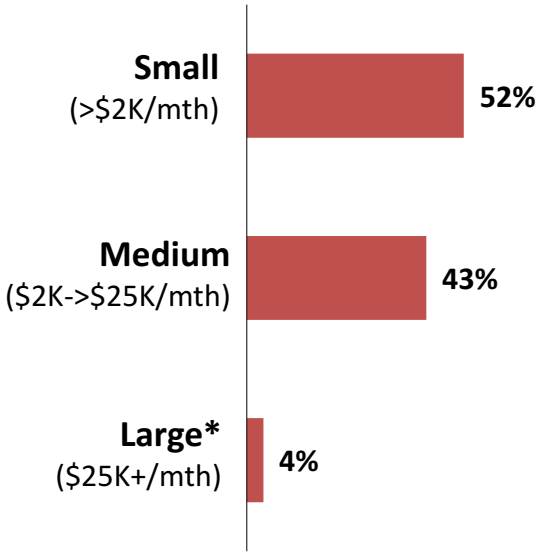


Don't know (<1%) not shown

Role of Respondent



Electricity Consumption



***Note**: Due to small sample size of large businesses (n=17) only n-sizes are reported for this group.

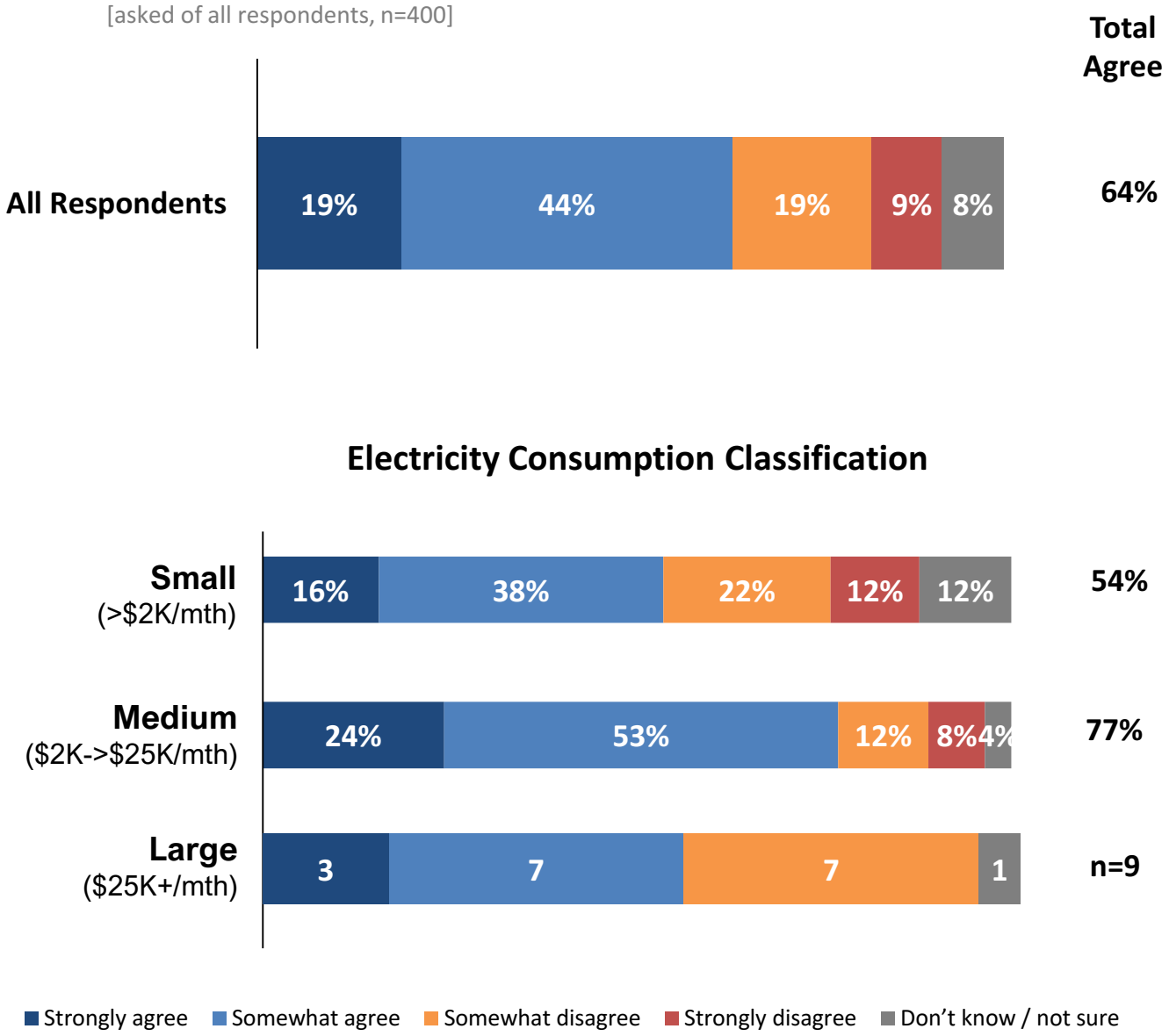
Segmentation

Electricity Bill Has Major Impact on Finances

Business

Q To what extent do you agree or disagree with the following statement?
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?

[asked of all respondents, n=400]



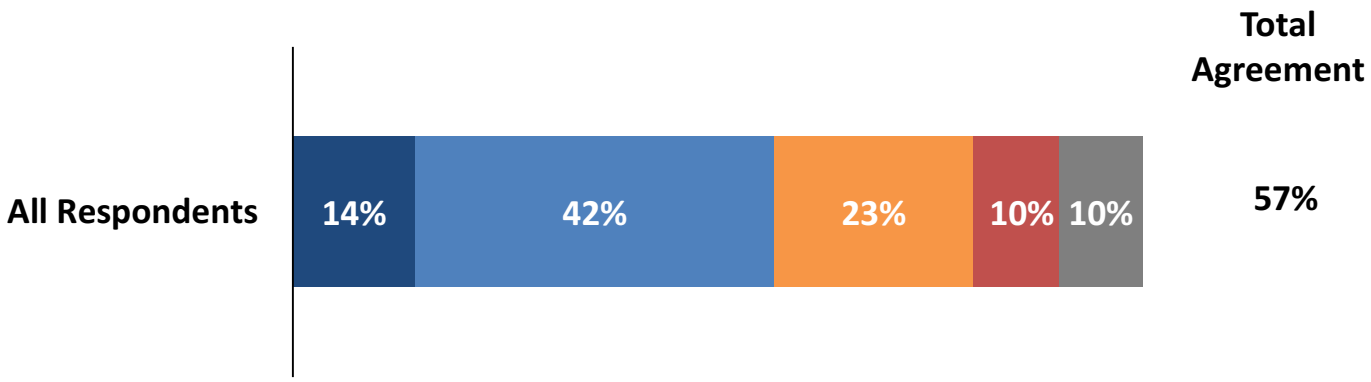
INNOVATIVE RESEARCH GROUP

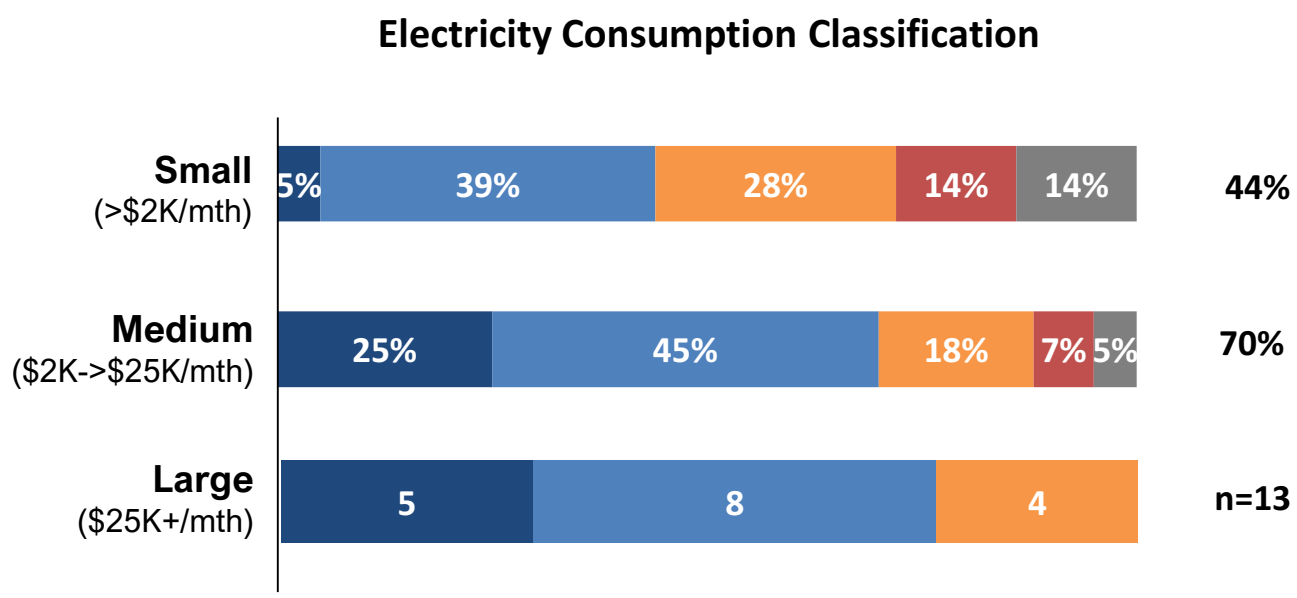
Segmentation

Businesses are Well Protected

Business

Q To what extent do you agree or disagree with the following statement?
Businesses are well-protected with respect to prices and the reliability and quality of electricity service in Ontario.
[asked of all respondents, n=400]





■ Strongly agree ■ Somewhat agree ■ Somewhat disagree ■ Strongly disagree ■ Don't know / not sure

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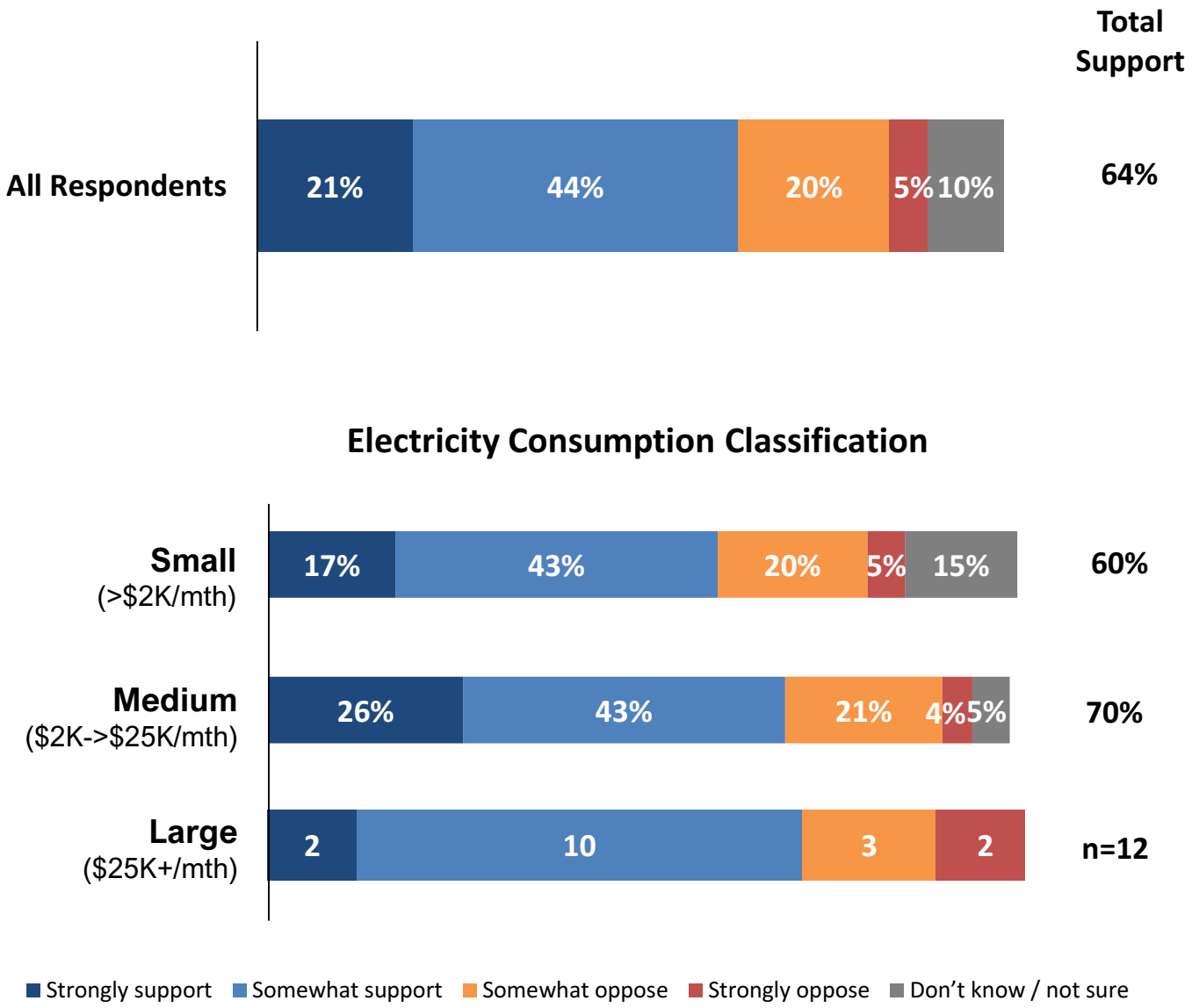
Segmentation
Support for Nuclear Energy

Business

Q Generally speaking, do you support or oppose nuclear as a way of generating electricity?
[asked of all respondents, n=400]



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Background Information

Electricity 101

Understanding OPG's Role in the Electricity System

Business

Ontario's electricity system is owned and operated by provincial, municipal, and private corporations across the province. It is made up of three key components: **generation**, **transmission** and **distribution**.

Generation

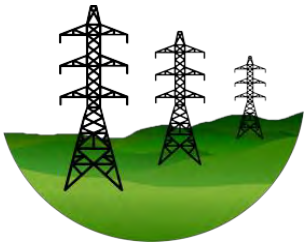
Where electricity comes from.

Ontario gets its electricity from a mix of energy sources. About half of our electricity comes from nuclear power. The remainder comes from a mix of hydroelectric, natural gas, wind and solar.

Most of Ontario's electricity generating stations are located in the southern part of the province close to where the demand for power is greatest. The majority of these power stations are owned and operated by **OPG**, a government owned company that generates about half of Ontario's electricity. The other half comes from multiple generators who have contracts with the grid operator to provide power from a variety of sources.

Transmission

Electricity travels across Ontario.



Once electricity is generated, it must be transported to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. The province has more than 30,000 km of transmission lines.

Local Distribution

Delivering power to homes and businesses in your community.

Your local utility is responsible for the distribution of electricity. This local distribution system includes transformer stations of various sizes and designs that decrease the voltage of the electricity so it can be used in your home or business.

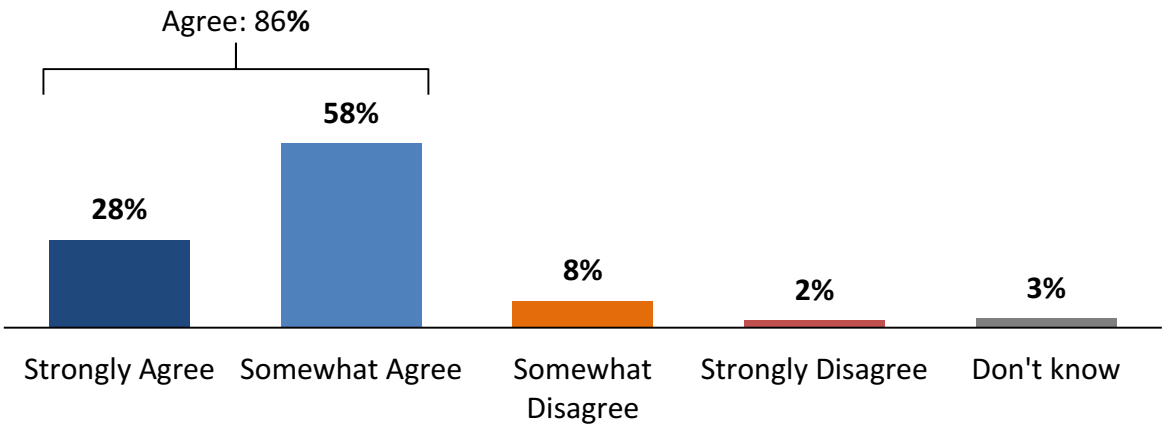
WORKBOOK PAGE

Electricity 101

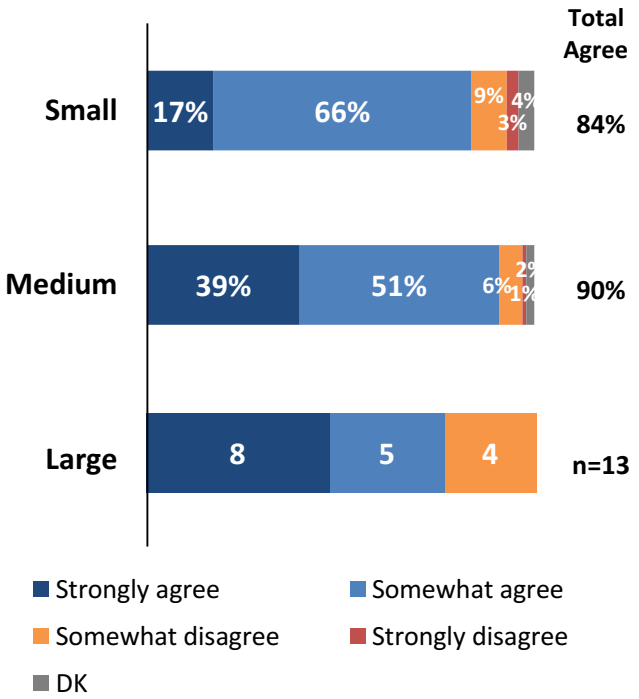
Understanding OPG's Role in the Electricity System

Business

Q To what extent do you agree or disagree with the following statement?
I generally understand how the various parts of the electricity system work together.
[asked of all respondents, n=400]

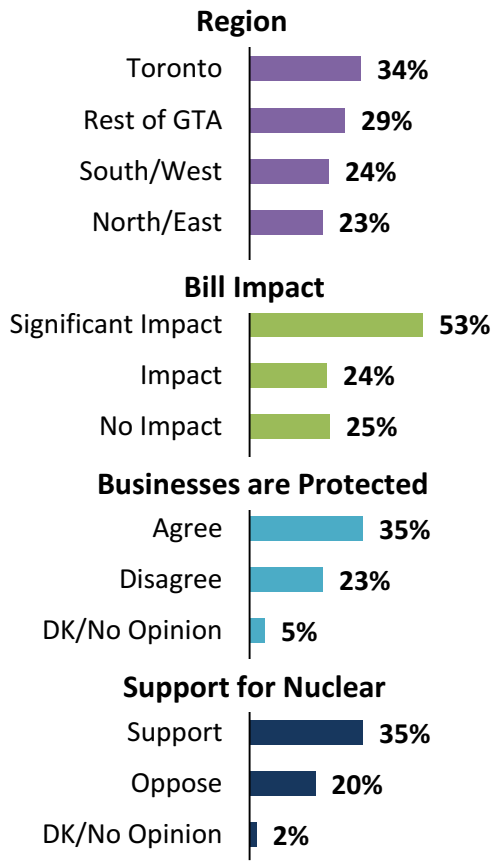


Results by Electricity Consumption



Segmentation:

*Those who "**Strongly Agree**":*



INNOVATIVE RESEARCH GROUP

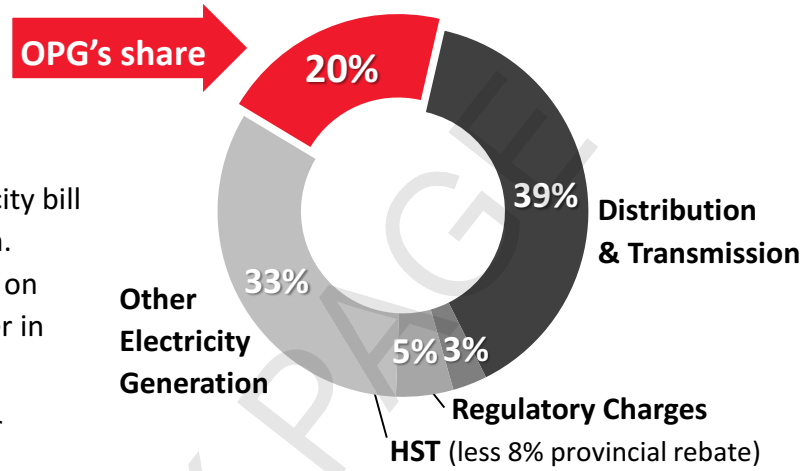
How much does electricity generation cost me?

Business

How much of my bill goes to OPG?

For the typical small business customer:

- About half of the monthly electricity bill goes to pay for power generation.
- Historically, 20% of the monthly electricity bill goes to pay for OPG's power generation. However, OPG's share entirely depends on consumption and can be higher or lower in any given month.
- The rest of the bill goes to pay for other generators, transmission companies, distribution companies, regulatory agencies, and government taxes.

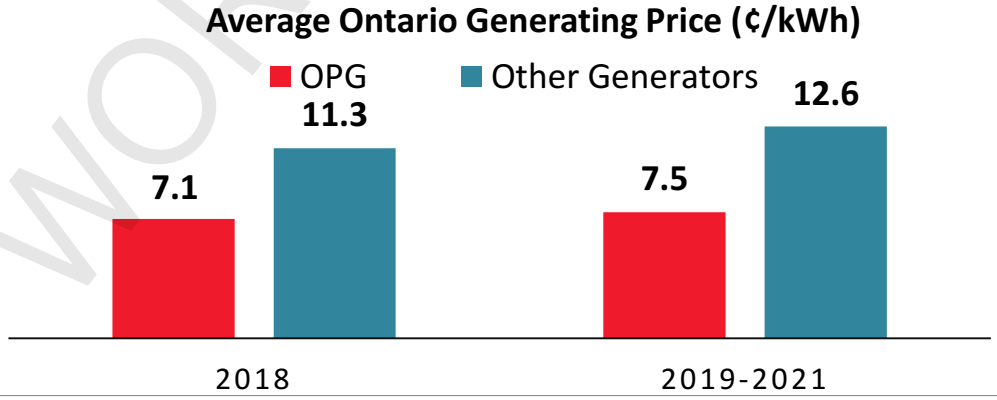


Who sets electricity rates?

The Ontario Energy Board sets the prices that OPG can charge its customers for most of the electricity it generates. OPG is the only "regulated" electricity generator in Ontario. For the other generators, electricity prices are set in their contracts.

How much does OPG's energy cost compared to others?

The electricity OPG generates costs you about 40% less than the average price paid to other generators in the province.



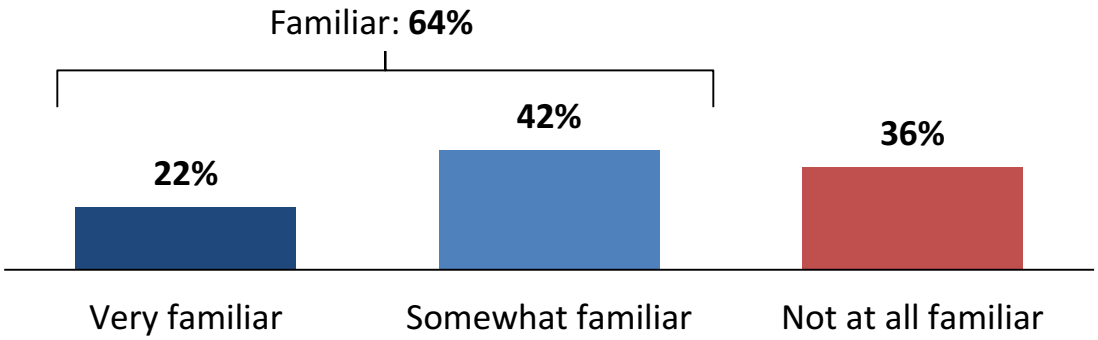
WORKBOOK PAGE

How much does electricity generation cost me?

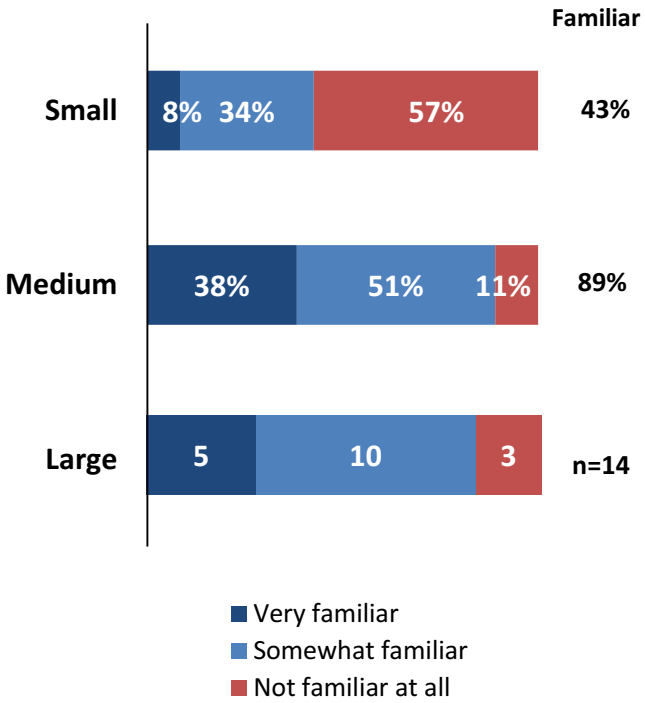
Business

Familiarity with OPG's Share of the Bill

Q Before this workbook, how familiar were you with the percentage of your organization's electricity bill that goes to OPG?
[asked of all respondents, n=400]

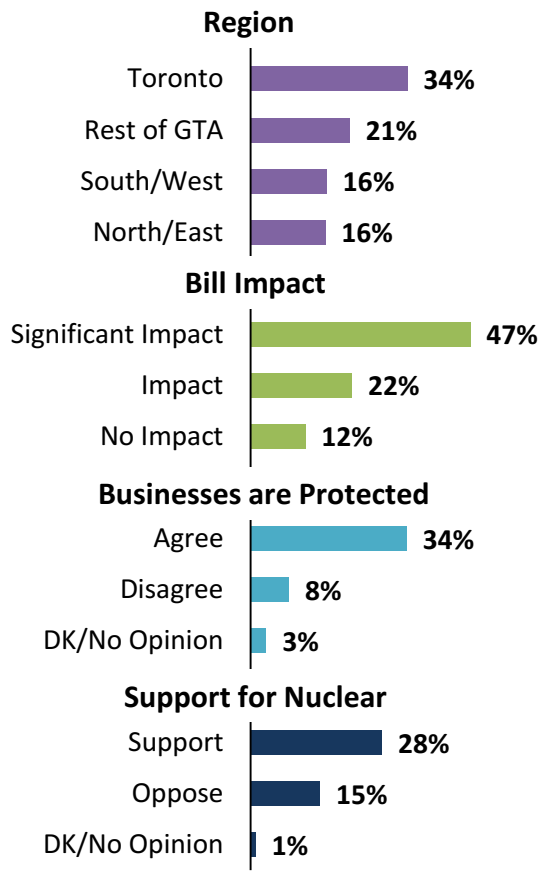


Results by Electricity Consumption



Segmentation:

*Those who say "**Very Familiar**":*



INNOVATIVE RESEARCH GROUP

Who is OPG?

- Ontario Power Generation is owned by the Province of Ontario.
- It was established in 1999 to operate the electricity generation facilities of the utility that was previously known as Ontario Hydro.
- Today, OPG is one of the largest and most complex generating companies in North America with about 9,000 employees across the province.

OPG's regulated electricity comes from two sources:

Hydroelectric

More than one third of the electricity that OPG produces comes from hydroelectric facilities located across the province.

This renewable resource has fueled Ontario's economic growth since the beginning of the 20th century and it remains an important contributor of clean, low-cost power in the province.

Nuclear

OPG's two nuclear generating stations play a significant role in Ontario's energy mix. **Darlington** and **Pickering Stations** operate continuously to meet the minimum level of power demand for the province while emitting virtually no air pollution.

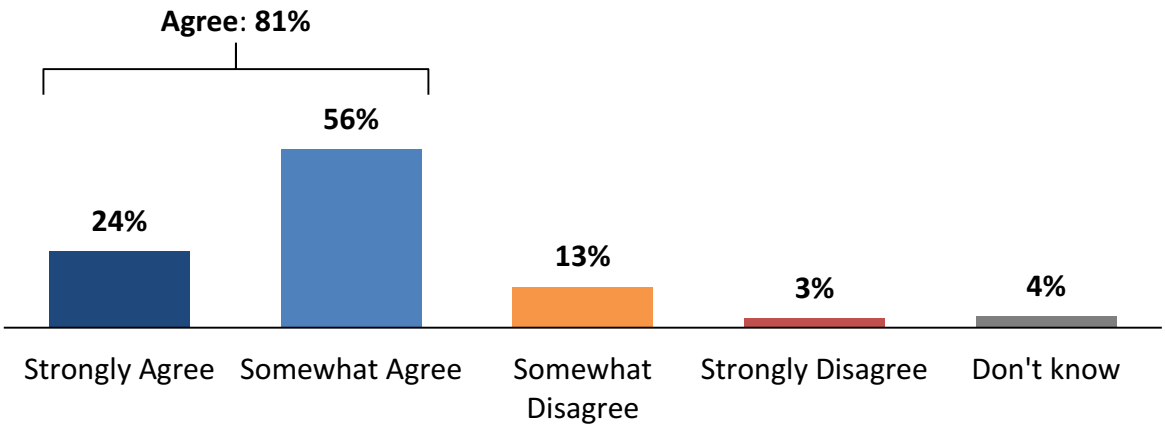
OPG began the refurbishment of Darlington Station in October 2016. The Darlington Refurbishment is a ten-year mega project that will extend the station's life by about another 30 years.

WORKBOOK PAGE

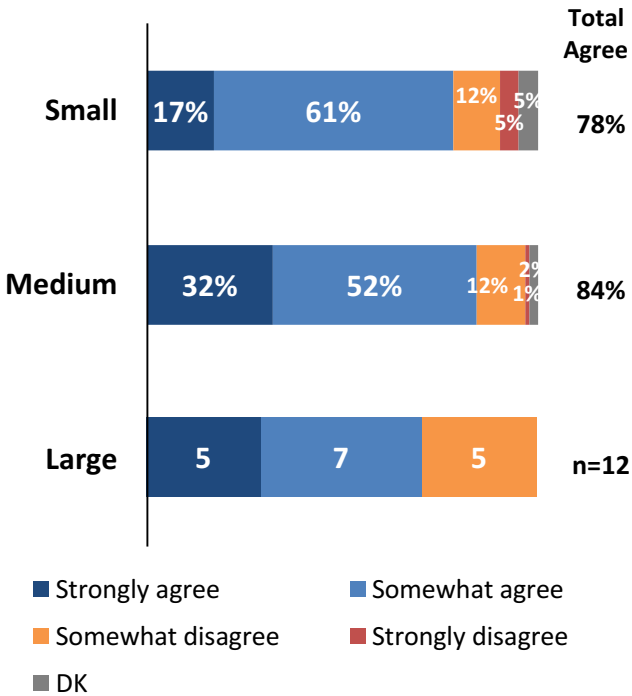
Who is OPG?

Business

Q To what extent do you agree or disagree with the following statement?
I have a general understanding of who OPG is.
[asked of all respondents, n=400]

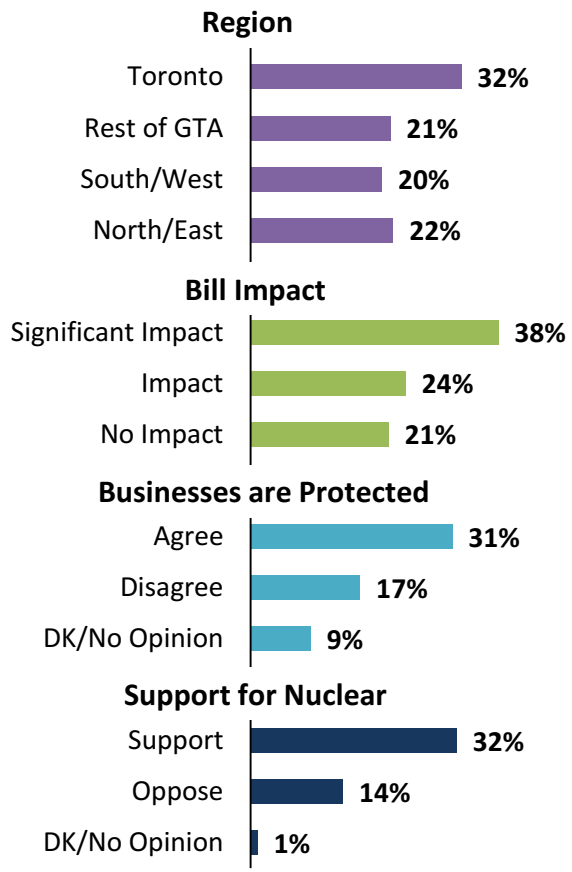


Results by Electricity Consumption



Segmentation:

*Those who "**Strongly Agree**":*



INNOVATIVE RESEARCH GROUP

Building OPG's Plan

Business

The purpose of this consultation is to get your input as OPG prepares its plan.

This plan must satisfy OPG's mandate as stated in the Memorandum of Agreement with the Province.

The goals in OPG's plan must follow the policy direction set by Ontario's Ministry of Energy. This includes OPG's role in Ontario's Long-Term Energy Plan.

As required by the Ontario Energy Board, OPG must also consider the views of customers like you as it develops its plan.

How does OPG consider customers' views in its plan?

OPG has developed a five phase approach to gathering and responding to customer feedback:

✔ **1. Identify customer priorities:** In 2018 OPG asked customers from across Ontario about their needs and priorities for electricity generation.

✔ **2. Use customer feedback to guide development of plan:** Key findings from the initial customer engagement informed the planning process.

You are here

3. Collect customer feedback on specific decisions

Now OPG is returning to customers to get feedback on specific business choices it needs to make.

4. Preparing the detailed plan: Prepare detailed plan based on customer feedback.

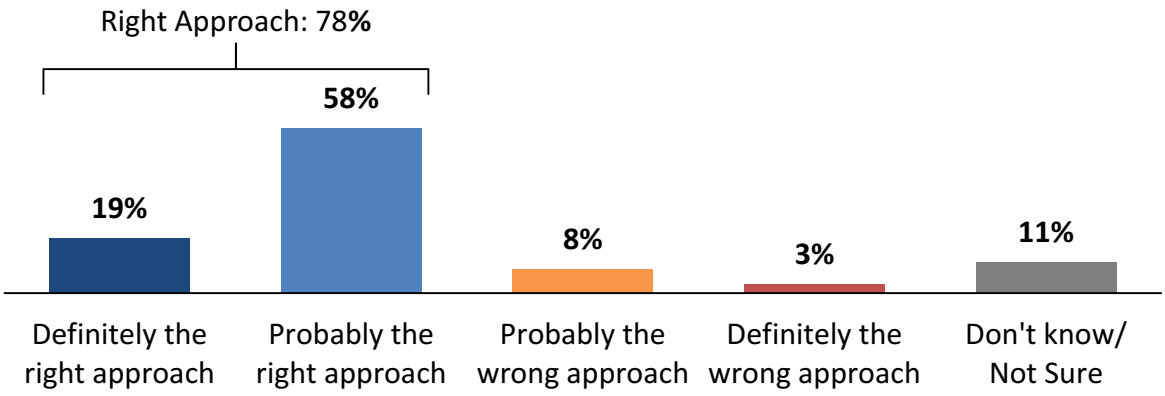
5. Submit the plan to the Ontario Energy Board: File the plan, this workbook, and a summary report with the OEB where it will be examined by the OEB, consumer advocates, and other independent parties in a public hearing on OPG's regulated prices.

WORKBOOK PAGE

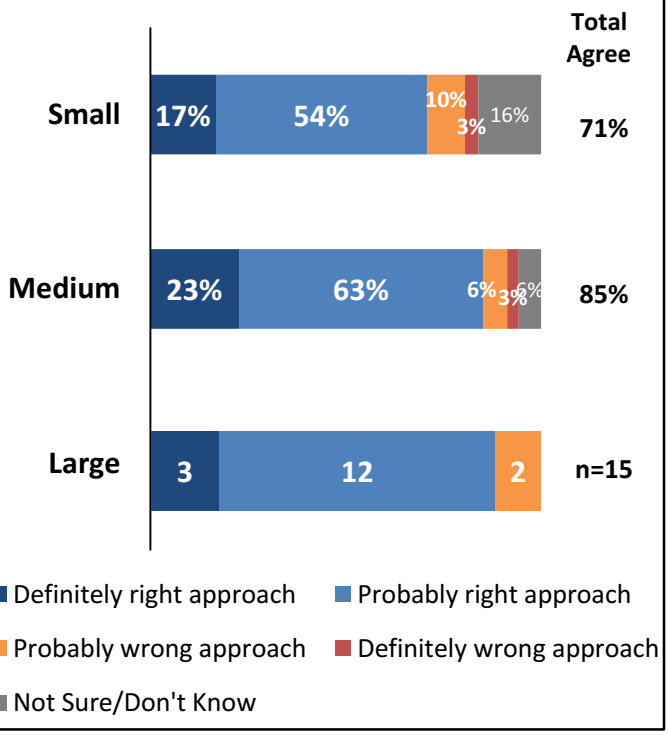
Building OPG's Plan

Business

Q Does this seem like the right approach or the wrong approach to building OPG's plan?
[asked of all respondents, n=400]

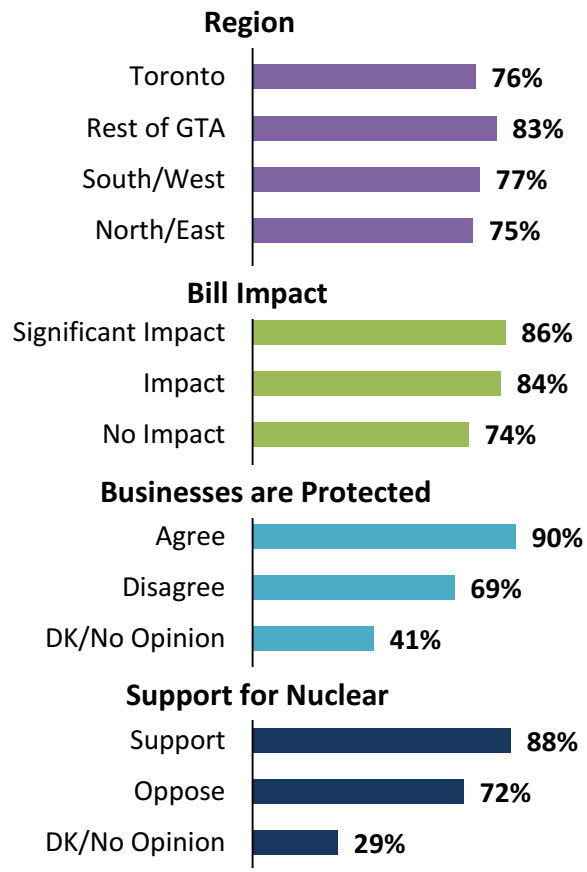


Results by Electricity Consumption



Segmentation:

*Those who say "**Right Approach**":*

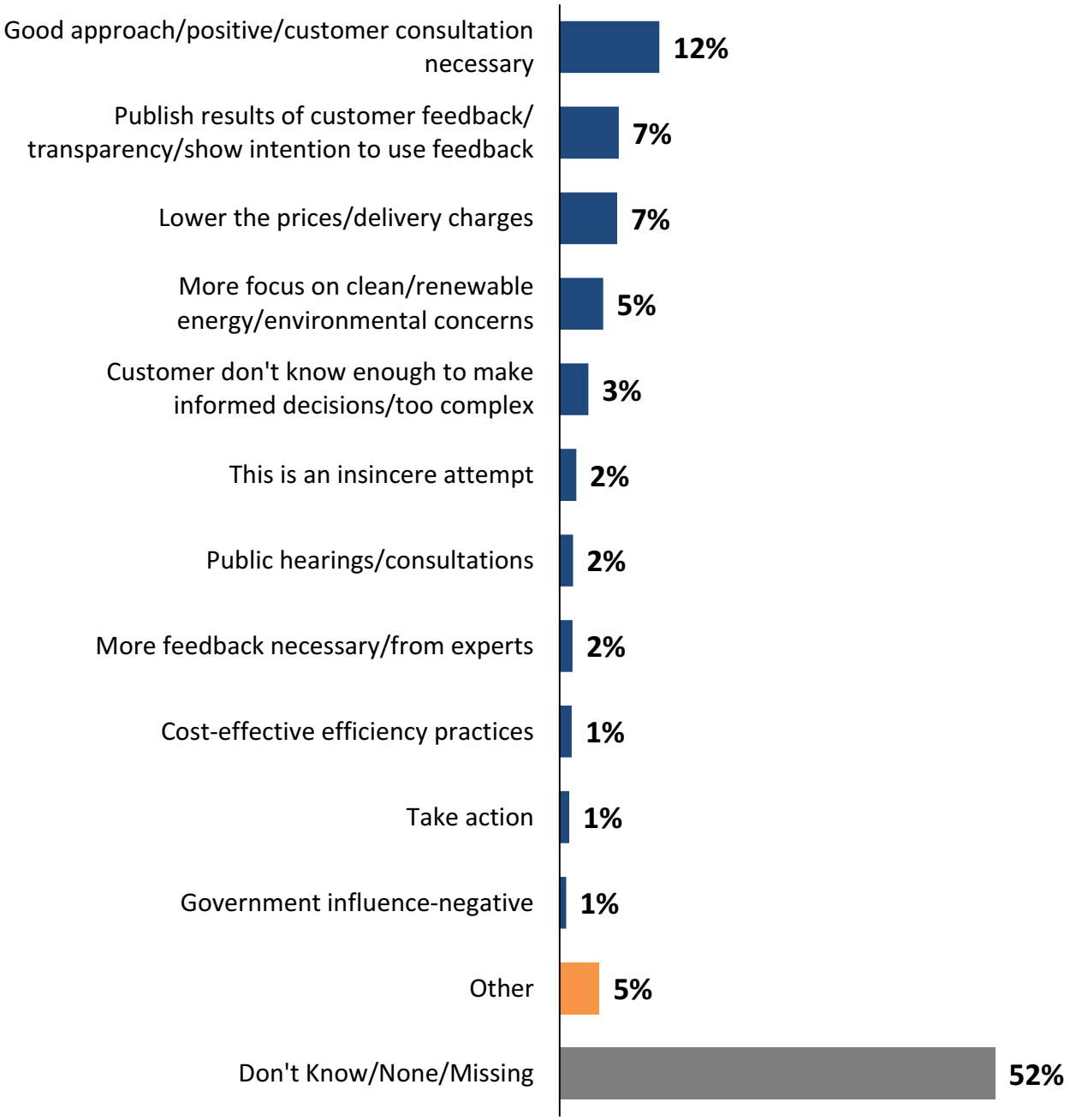


INNOVATIVE RESEARCH GROUP

Building OPG's Plan

Business

Q Is there anything in particular you would change about this approach or any other comments you would like to make?
[asked of all respondents, n=400]

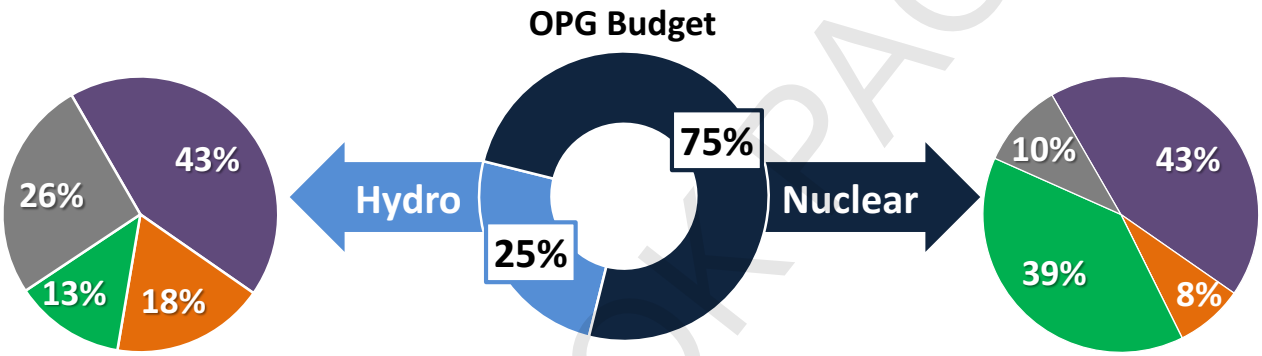


INNOVATIVE RESEARCH GROUP

Where does the money go?

The efficient and cost-effective operation of its facilities is one of OPG's key objectives established by government. OPG is also mandated to operate its generating assets safely and in accordance with all applicable safety and environmental regulations and standards. Any profits are either reinvested in the business or paid out to the Province of Ontario.

OPG manages separate budgets for hydroelectric and nuclear generation. The cost of OPG's Hydro business is $1.3 billion per year. The nuclear business costs a total of $3.2 billion per year.



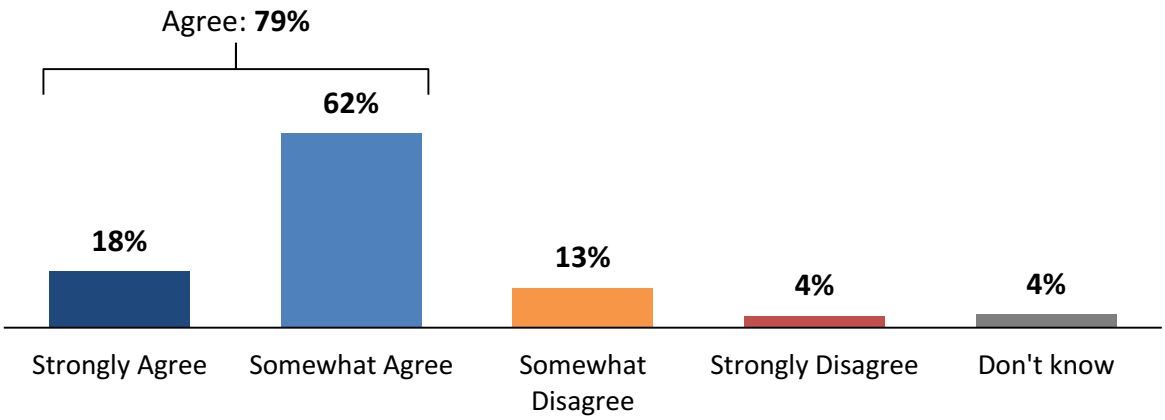
Maintenance	Spending required to keep the existing stations and equipment working at the current level, including both normal daily costs and project investments.
Value Enhancing	Spending that would allow OPG to get more out of existing stations (e.g. refurbishment of Darlington Station), by reducing costs, improving efficiency, or increasing the amount of power generated.
Operating Expenses	Ongoing costs to run the business (e.g. nuclear and hydroelectric station operations, security, engineering, radiation protection services, and support functions such as leased real estate, IT services, finance, human resources, and procurement). More people are needed to run nuclear than hydroelectric stations, so operating expenses represent a larger share of the nuclear budget.
Taxes, Fuel, and Other	Income tax, property tax, corporate insurance, water usage taxes and uranium costs, as well as cost of nuclear station shutdown and handling and disposal of used nuclear fuels and other nuclear waste.

WORKBOOK PAGE

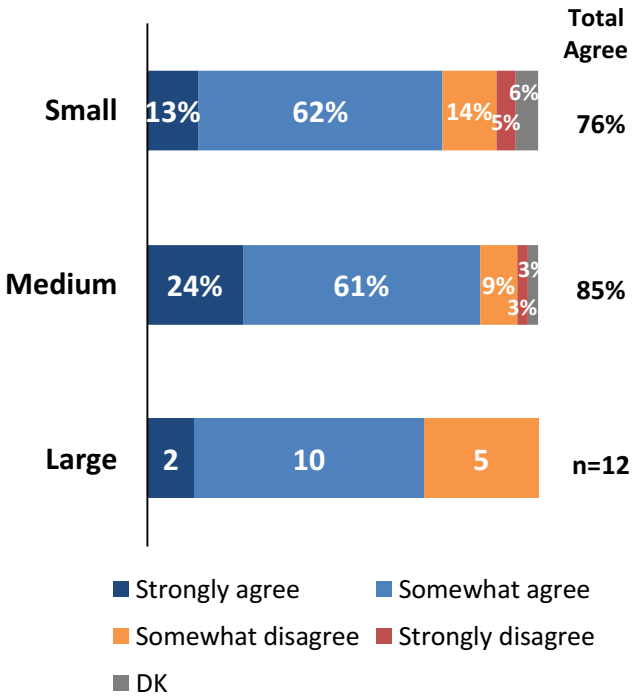
Where does the money go?

Business

Q To what extent do you agree or disagree with the following statement?
I have a general understanding of how OPG spends the rates my organization pays.
[asked of all respondents, n=400]

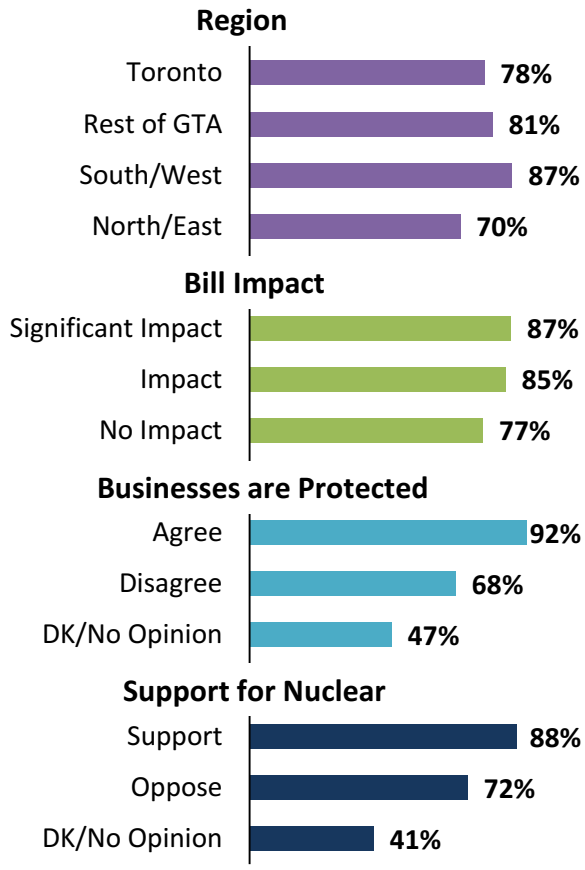


Results by Electricity Consumption



Segmentation:

*Those who "**Strongly/Somewhat Agree**":*



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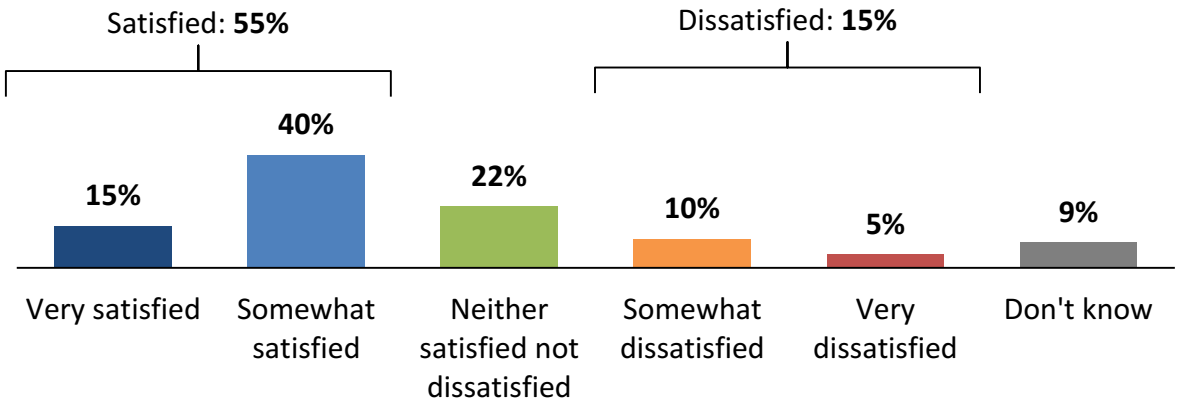
Satisfaction with OPG

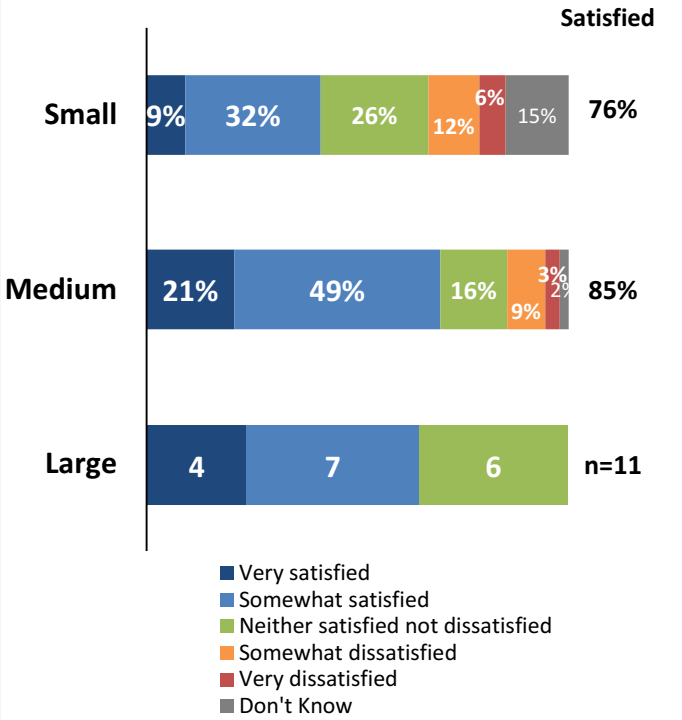
Satisfaction with OPG

Business

Q Now that you've read a bit more about OPG and how it fits into Ontario's electricity system, how satisfied are you with OPG's performance?
[asked of all respondents, n=400]

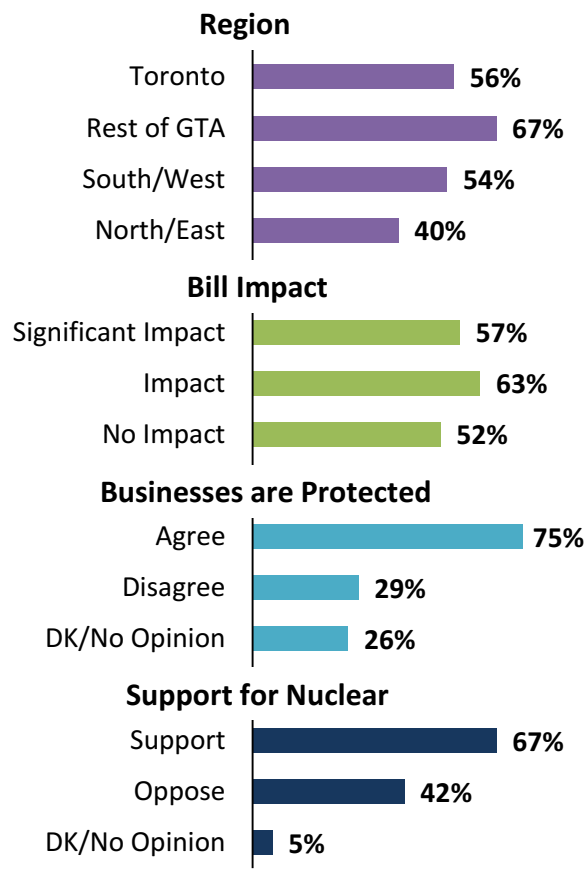


Results by Electricity Consumption



Segmentation:

*Those who say "**Satisfied**":*

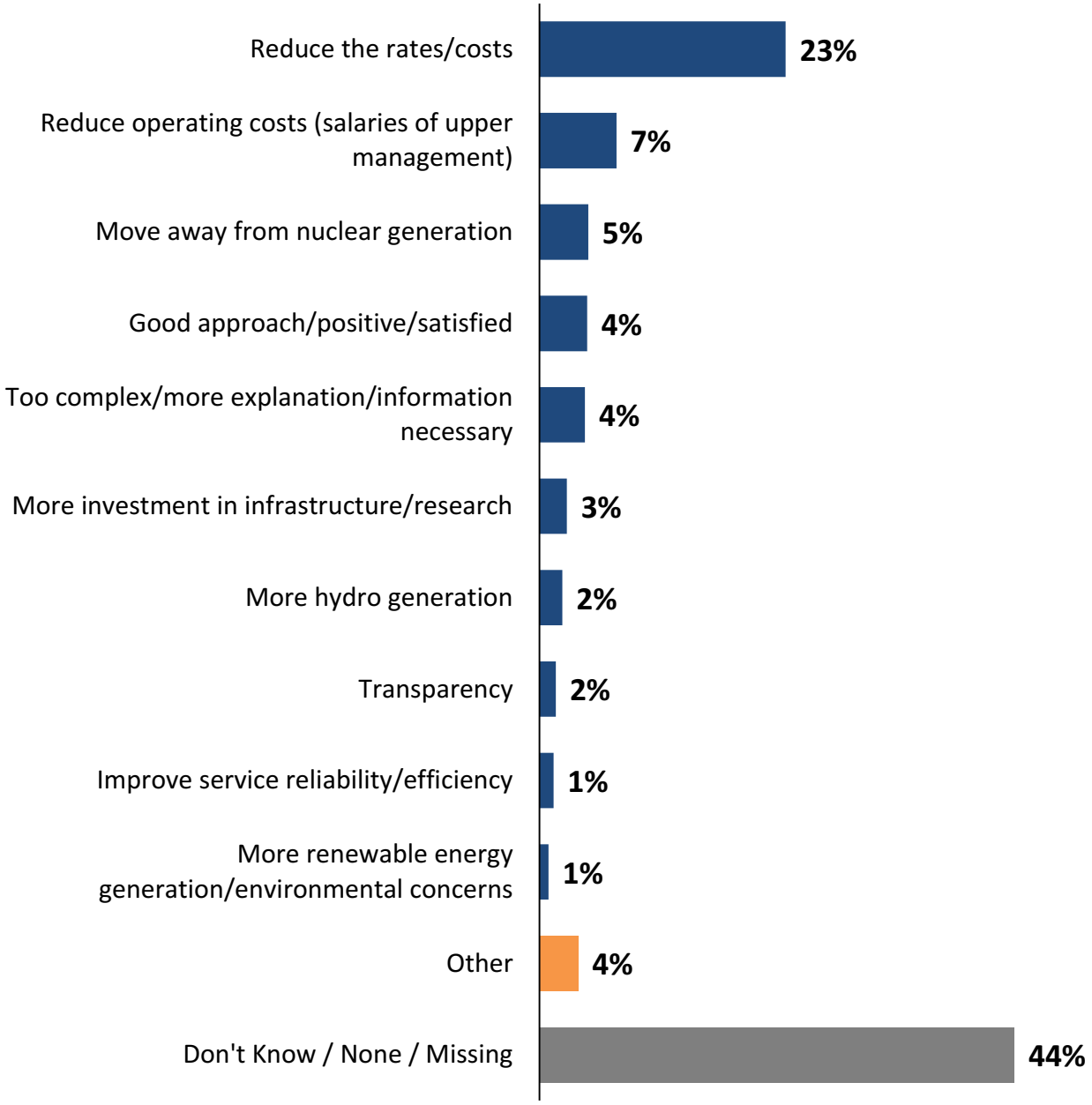


INNOVATIVE RESEARCH GROUP

Suggestions for Improvement

Business

Q Is there anything in particular that OPG could do better for you?
[asked of all respondents, n=400]



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INNOVATIVE RESEARCH GROUP

Making Choices

Rate Smoothing Options

Business

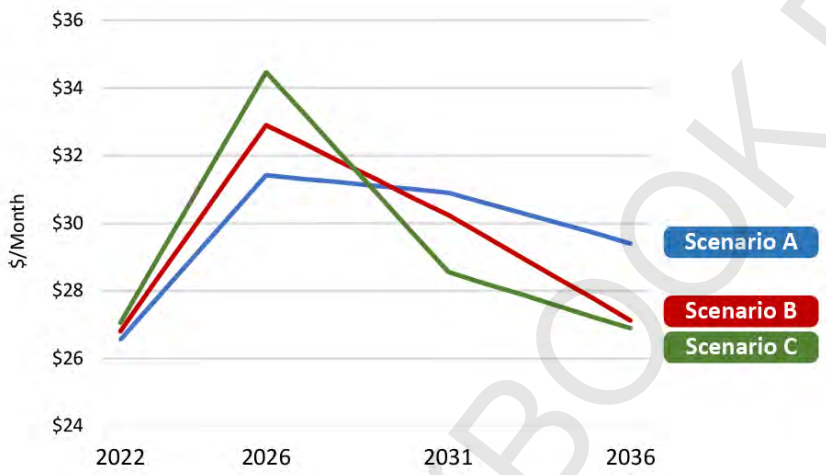
Although it takes years of construction before a major generating station is ready to produce electricity, consumers only pay for those costs once a station is completed and operating. This can create "spikes" in electricity prices. To avoid those spikes, OPG is legally required to propose some form of "rate smoothing" in its next application to the OEB.

OPG wants to hear from you how much rate smoothing you would like to see—a little or a lot?

What does rate smoothing mean?

Rate-smoothing spreads costs over a longer period, avoiding spikes in electricity rates in particular years. OPG can smooth-out increases in its rates by borrowing money to pay for some costs, instead of collecting the cost from customers. However, OPG must pay interest on that borrowed money, which is eventually paid through electricity prices.

The basic trade-off is: Would you prefer paying more now, but less over time? Or less now, but more overall? The chart below shows three example rate smoothing scenarios:



This smoothing only applies to OPG's share of the bill, based on a period of time until 2036. The typical customer bill is based on a typical small business monthly consumption (2,500kWh) and on the OEB "Bill Calculator" for estimating monthly electricity bills.

Q9. Which of the rate smoothing options presented above would you prefer?

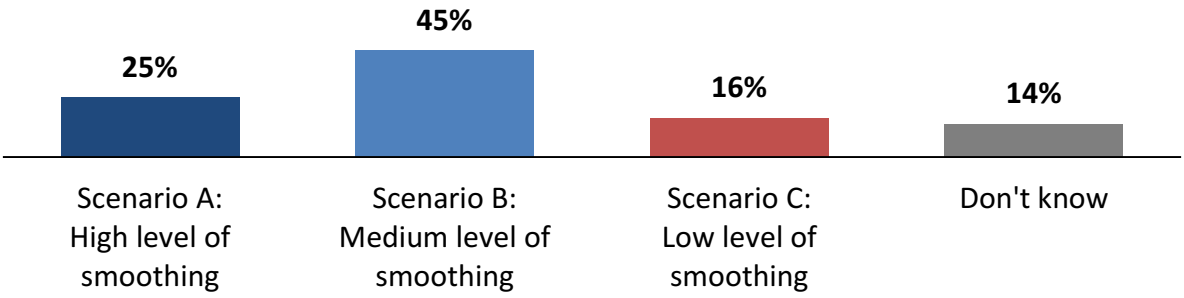
	Scenario	Bill increase	Interest cost
☐	Scenario A: High level of smoothing	Produces the steadiest bills.	Highest total interest costs (approx. $500M higher than Scenario B and approx. $1B higher than Scenario C).
☐	Scenario B: Medium level of smoothing	Produces steadier bills than Scenario C, but less steady bills than Scenario A	Total interest costs that are approx. $500M less than Scenario A, but approx. $500M higher than Scenario C.
☐	Scenario C: Low level of smoothing	Produces higher bills in the 2020s, but lower bills in the 2030s.	Lowest total interest costs of the three scenarios (approx. $500M lower than Scenario B and approx. $1B lower than Scenario A).
☐	Don't know		

WORKBOOK PAGE

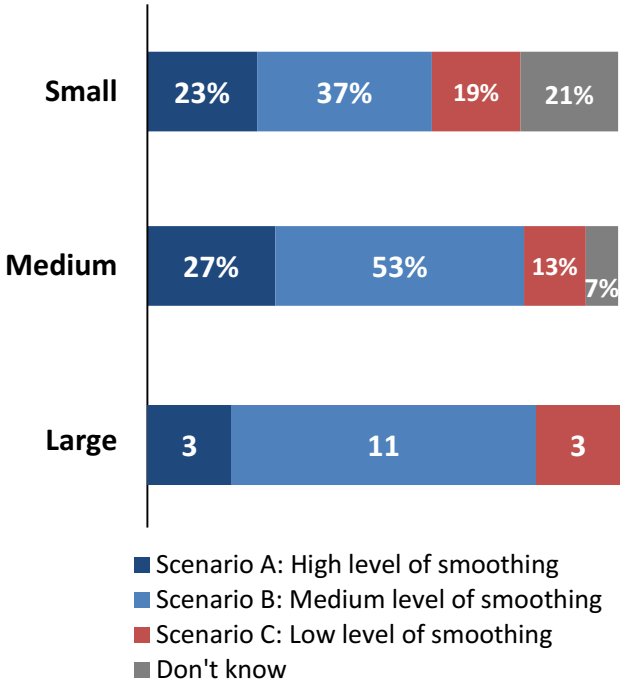
Rate Smoothing Options

Business

Q Which of the rate smoothing options presented above would you prefer?
[asked of all respondents, n=400]

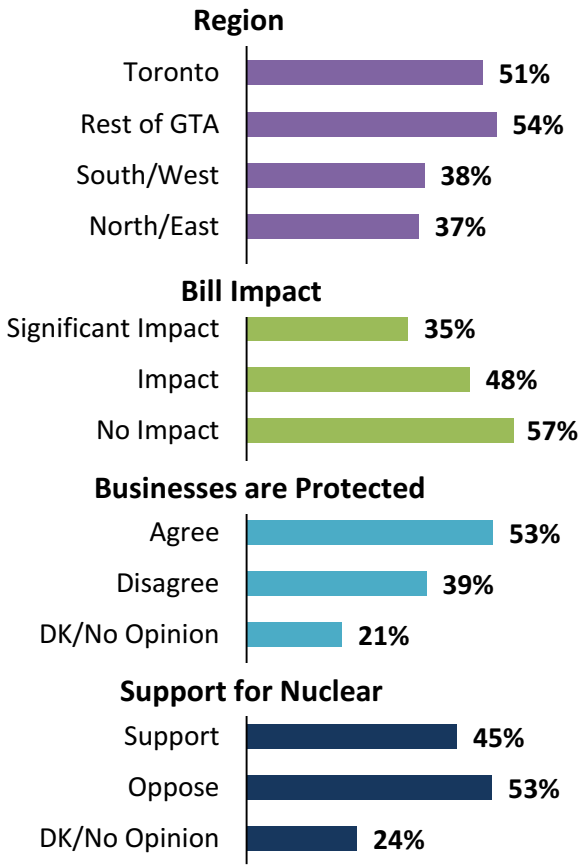


Results by Electricity Consumption



Segmentation:

*Those who say "**Scenario B**":*



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Investing in OPG's Hydroelectric Stations

How does OPG typically invest in its Hydroelectric Stations?

Every year, OPG invests in maintaining its Hydroelectric Stations across the province.
It also invests to increase the amount of electricity produced at some existing hydroelectric stations.

When making investment decisions, OPG has certain options but needs to remember some basic facts:

- Hydroelectric stations use water to generate very low-cost, low-emissions electricity. If these facilities aren't operating, other, more expensive or less clean generation methods may be needed.
- Hydroelectric generation equipment consists of large, custom-made parts. Ordering and installing replacement parts requires significant lead time.
- **Ontario currently has an energy surplus**. However, the province is likely to need more power in about 5 years.
- That means, increasing the capacity of existing hydroelectric stations is not absolutely necessary in the short term. However, because the system is currently not strained, now could be a good time to do the work on long-term projects that require hydroelectric stations to shut down while the work is underway.
- Doing the work sooner, rather than later, would reduce the risk of equipment failure and make the total cost more predictable, and possibly lower. However, doing the work now would also mean making major investments now and raising rates rather than delaying the costs.

For the 2020-2026 period, OPG must make decisions about the timing and pace of investments in its Hydroelectric Stations.

BOOK PAGE

Overhauling Hydroelectric Stations

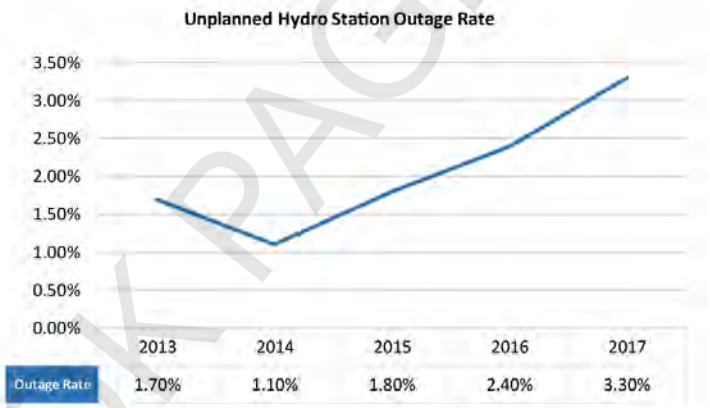
Business

OPG must periodically take its Hydroelectric Stations out of service to do major maintenance and repair work. Whenever OPG takes its generators off-line, it is called an "outage." Outages can be planned in advance, or they can happen because of unexpected equipment issues.

The graph below shows how often OPG has had to take generators off-line unexpectedly. When OPG has to do unplanned maintenance work, it is generally more expensive than work that is planned in advance.

As shown in this graph, the frequency of these unplanned outages has been increasing at OPG's Hydroelectric Stations since 2014.

OPG believes it can reverse this trend and restore these outages to historic levels by increasing the pace of major maintenance projects (called "overhauls") at its Hydroelectric Stations.



Q11. In the 2020 to 2026 period, OPG plans to increase the number of overhauls it does each year. OPG must also decide on the right *pace* for that overhaul program. Which approach would you prefer?

	Options	Pros	Cons
☐	**Faster pace** Average investment: **$86M** per year Bill impact*: **$1.02 cents** per month	Most reliable hydroelectric generation at the fastest pace; good timing for major repairs	Higher investment costs in the short-term than other approaches
☐	**Moderate Pace** Average investment: **$72M** per year Bill impact*: **85 cents** per month	More reliable hydroelectric generation; repairs come at a reasonable time; lower investment costs in the short-term than in the faster pace	Less reliable hydroelectric generation; lower investment in overhauls will lead to higher costs and bills in the future
☐	**Slower Pace** Average investment: **$57M** per year Bill impact*: **68 cents** per month	Lower investment costs in the short-term than other approaches	Least reliable hydroelectric generation; lower investment in overhauls will lead to higher costs and bills in the future
☐	**Don't know**		

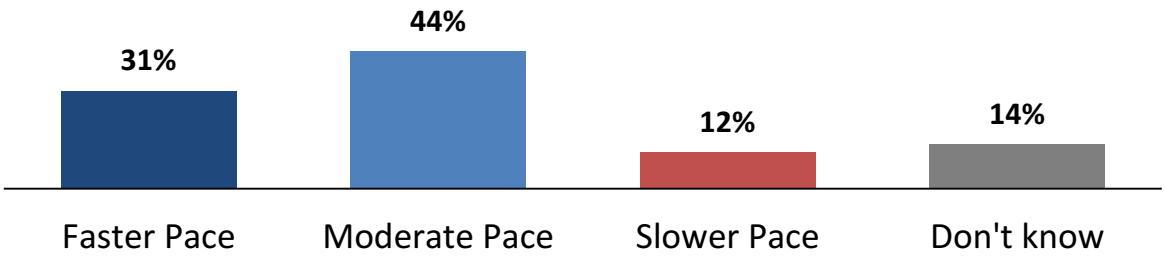
WORKBOOK PAGE

Overhauling Hydroelectric Stations

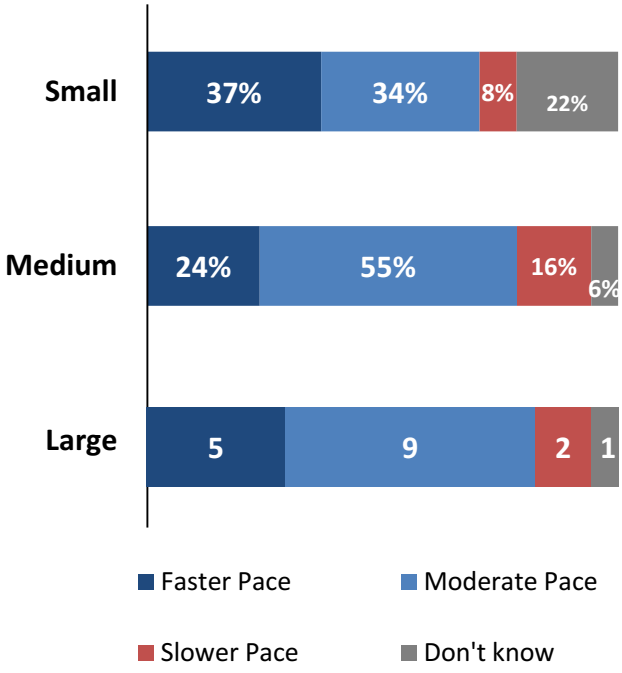
Business

Q In the 2020 to 2026 period, OPG plans to increase the number of overhauls it does each year. OPG must also decide on the right pace for that overhaul program. Which approach would you prefer?

[asked of all respondents, n=400]

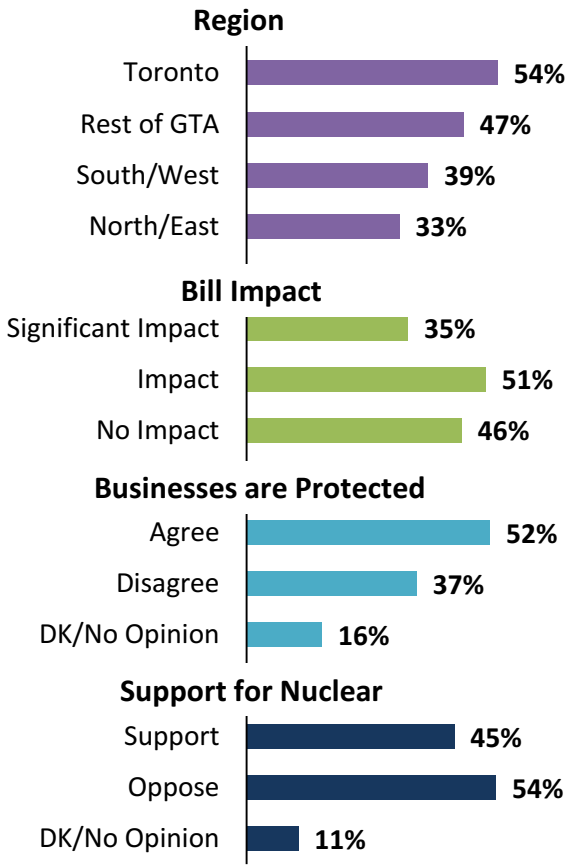


Results by Electricity Consumption



Segmentation:

*Those who say "**Moderate Pace**":*



INNOVATIVE RESEARCH GROUP

Niagara Frequency Conversion Project

Business

This is a project where the timing is flexible.

OPG's Sir Adam Beck I Station was the first hydroelectric station at Niagara Falls.

When the station started operating in 1922, North America's electric grid ran at a frequency of 25 Hz. In the 1950s, the grid converted to the 60 Hz standard that is still used today.

OPG converted most of the "units" at the Sir Adam Beck I station to the new standard, but kept two units on the old 25 Hz standard to power steel plants and other large industrial customers who continued to use the old frequency. The last of these customers were converted to the new standard in 2009. Since that time, the two 25 Hz units have been disconnected, because they are incompatible with the modern grid.

While in previous years, there was no room in the transmission system for more 60 Hz power, the system has recently been expanded. OPG has to decide whether to proceed with the project now or later. Regardless of the timing, both units will be converted together, because there are savings associated with converting both at the same time.

Q13. OPG is planning to convert the two 25 Hz units to the modern 60 Hz standard, and it needs to decide when to do the work. Which of the following options do you prefer?

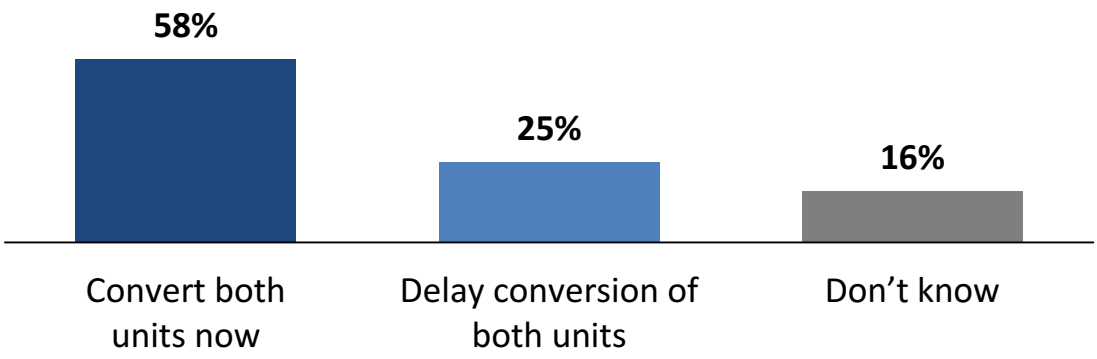
	Options	Pros	Cons
☐	**Convert both units now**	Increase the amount of power that can be generated at the station; access to unused capacity sooner, allowing more flexibility in the system while nuclear stations undergo refurbishment; additional power could help offset reduced production when Pickering Station is closed	Replacement costs of approximately $120 million would occur now, resulting in 25 cents more on a typical customer's monthly bill. The new power will be added while the provincial system may still have a surplus of power.
☐	**Delay conversion of both units**	Replacement costs would be deferred in the short-term. Depending on the provincial demand for electricity in the early 2020s, the delayed approach may better align with the needs of the grid.	Potentially higher total replacement costs; less opportunity to offset energy production while nuclear stations undergo refurbishment; additional power may not be available to offset reduced production when Pickering Station is closed
☐	**Don't know**		

WORKBOOK PAGE

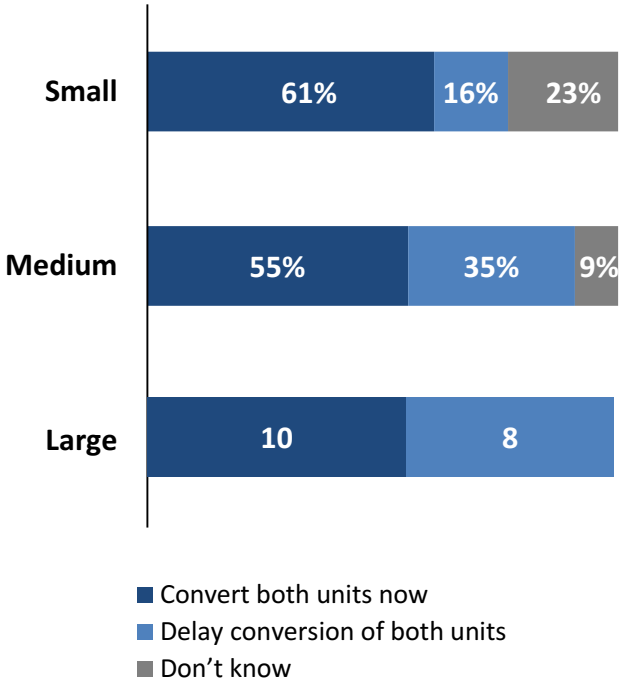
Niagara Frequency Conversion Project

Business

Q OPG is planning to convert the two 25 Hz units to the modern 60 Hz standard, and it needs to decide when to do the work. Which of the following options do you prefer?
[asked of all respondents, n=400]

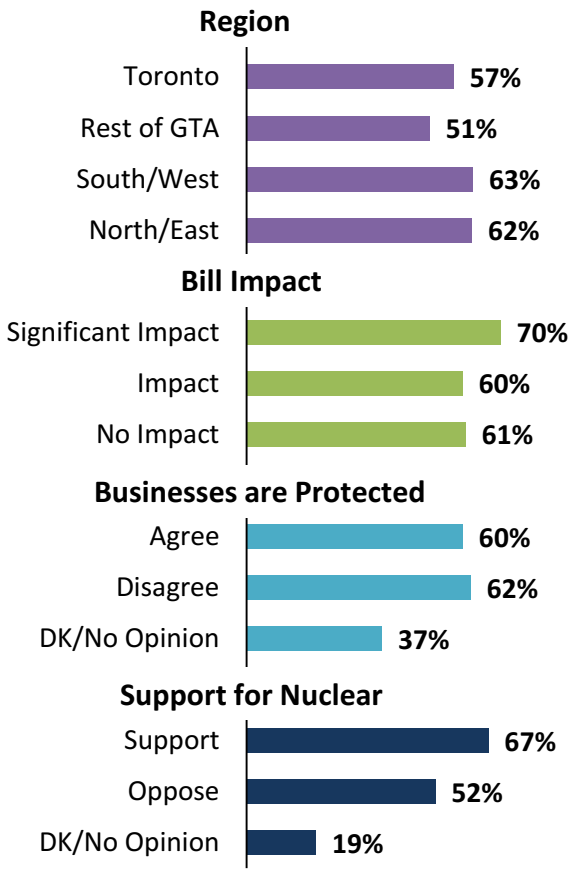


Results by Electricity Consumption



Segmentation:

*Those who say "**Convert Now**":*



INNOVATIVE RESEARCH GROUP

Making the Pickering Station Site Available for Other Uses

Business

What is Pickering Station?

Pickering Nuclear Generating Station is located on the shore of Lake Ontario, just east of Toronto.

The station has served Ontario for almost five decades, and currently provides approximately 14% of the province's electricity – enough to power a city of 1.5 million people. Pickering Station is also a major employer and contributes approximately $1.5 billion to Ontario's GDP each year.

Pickering Station will soon be reaching the end of its life and is scheduled to shut down in 2024.

Making the Pickering Station site available for other uses

Pickering Station occupies a large, valuable site on the shores of Lake Ontario on the east side of the GTA, which encompasses approximately 500 acres of land and 250 acres of water lots.

After the station shuts down, the site will be returned to a state that allows it to be used for many different purposes. The current **standard approach** to get there takes about **45 years**.

OPG has done some research that indicates the total time to safely shut down a nuclear station could be reduced to about **25 years**. That would allow the site to be put back to use for other purposes sooner.

This public benefit would come at a cost though. Early OPG estimates suggest the cost of accelerated shut-down at Pickering Station would be about $500 million to $1.5 billion. This may result in a typical customer paying about $3 to $9 more on their monthly bill over the remaining operating life of Pickering Station.

Repurposing Pickering

OPG has held a public consultation to gather information and ideas from the community to develop a long-term plan for redeveloping available site lands during and after shutting down Pickering Station.

What is involved in safely shutting down a nuclear site?

- De-energizing the nuclear systems and components
- Removing irradiated nuclear fuel and water from the reactor core
- Monitoring the site for approximately 30 years after removal to allow nuclear radiation fields to decay naturally
- Dismantling the reactor and removing radioactive components
- Safely demolishing the site structures

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Making the Pickering Station Site Available for Other Uses

Business

Q15. Would you be willing to pay more on your monthly bill until the end of Pickering Station's operations, to reduce the shut-down period to approximately 25 years and have the land available for other purposes sooner?

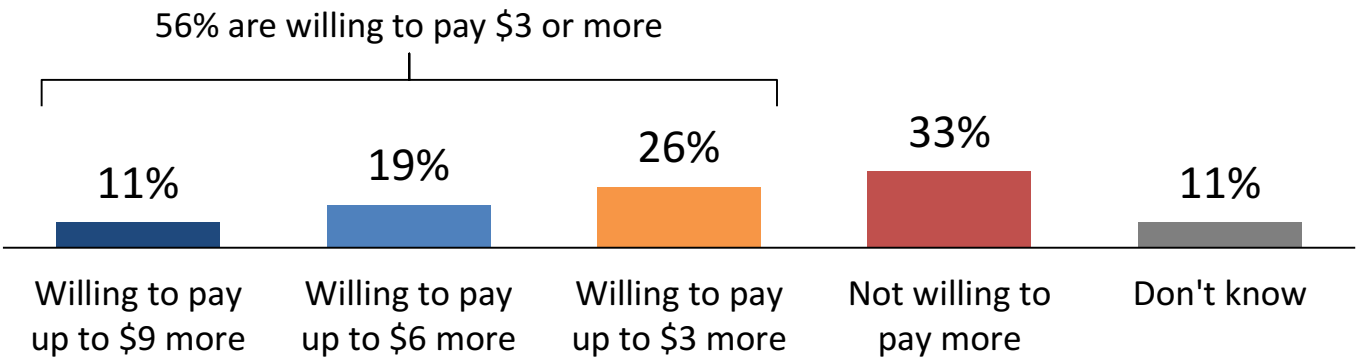
- ☐ I would be willing to pay up to $9 more on my monthly bill for an accelerated approach, as long as the process is safe and other approvals are obtained.
- ☐ I would be willing to pay up to $6 more on my monthly bill for an accelerated approach, as long as the process is safe and other approvals are obtained.
- ☐ I would be willing to pay up to $3 more on my monthly bill for an accelerated approach, as long as the process is safe and other approvals are obtained.
- ☐ I would not be willing to pay more, even if the standard approach means it will take 45 years to have the land available for other purposes.
- ☐ Don't know

WORKBOOK PAGE

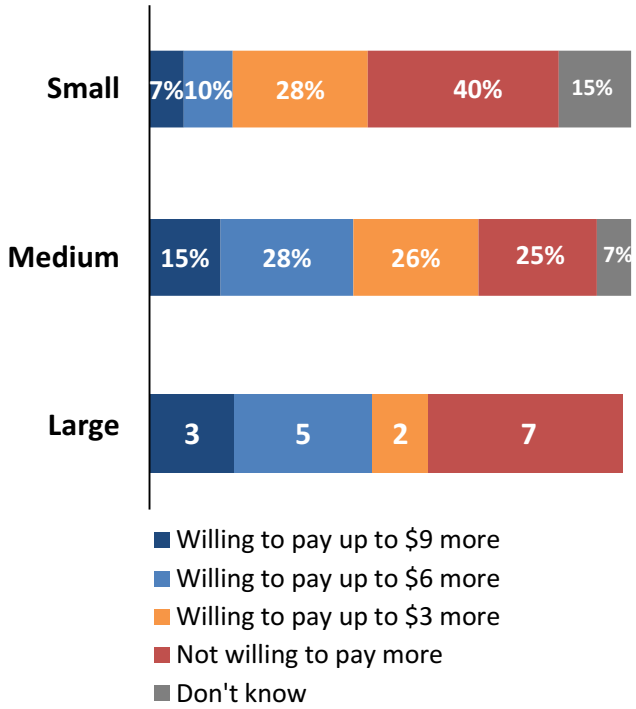
Making the Pickering Station Site Available for Other Uses

Business

Q Would you be willing to pay more on your monthly bill until the end of Pickering Station's operations, to reduce the shut-down period to approximately 25 years and have the land available for other purposes sooner?
[asked of all respondents, n=400]

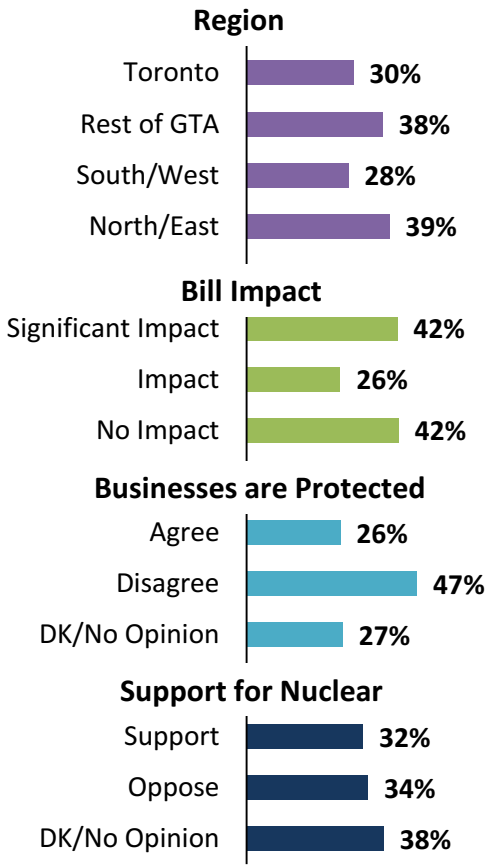


Results by Electricity Consumption



Segmentation:

*Those **not willing to pay more**:*



INNOVATIVE RESEARCH GROUP

Darlington Vapour Recovery System Improvement

Business

This project is to improve the efficiency and reliability of the Vapour Recovery System (VRS) at Darlington Station.

What is the VRS?

This is one of the systems responsible for controlling the tritium emissions at the station.

The VRS requires improvement or replacement, as its efficiency and reliability are challenged by changing external factors, such as:

- Rising lake temperatures affect the system's air-water coolers, leading to higher radiation doses from tritium to workers and higher tritium emissions to the environment. However, both remain well within the regulatory limit.
- The Darlington Refurbishment Program requires the presence of more personnel at the station than the VRS was originally designed for.
- Some components within the VRS have no back-up, which makes it impossible to maintain them without impacting operations or emissions.

To address these challenges, OPG has two options. Both options deliver tritium levels well below the regulatory standard.

What does the VRS do?

- Recover water containing tritium to minimize losses
- Minimize radiation doses to workers in the reactor
- Minimize tritium emissions to the environment

What is tritium?

Tritium is a radioactive form of hydrogen that is a by-product of nuclear power generation.

Darlington Station's airborne tritium emissions are well within the regulatory limits (less than 1% of what is legally allowed).

Historically, the station has also performed better than average when compared to other nuclear plants with the same technology worldwide.

Historic and Target Airborne Tritium Emissions at Darlington Station	
2014	
2015	
2016	
2017	
2018	
2019-21	
2026	

Legend	
	Best performers (top 25 percent)
	Worst performers (bottom 25 percent)

WORKBOOK PAGE

Darlington Vapour Recovery System Improvement

Business

Q17. OPG needs to decide whether to improve the existing system or replace the system with a higher capacity system. In either case, OPG expects to be within the top 25% of nuclear generators with the same reactor technology for airborne tritium emissions. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Improve existing VRS**	Improve vapour removal capability of the VRS, leading to lower tritium levels in containment and confinement, lower doses to workers, and lower emissions to the environment	Improvement costs of approximately $30 million, resulting in 6 cents more on a typical customer's monthly bill; OPG's performance results may not be as favourable as in OPG's alternative option but will still be well below regulatory standards
☐	**Replace VRS with a higher capacity system**	Larger dryers can take more tritium out, resulting in even lower emissions and radiation compared to the above option; OPG's performance results will be more favorable compared to the above option and will continue to be well below the regulatory standards	Replacement costs of approximately $65 million, resulting in 12 cents more on a typical customer's monthly bill
☐	**Don't know**		

WORKBOOK PAGE

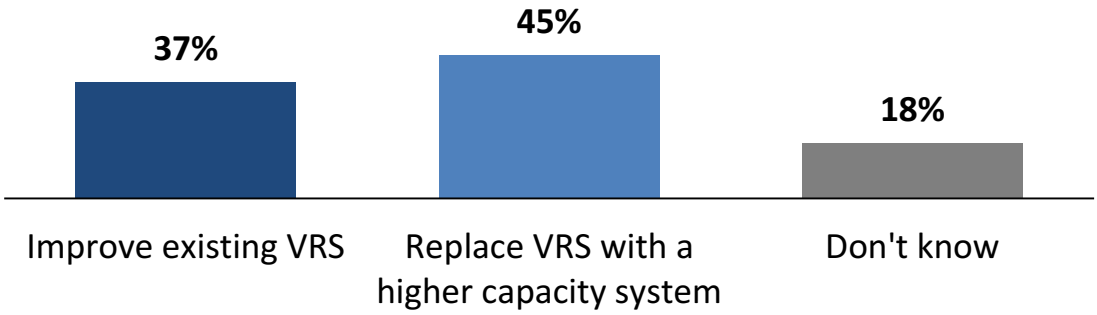
Darlington Vapour Recovery System Improvement

Business

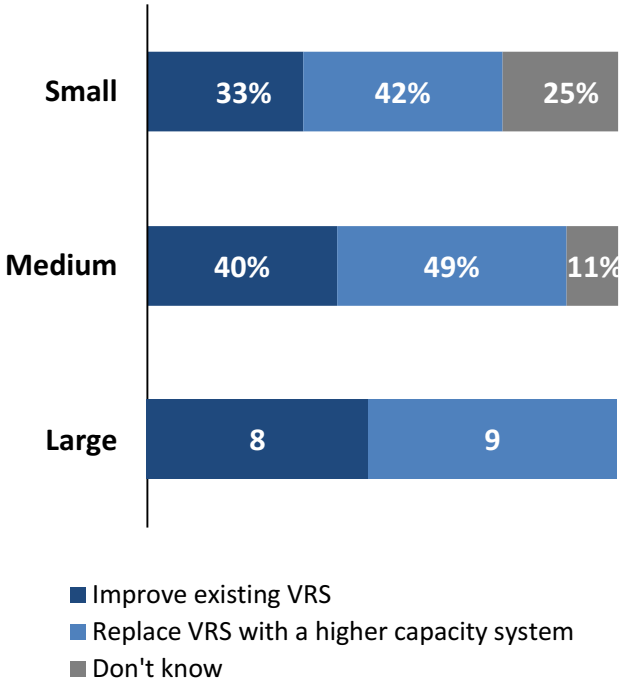
Q

OPG needs to decide whether to improve the existing system or replace the system with a higher capacity system. In either case, OPG expects to be within the top 25% of nuclear generators with the same reactor technology for airborne tritium emissions. Which of the following options do you prefer?

[asked of all respondents, n=400]

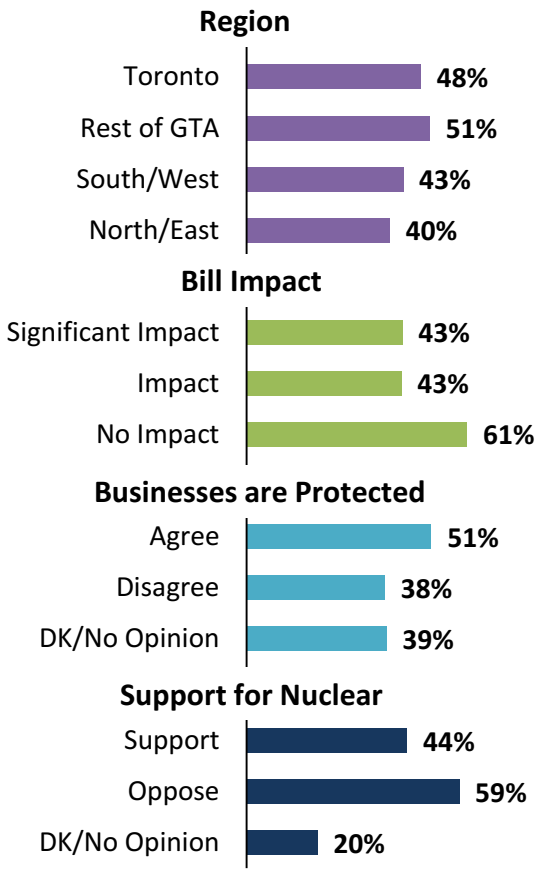


Results by Electricity Consumption



Segmentation:

*Those who say "**Replace VRS**":*



INNOVATIVE RESEARCH GROUP

Darlington Air Compressor Replacement

Business

This project is to replace the 19 air compressors used to supply compressed air at Darlington Station. The current compressors have been in-service for over 30 years and their current condition is rated as fair.

The equipment manufacturer no longer makes parts for the model of compressor in use at Darlington Station. Eventually, OPG will have to replace all 19 compressors. However, the company has a choice in how quickly it does the replacement.

The table below shows what compressed air is used for at Darlington Station and what happens if compressors fail.

Purpose	What the system does	Risks if compressors fail
Service Air	This system supplies air-powered tools and hoists throughout the station.	Service air unavailability would impact the operation of tools and hoists needed to maintain station equipment. This could result in additional outages as back-up solutions are implemented.
Breathing Air	This system supplies air for worker protection from radioactive contamination in the reactor vault. Breathing air is used for air-supplied masks for airborne contamination and for plastic suits, which protect against airborne, liquid and surface contamination.	Unavailability of breathing air compressors would restrict the ability of operators and maintenance personnel to work in areas of high contamination. This could result in impacts on production due to inability to operate or maintain equipment in these areas.
Instrument Air	This system supplies very dry high pressure air that is used to operate valves in various systems throughout the station.	Instrument air unavailability would affect the operation of valves with important process and safety functions in the station. While these valves are designed to fail in their safe position upon loss of instrument air, increasing unreliability of the instrument air due to failure of compressors would result in operational upsets up to and including additional forced outages and costs.

WORKBOOK PAGE

Darlington Air Compressor Replacement

Business

Q19. OPG needs to decide whether to proactively replace all of the air compressors or purchase some spares and replace as the existing compressors fail. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Proactively replace all 19 air compressors**	Improved reliability of air compressors; reduced probability of forced outages or extensions to planned outages; reduced worker tritium doses; reduced maintenance complexity by standardizing on one make and model of air compressor; reduced spare parts inventory requirements by standardizing on one make and model of air compressor	Replacement costs of approximately $30 million, resulting in 6 cents more on a typical customer's monthly bill
☐	**Acquire 4 spare air compressors initially and replace as in-service compressors fail. Acquire and replace compressors until all 19 are replaced.**	Initial costs of approximately $5 million, resulting in 1 cent more on a typical customer's bill; other replacements will be deferred to a later date	Added costs to replace compressors as they fail over time; long-term costs likely higher, totalling up to $50 million; increased chance of unplanned or extended planned outages; potential impact on worker radiation doses; potential risk that replacement parts will not be available later in replacement cycle, resulting in increased maintenance complexity and spare parts inventory requirements
☐	**Don't know**		

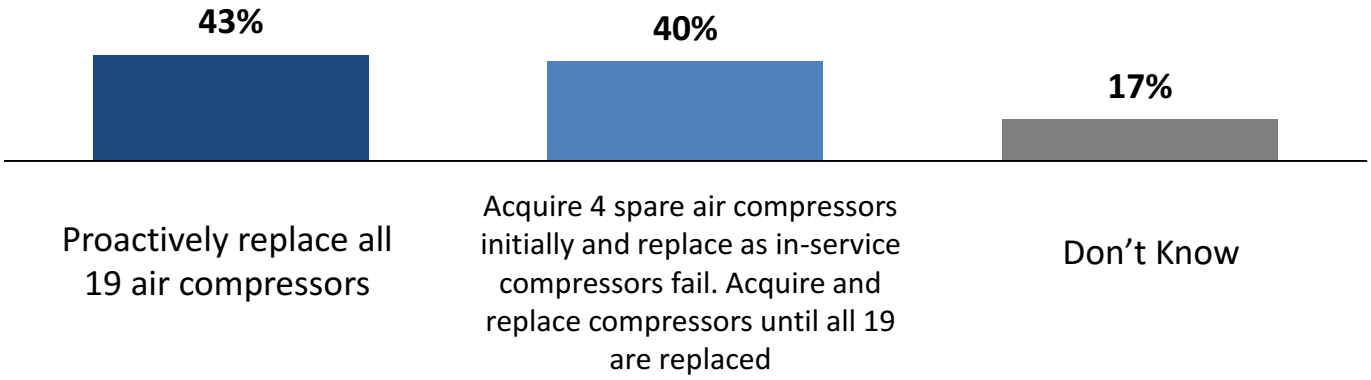
WORKBOOK PAGE

Darlington Air Compressor Replacement

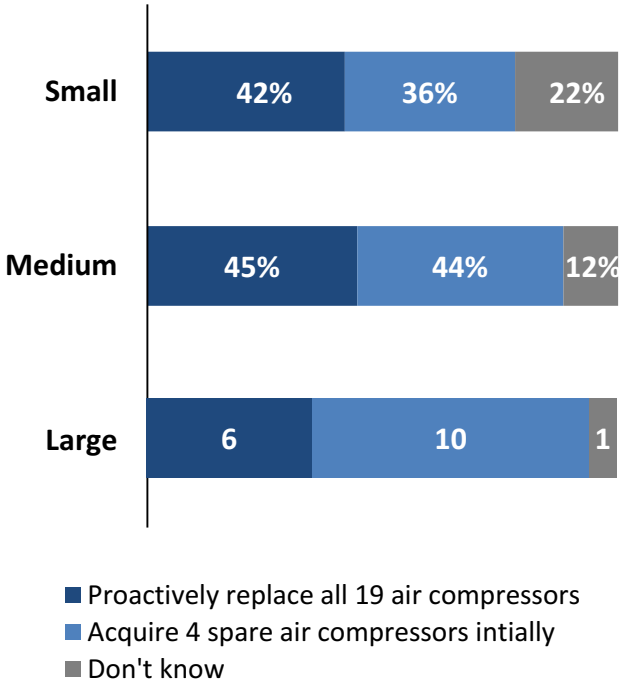
Business

Q OPG needs to decide whether to proactively replace all of the air compressors or purchase some spares and replace as the existing compressors fail. Which of the following options do you prefer?

[asked of all respondents, n=400]

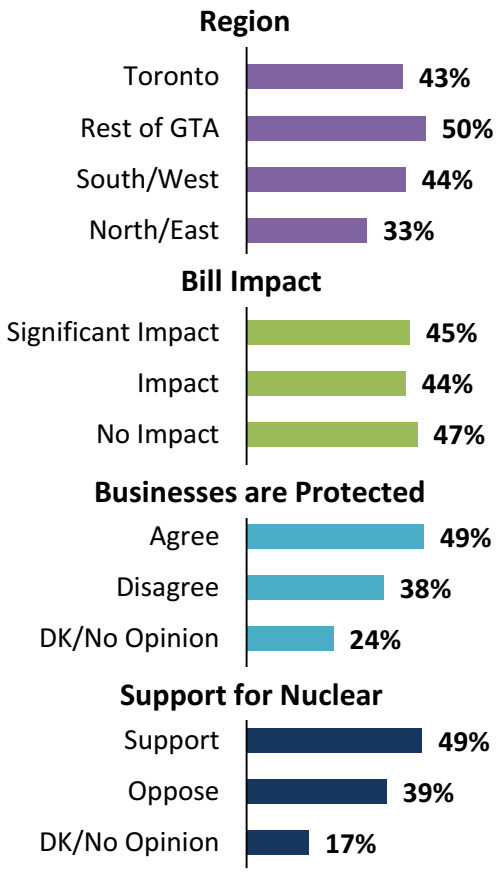


Results by Electricity Consumption



Segmentation:

*Those who say "**Proactively Replace**":*



INNOVATIVE RESEARCH GROUP

Darlington Crane Group Project

Business

This project is to refurbish the 20 major cranes at Darlington Station, with capacities up to 200,000 kg, that are used to support operations, maintenance and refurbishment activities. The function of these cranes is to safely lift and move material, equipment and irradiated fuel.

These cranes have been in-service since the 1980's. A third party assessment of station cranes concluded that the cranes are in fair to poor condition and will require refurbishment to provide reliable service until the end of Darlington Station's commercial service.

Experience from other utilities indicates that major cranes such as these are refurbished when they have been in-service for 30 years.

The work involved with refurbishing the cranes includes:

- Controls upgrade including addition of remote pendant
- Inspection of rails
- Replacement of motors, gear boxes, brakes and wire ropes

Q27. OPG needs to decide whether to refurbish all of the cranes or only the 14 most critical ones. Which of the following options do you prefer?

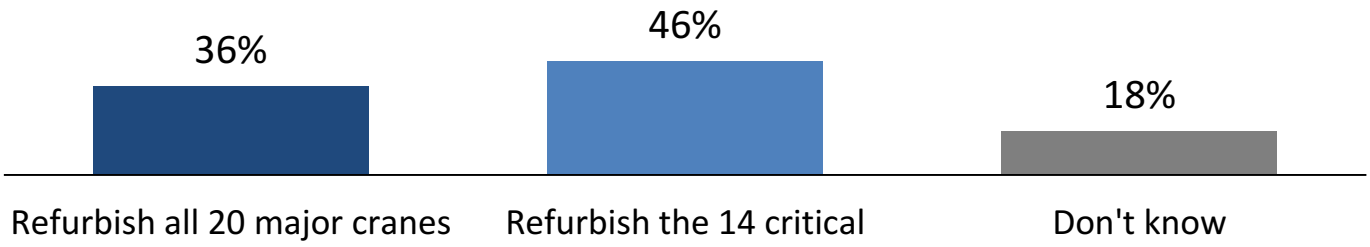
	Options	Pros	Cons
☐	**Refurbish all 20 major cranes**	Ensure reliable operation to end of Darlington Station's commercial service; eliminate risk of mechanical failure that could result in dropped loads and damage to surrounding equipment; ensure improved availability of replacement parts and manufacturer service support	Refurbishment costs of approximately $75 million, resulting in 14 cents more on a typical customer's monthly bill
☐	**Refurbish the 14 critical cranes now and the other 6 later**	Same as Option 1 for the 14 refurbished cranes; reduced immediate refurbishment costs of approximately $65 million ($10 million lower than Option 1), resulting in 12 cents more on a typical customer's monthly bill	Reliability of the 6 non-refurbished cranes is likely to decrease with time; spare parts necessary to maintain the 6 non-refurbished cranes may not be available in the future; potential risk of damage to the facility if failure results in a load being dropped
☐	**Don't know**		

WORKBOOK PAGE

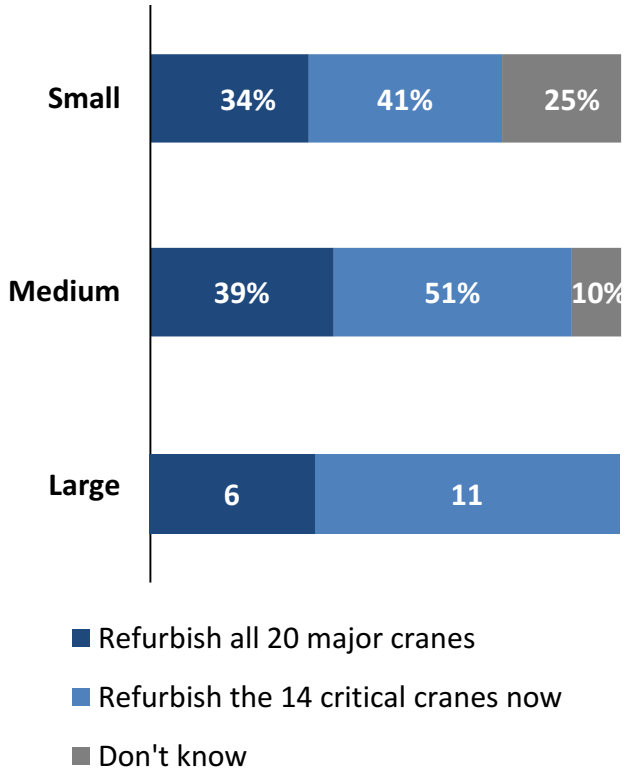
Darlington Crane Group Project

Business

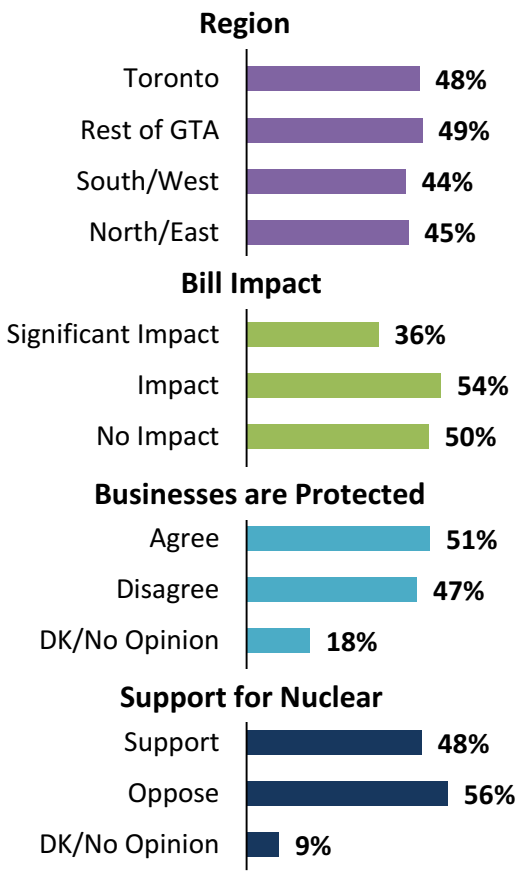
Q OPG needs to decide whether to refurbish all of the cranes or only the 14 most critical ones. Which of the following options do you prefer?
[asked of all respondents, n=400]



Results by Electricity Consumption



Segmentation:
*Those who say "**Refurbish 14 now**":*



INNOVATIVE RESEARCH GROUP

Investing in Technology to Create Efficiencies

Efficiency Initiatives

OPG is also developing initiatives that will reduce costs and create efficiencies throughout the company. OPG expects that these investments will **increase the reliability of its stations**, **improve safety**, and allow it to plan its **work more efficiently**.

Over the 2020 to 2026 period**, OPG is considering investing between $30 million and $60 million on these initiatives. OPG expects that these investments will save or avoid $50 million to $100 million in costs.**

Increased use of data and innovative technology

- OPG is actively looking for areas where better data and innovative technological solutions can deliver value for money. For example, OPG is in the process of creating a **Monitoring & Diagnostic Centre**, which will use advanced sensors and data analysis to improve the performance and reliability of OPG's nuclear generating equipment.
- OPG is also planning to use new technologies to improve safety and efficiency at its nuclear stations. As an example, OPG is testing a program to use drones to monitor the radiation levels around its nuclear plants.
- In order to operate and maintain its hydroelectric stations in the most cost-effective manner, OPG is looking to invest in technologies that would allow these stations to be monitored for safety and maintenance requirements remotely and proactively identify maintenance needs.

OPG will only invest in technologies that would deliver value for money. OPG would only proceed with new technologies that are expected to more than pay for themselves.

WORKBOOK PAGE

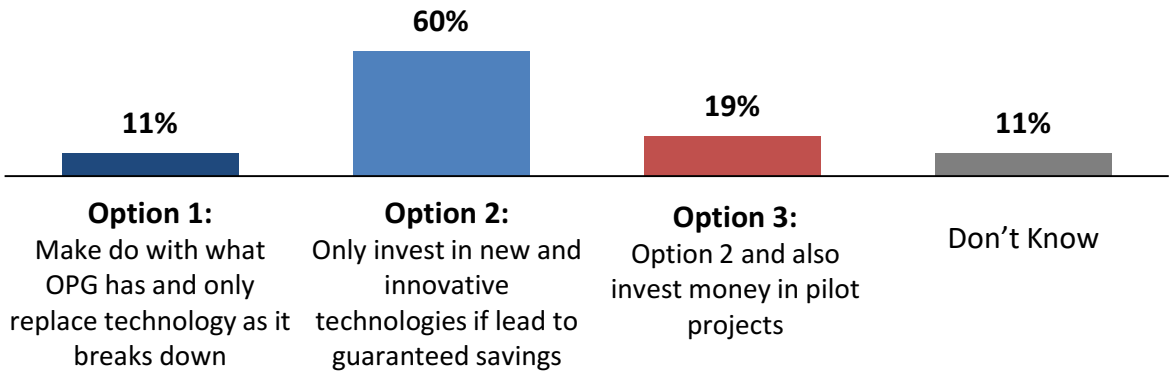
Q29. Which of the following statements best reflects your own point of view?

- ☐ Option 1: OPG should make do with what it has and only replace technology as it breaks down
- ☐ Option 2: OPG should only invest in new and innovative technologies if there is proof that these technologies will lead to guaranteed savings
- ☐ Option 3: OPG should pursue Option 2 and also invest money in pilot projects in cases where no previous evidence of guaranteed savings exists, but where the company sees a good chance that it would lead to savings
- ☐ Don't know

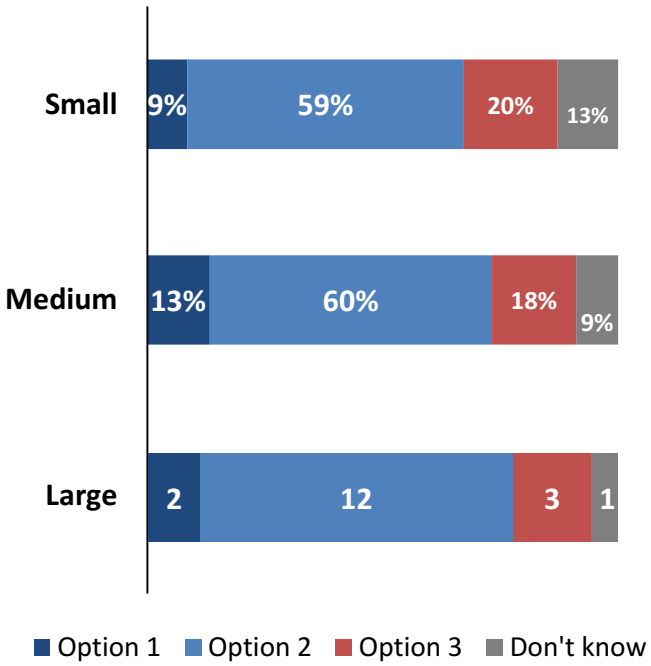
Investing in Technology to Create Efficiencies

Business

Q Which of the following statements best reflects your own point of view?
[asked of all respondents, n=400]

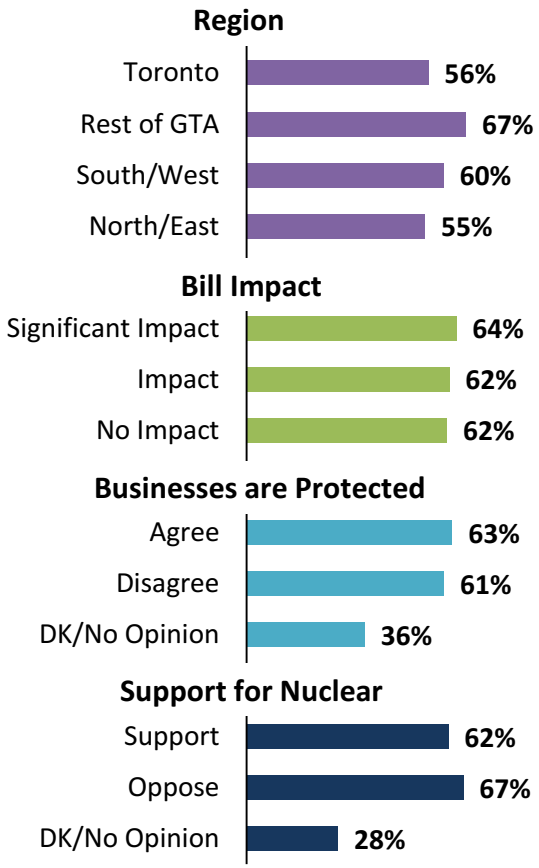


Results by Electricity Consumption



Segmentation:

*Those who say "**Option 2**":*



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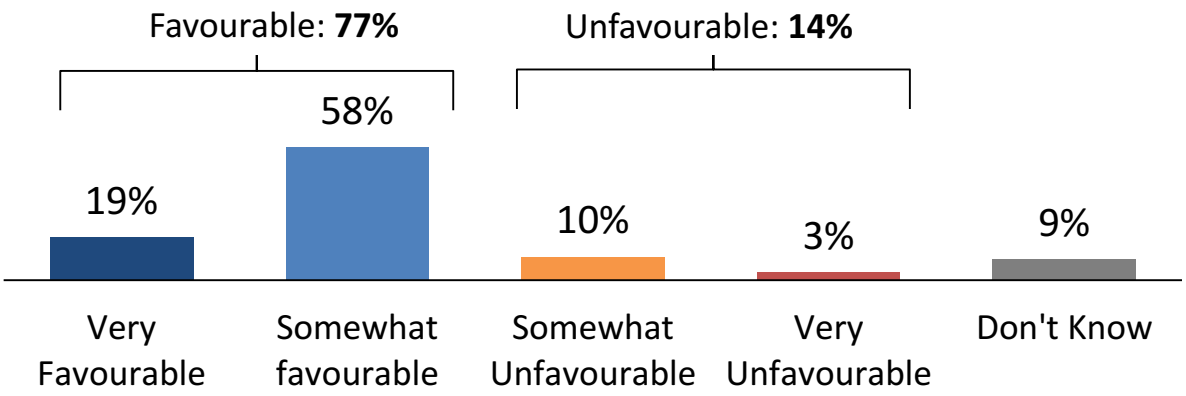
Workbook Diagnostics

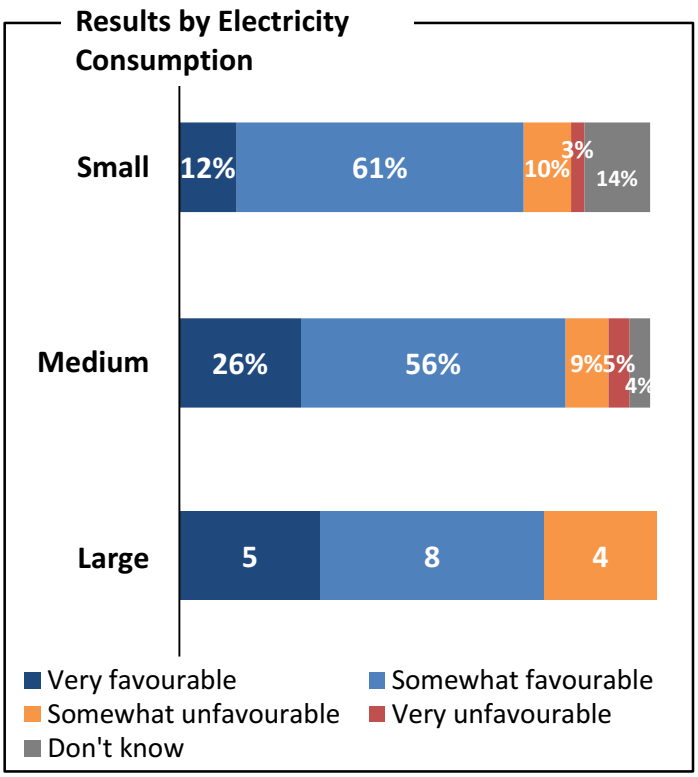
Overall Impression of the Workbook

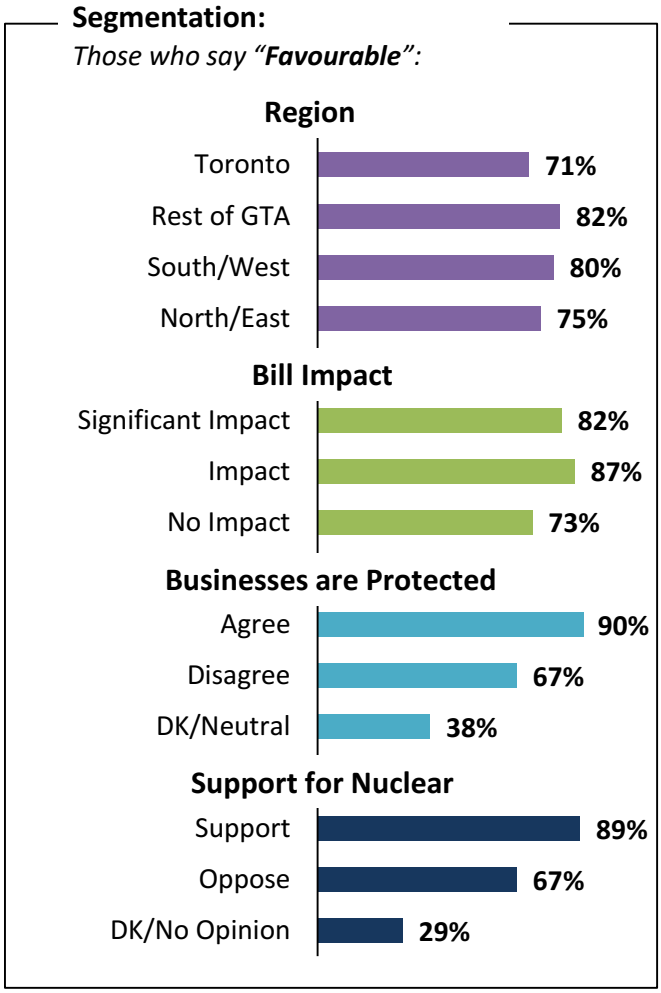
Business

Q Do you have a favourable or unfavourable impression of the workbook?

[asked of all respondents, n=400]







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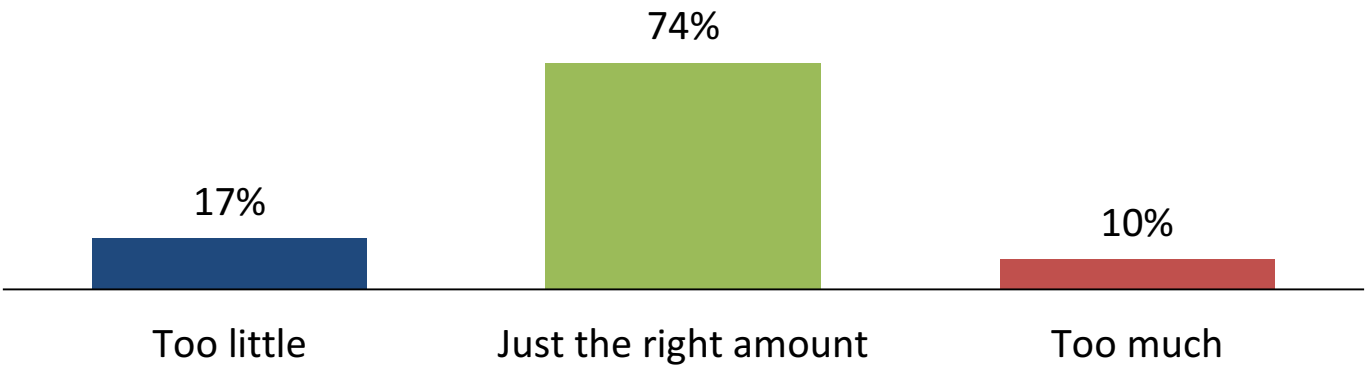
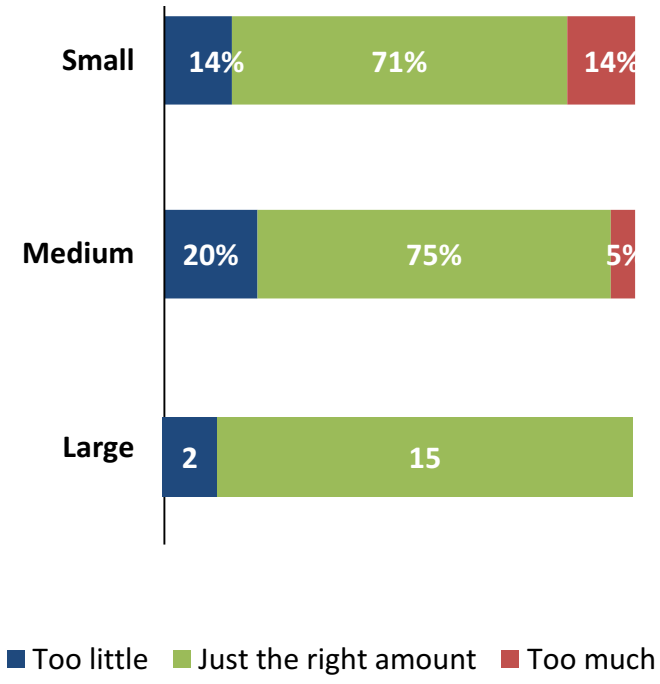
Volume of Information

Business

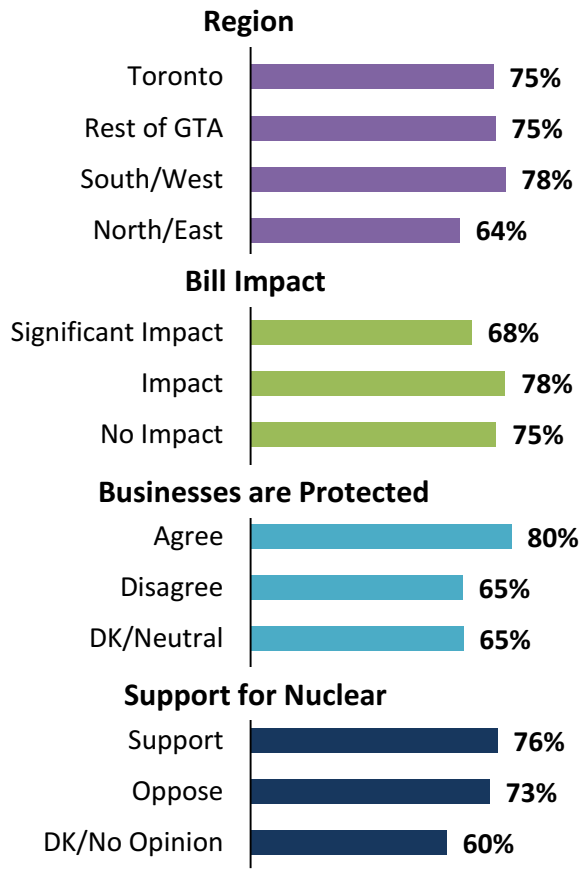
Q Did OPG provide too much information, not enough, or just the right amount?
[asked of all respondents, n=400]



Results by Electricity Consumption



Segmentation:
*Those who say "**Right Amount**":*



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Online Workbook Report
2019 Customer Engagement

ONTARIO POWER GENERATION

May 2019

STRICTLY PRIVILEGED AND CONFIDENTIAL

About This Report

This report presents the results from the **voluntary online workbook** that was open to **residential and business customers**, as part of OPG's 2019 customer engagement process.

To provide context to how customer feedback was collected, this report contains the original workbook pages used in the workbook.

Workbook Pages

Pages in this report that are taken from the online workbook are denoted by watermarks. Please note that some of these pages include graphs and charts; these do not represent data collected from the online workbook, but were used to equip respondents with the facts and figures needed to provide informed opinions. The workbook pages are shown in the order they were presented to respondents.

Results and Segmentation

The results are presented after the workbook page wherein a particular question was asked.

This report shows the overall results and breaks down a particular response of interest into key demographic and psychographic categories.

For residential customers, segmentation is provided for **region**, **bill impact**, **LEAP qualification**, **consumer protection**, and **relationship to energy sector.** These categories were chosen to identify vulnerable customers who are particularly affected by environmental factors outside of OPG's control, such as their financial well-being and confidence in regulatory agents.

For business customers, due the smaller sample size, only the overall results are provided.

Online Workbook Methodology

Ontario Power Generation (OPG) commissioned INNOVATIVE to develop an online workbook to provide all customers with an opportunity to learn more about OPG and to tell OPG what their priorities should be moving forward.

Field Dates & Completes

The Online Workbook was accessible to Ontario residents and businesses from April 6th to May 6th, 2019. A total of 4,390 participants completed the workbook, as follows:

Residential
N=4,288

Business
N=102

Promoting the Online Workbook

To make the workbook accessible to as many people as possible it was promoted through a variety of channels including:

- Ontario Power Generation corporate website promotions;
- Social media promotion on Facebook, Twitter and LinkedIn;
- Print promotion in local newspapers across Ontario.

Validating Responses

Because the survey was posted publicly, the sample was also screened for respondents who were not seriously answering the questions. This was done by analyzing the content of open ended responses, and responses deemed invalid were removed from the final sample.

Despite the large number of responses, this is a sample of volunteers and not a systematic sample of Ontarians. The responses in this report provided important direction as we finalized the online panel survey. However, these results cannot be generalized to the broader public.

Note: *Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers. Caution interpreting results with small n-sizes.*

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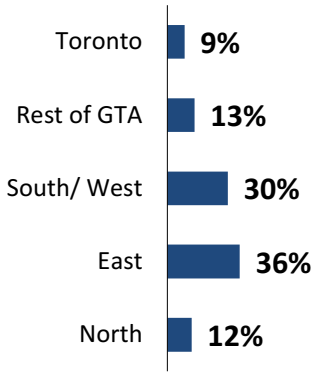
Residential Workbook

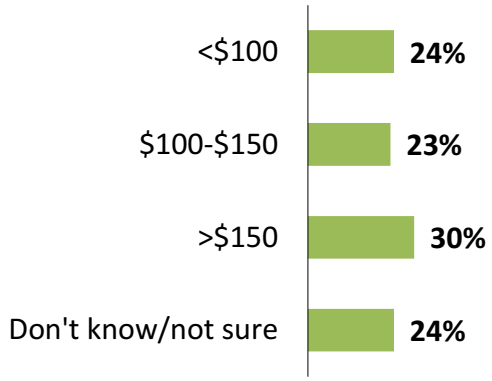
Demographics
Respondent Profile

Residential

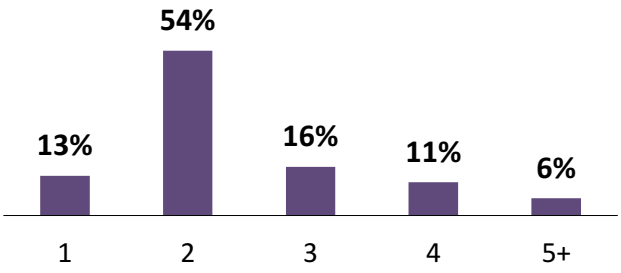
Region



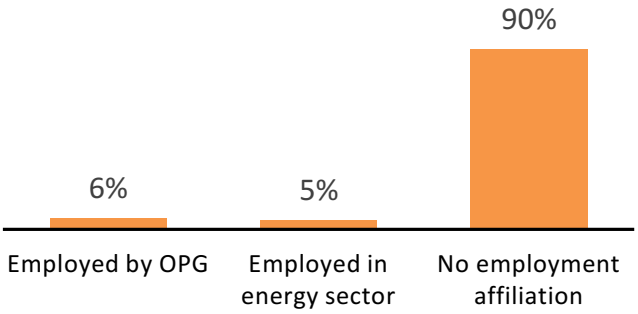
Bill Size



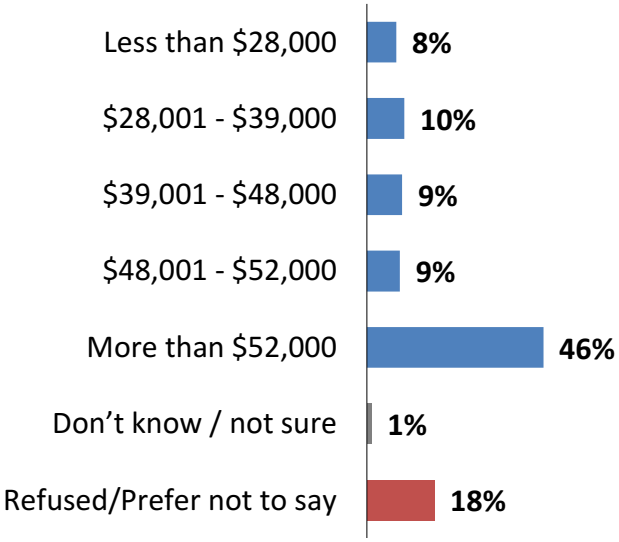
Household Size



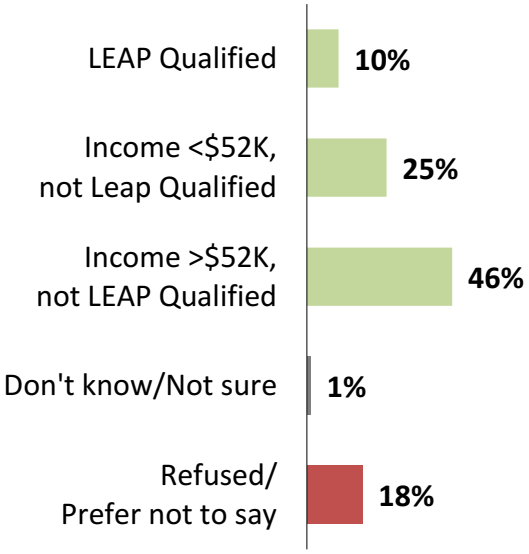
OPG/ Energy Sector Employment in Immediate Family



Household Income



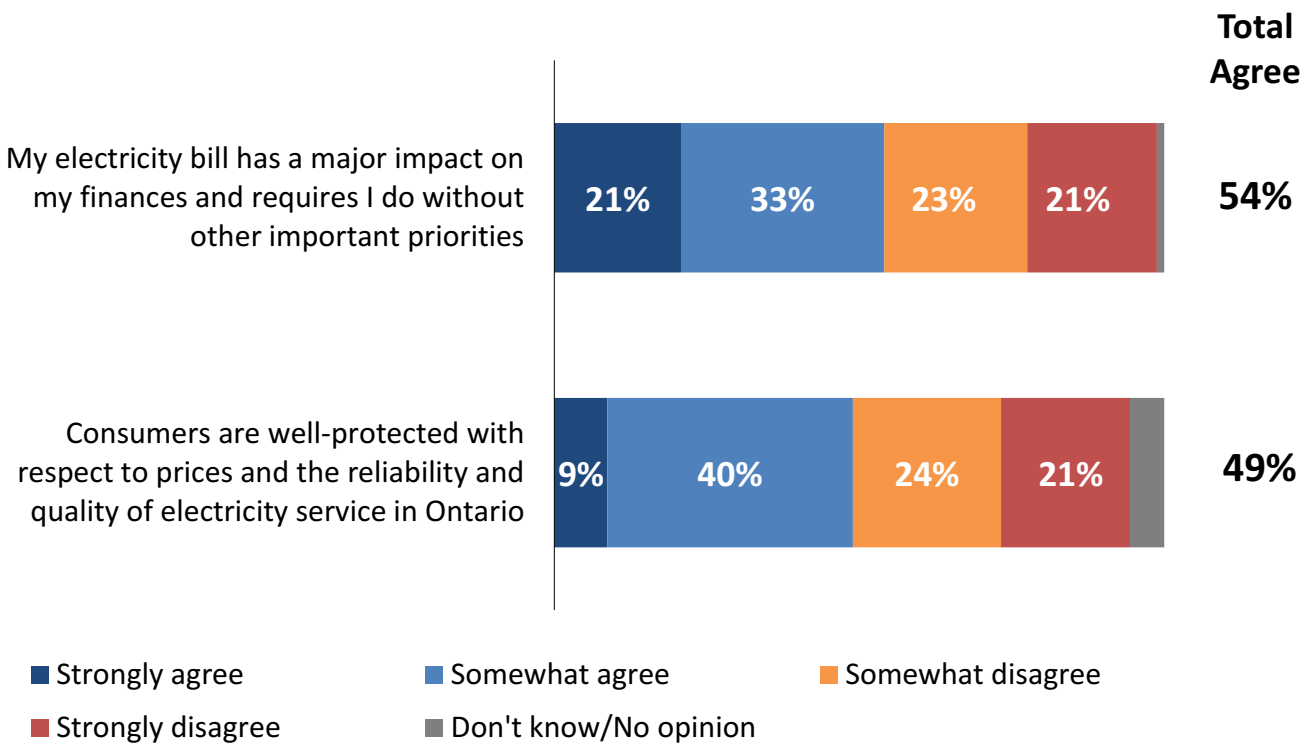
LEAP Qualification



Segmentation

Residential

Q To what extent do you agree or disagree with the following statement?
[asked of all residential respondents, n=4,288]



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Background Information

Electricity 101

Understanding OPG's Role in the Electricity System

Residential

Ontario's electricity system is owned and operated by provincial, municipal, and private corporations across the province. It is made up of three key components: **generation**, **transmission** and **distribution**.

Generation

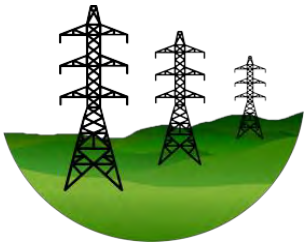
Where electricity comes from.

Ontario gets its electricity from a mix of energy sources. About half of our electricity comes from nuclear power. The remainder comes from a mix of hydroelectric, natural gas, wind and solar.

Most of Ontario's electricity generating stations are located in the southern part of the province close to where the demand for power is greatest. The majority of these power stations are owned and operated by **OPG**, a government owned company that generates about half of Ontario's electricity. The other half comes from multiple generators who have contracts with the grid operator to provide power from a variety of sources.

Transmission

Electricity travels across Ontario.



Once electricity is generated, it must be transported to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. The province has more than 30,000 km of transmission lines.

Local Distribution

Delivering power to homes and businesses in your community.

Your local utility is responsible for the distribution of electricity. This local distribution system includes transformer stations of various sizes and designs that decrease the voltage of the electricity so it can be used in your home or business.

WORKBOOK PAGE

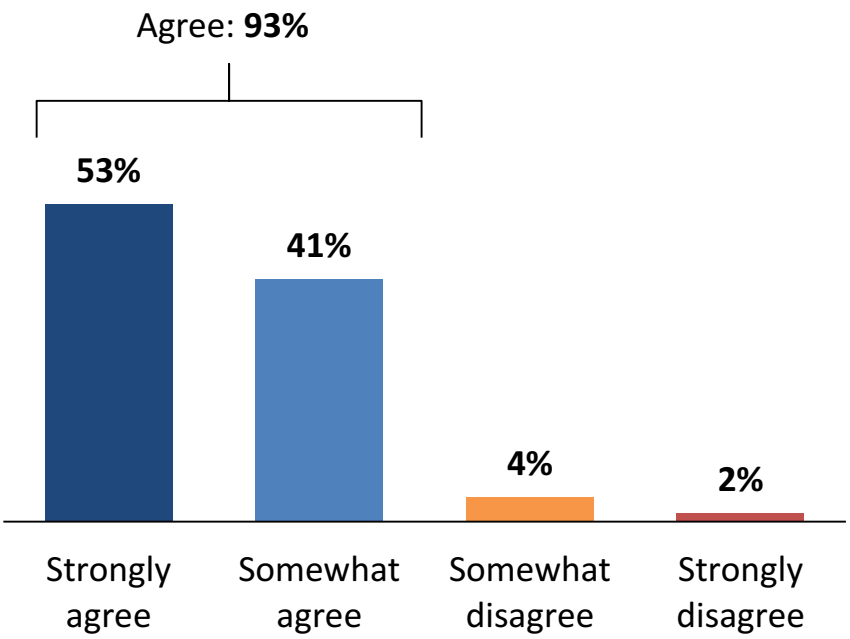
Electricity 101

Understanding OPG's Role in the Electricity System

Residential

Q

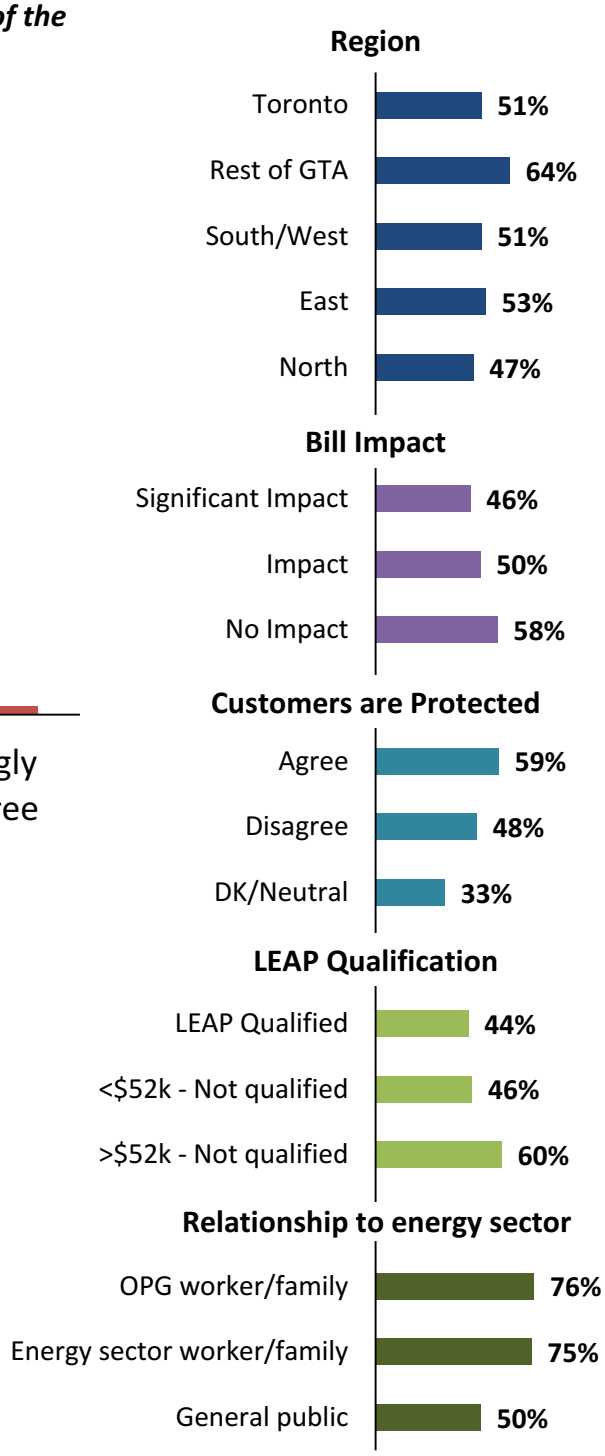
To what extent do you agree or disagree with the following statement?
I generally understand how the various parts of the electricity system work together.
[asked of all respondents, n=4,288]



Note: 'Don't know' (1%) not shown.

Segmentation

*Those who say "**Strongly agree**":*



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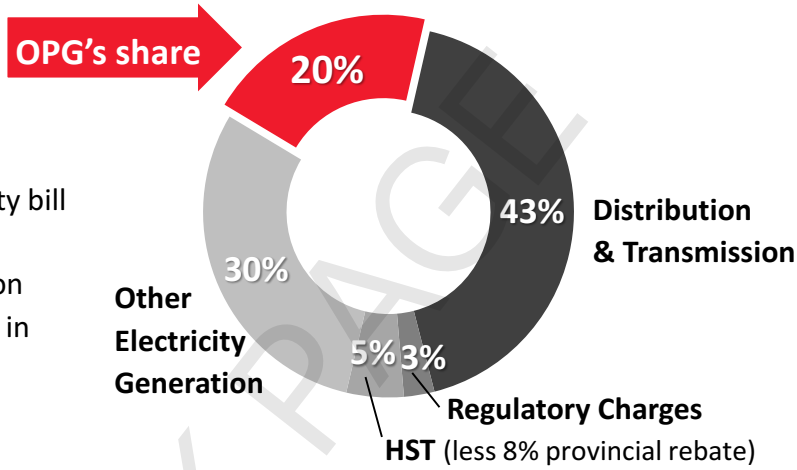
How much does electricity generation cost me?

Residential

How much of my bill goes to OPG?

For the typical residential customer:

- About half of the monthly electricity bill goes to pay for power generation.
- Historically, 20% of the monthly electricity bill goes to pay for OPG's power generation. However, OPG's share entirely depends on consumption and can be higher or lower in any given month.
- The rest of the bill goes to pay for other generators, transmission companies, distribution companies, regulatory agencies, and government taxes.



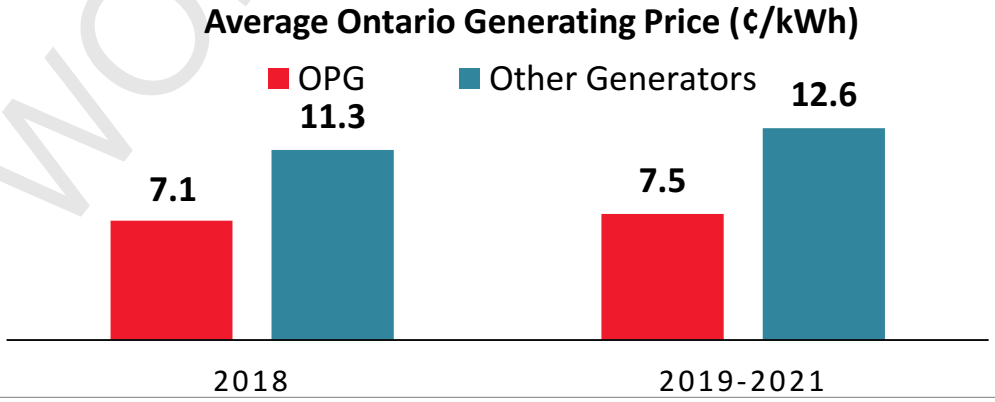
Click here if you want to learn more about the other 80% of your bill.

Who sets electricity rates?

The Ontario Energy Board sets the prices that OPG can charge its customers for most of the electricity it generates. OPG is the only "regulated" electricity generator in Ontario. For the other generators, electricity prices are set in their contracts.

How much does OPG's energy cost compared to others?

The electricity OPG generates costs you about 40% less than the average price paid to other generators in the province.



WORKBOOK PAGE

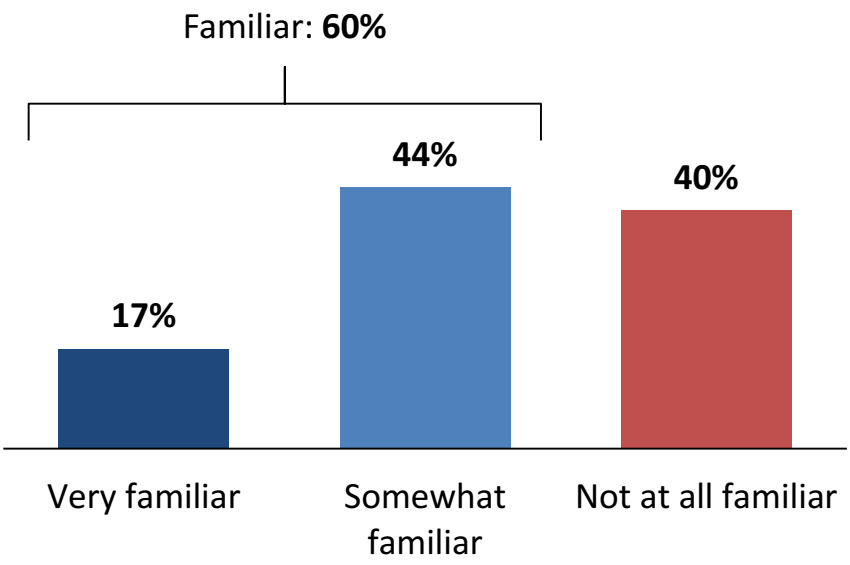
How much does electricity generation cost me?

Residential

Familiarity with OPG's Share of the Bill

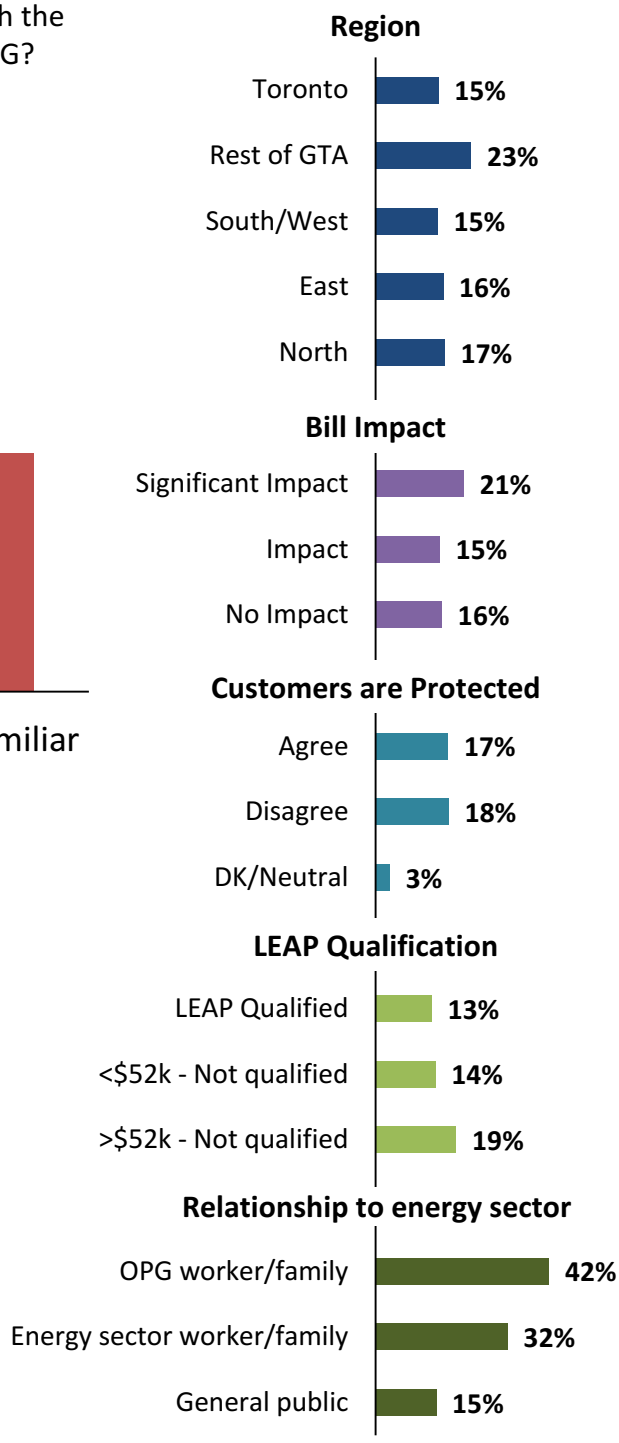
Q Before this workbook, how familiar were you with the percentage of your electricity bill that goes to OPG?

[asked of all respondents, n=4,288]



Segmentation

*Those who say "**Very Familiar**":*



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Who is OPG?

Residential

- Ontario Power Generation is owned by the Province of Ontario.
- It was established in 1999 to operate the electricity generation facilities of the utility that was previously known as Ontario Hydro.
- Today, OPG is one of the largest and most complex generating companies in North America with about 9,000 employees across the province.

OPG's regulated electricity comes from two sources:

Hydroelectric

More than one third of the electricity that OPG produces comes from hydroelectric facilities located across the province.

This renewable resource has fueled Ontario's economic growth since the beginning of the 20th century and it remains an important contributor of clean, low-cost power in the province.

Click here to learn more about:
- How hydroelectric power generation works
- Water safety
- Environmental impacts

Nuclear

OPG's two nuclear generating stations play a significant role in Ontario's energy mix. **Darlington** and **Pickering Stations** operate continuously to meet the minimum level of power demand for the province while emitting virtually no air pollution.

OPG began the refurbishment of Darlington Station in October 2016. The Darlington Refurbishment is a ten-year mega project that will extend the station's life by about another 30 years.

Click here to learn more about:
- How OPG deals with nuclear waste
- The Darlington Refurbishment
- Why refurbish as opposed to other forms of generation?

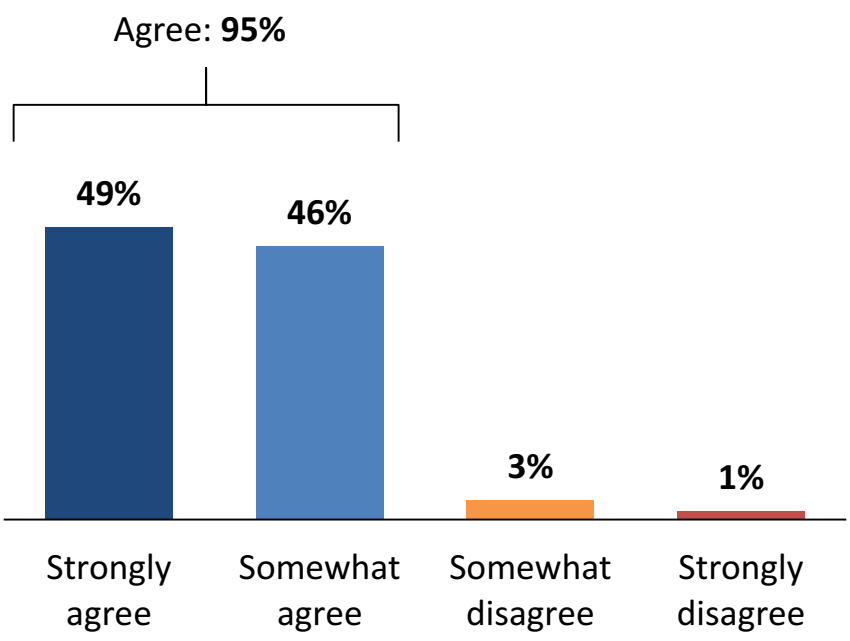
WORKBOOK IMAGE

Who is OPG?

Residential

Q To what extent do you agree or disagree with the following statement?

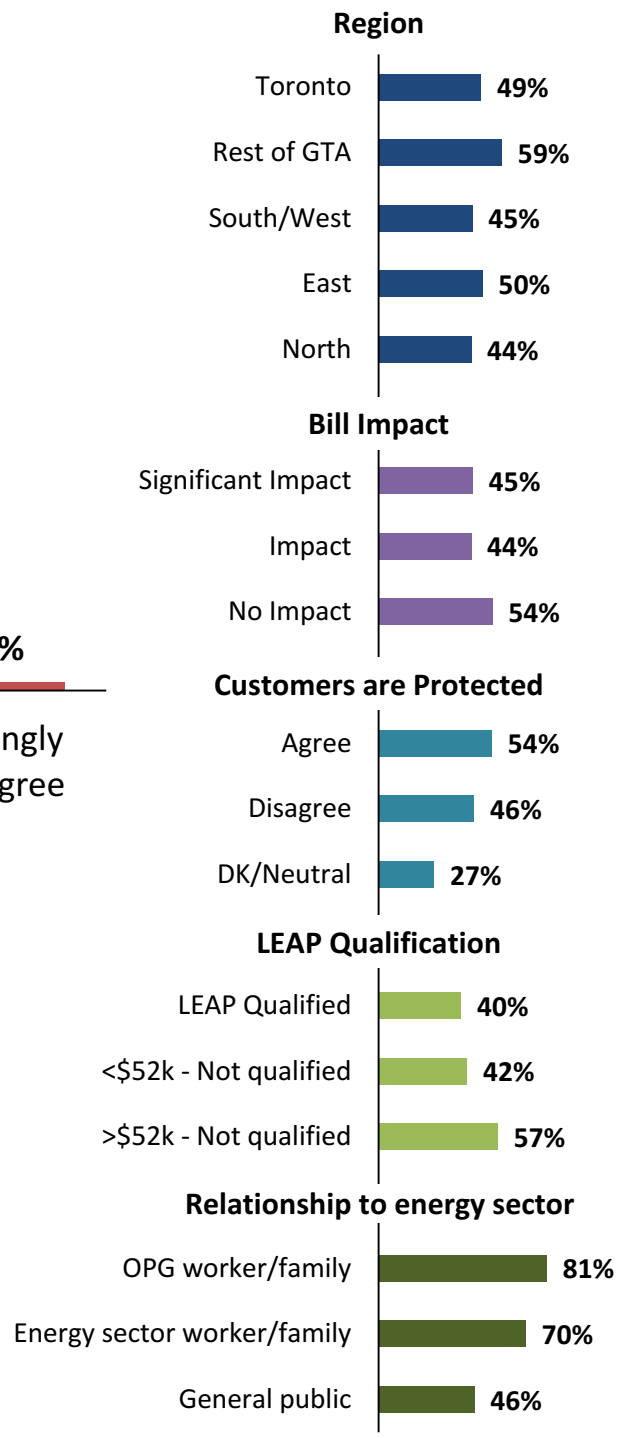
I have a general understanding of who OPG is.
[asked of all respondents, n=4,288]



Note: 'Don't know' (1%) not shown.

Segmentation

*Those who say "**Strongly agree**":*



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Building OPG's Plan

Residential

The purpose of this consultation is to get your input as OPG prepares its plan.

This plan must satisfy OPG's mandate as stated in the Memorandum of Agreement with the Province.

The goals in OPG's plan must follow the policy direction set by Ontario's Ministry of Energy. This includes OPG's role in Ontario's Long-Term Energy Plan.

As required by the Ontario Energy Board, OPG must also consider the views of customers like you as it develops its plan.

How does OPG consider customers' views in its plan?

OPG has developed a five phase approach to gathering and responding to customer feedback:

✔ **1. Identify customer priorities:** In 2018 OPG asked customers from across Ontario about their needs and priorities for electricity generation.

✔ **2. Use customer feedback to guide development of plan:** Key findings from the initial customer engagement informed the planning process.

You are here

3. Collect customer feedback on specific decisions

Now OPG is returning to customers to get feedback on specific business choices it needs to make.

4. Preparing the detailed plan: Prepare detailed plan based on customer feedback.

5. Submit the plan to the Ontario Energy Board: File the plan, this workbook, and a summary report with the OEB where it will be examined by the OEB, consumer advocates, and other independent parties in a public hearing on OPG's regulated prices.

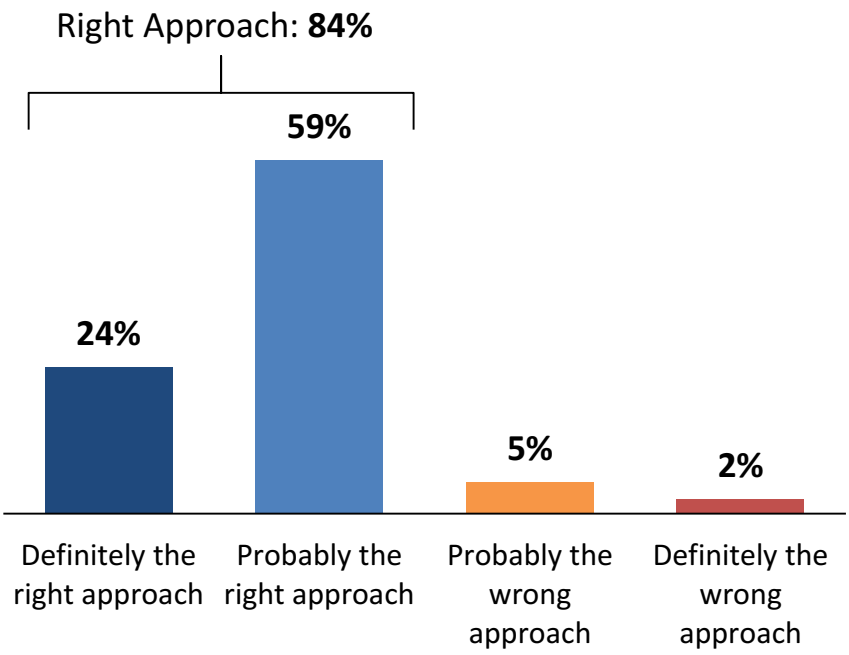
WORKBOOK PAGE

Building OPG's Plan

Residential

Q Does this seem like the right approach or the wrong approach to building OPG's plan?

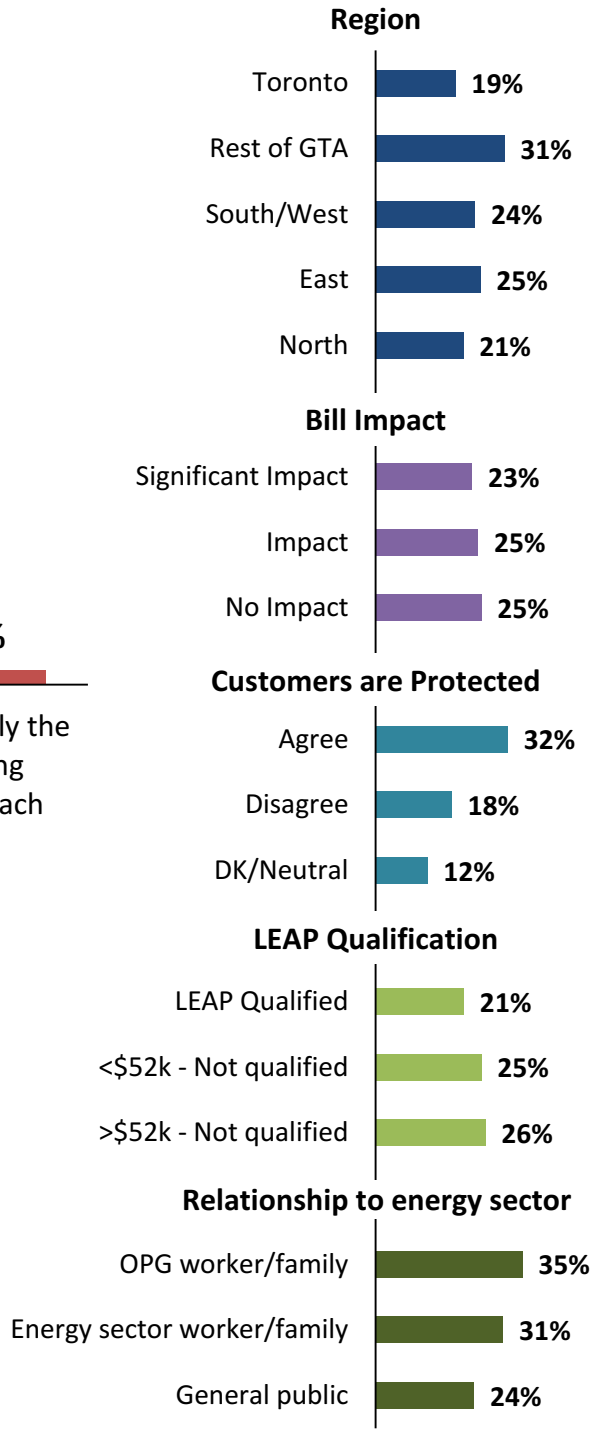
[asked of all respondents, n=4,288]



Note: 'Don't know' (2%) and 'Not sure' (7%) not shown.

Segmentation

*Those who say "**Definitely Right Approach**":*



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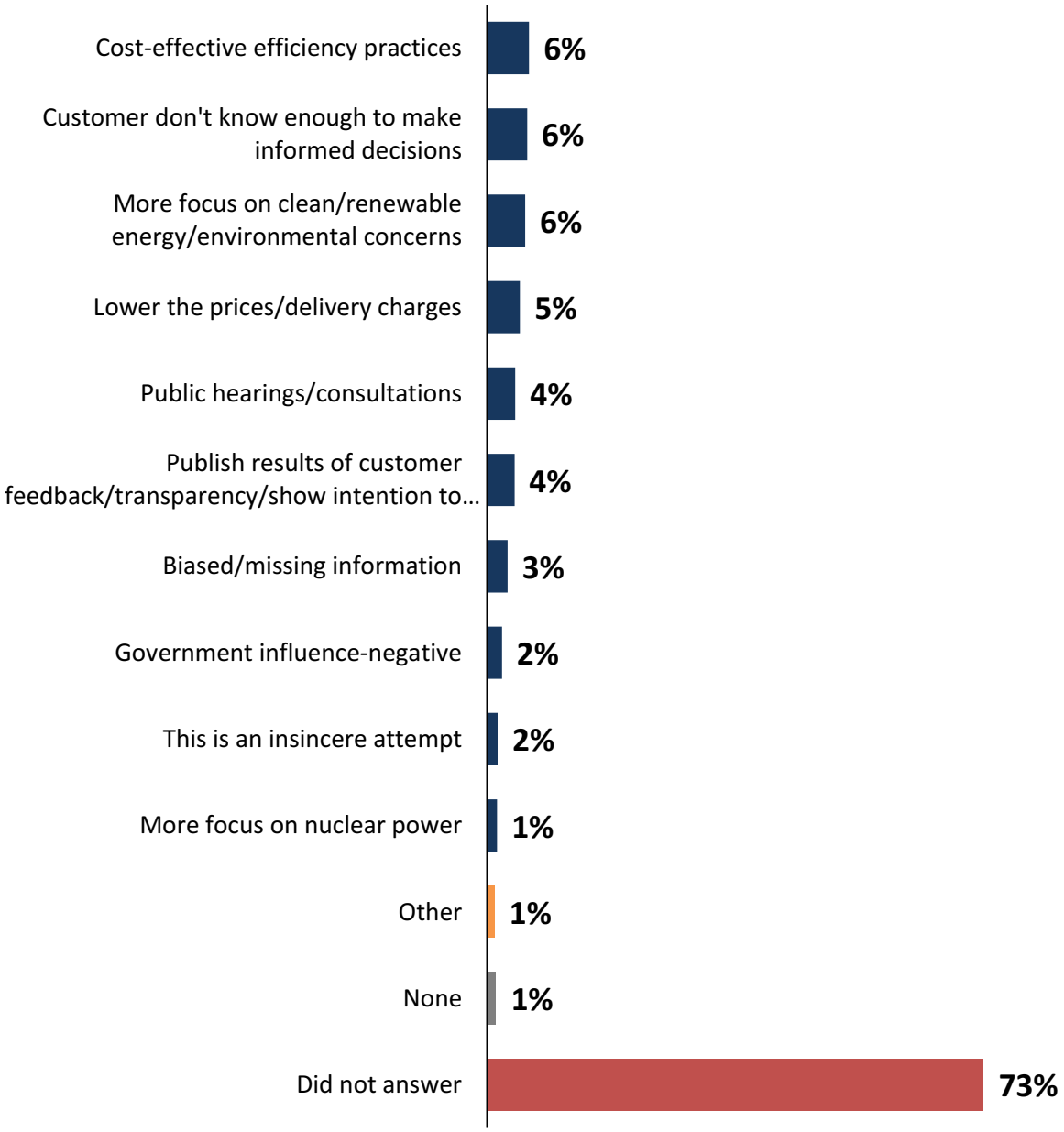
Building OPG's Plan

Residential

Q Is there anything in particular you would change about this approach or any other comments you would like to make?

[asked of all respondents, up to 3 responses coded, n=4,288]



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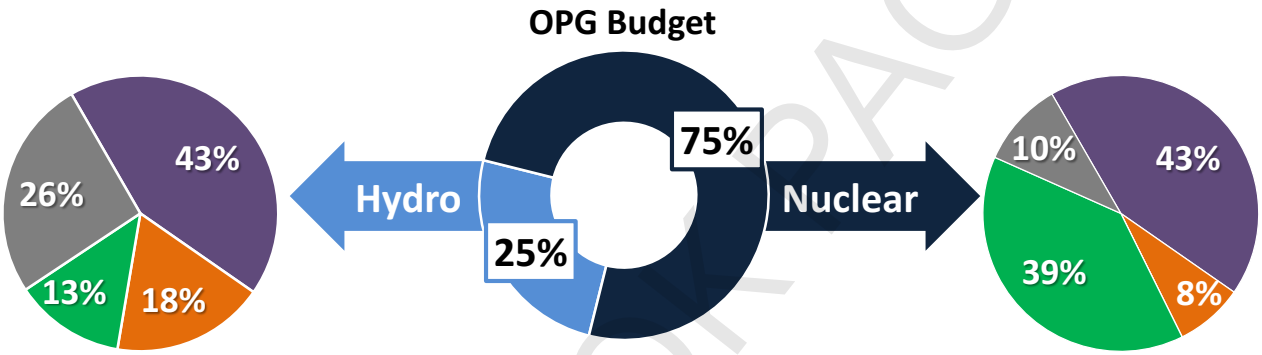
Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Where does the money go?

Residential

The efficient and cost-effective operation of its facilities is one of OPG's key objectives established by government. OPG is also mandated to operate its generating assets safely and in accordance with all applicable safety and environmental regulations and standards. Any profits are either reinvested in the business or paid out to the Province of Ontario.

OPG manages separate budgets for hydroelectric and nuclear generation. The cost of OPG's Hydro business is $1.3 billion per year. The nuclear business costs a total of $3.2 billion per year.



Maintenance	Spending required to keep the existing stations and equipment working at the current level, including both normal daily costs and project investments.
Value Enhancing	Spending that would allow OPG to get more out of existing stations (e.g. refurbishment of Darlington Station), by reducing costs, improving efficiency, or increasing the amount of power generated.
Operating Expenses	Ongoing costs to run the business (e.g. nuclear and hydroelectric station operations, security, engineering, radiation protection services, and support functions such as leased real estate, IT services, finance, human resources, and procurement). More people are needed to run nuclear than hydroelectric stations, so operating expenses represent a larger share of the nuclear budget.
Taxes, Fuel, and Other	Income tax, property tax, corporate insurance, water usage taxes and uranium costs, as well as cost of nuclear station shutdown and handling and disposal of used nuclear fuels and other nuclear waste.

WORKBOOK PAGE

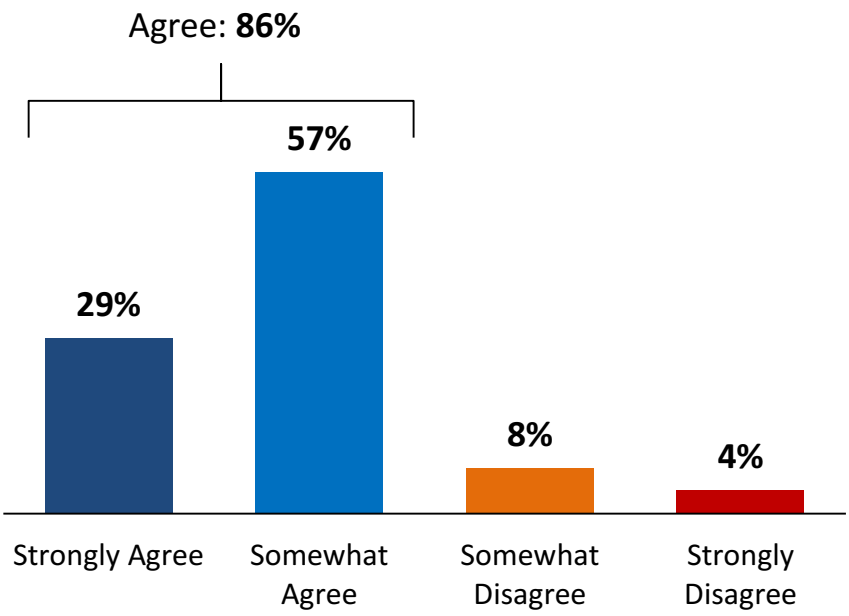
Where does the money go?

Residential

Q To what extent do you agree or disagree with the following statement?

I have a general understanding of how OPG spends the rates I pay.

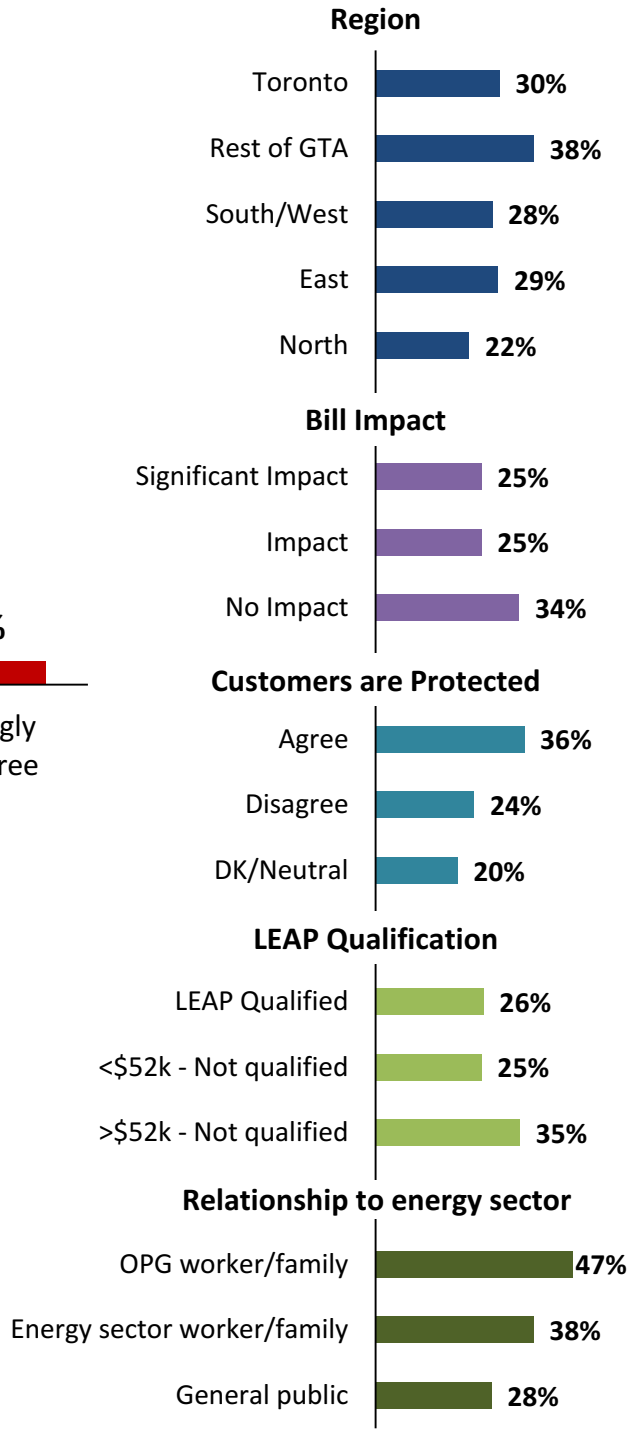
[asked of all respondents, n=4,288]



Note: 'Don't know' (2%) not shown.

Segmentation

*Those who "**Strongly Agree**":*



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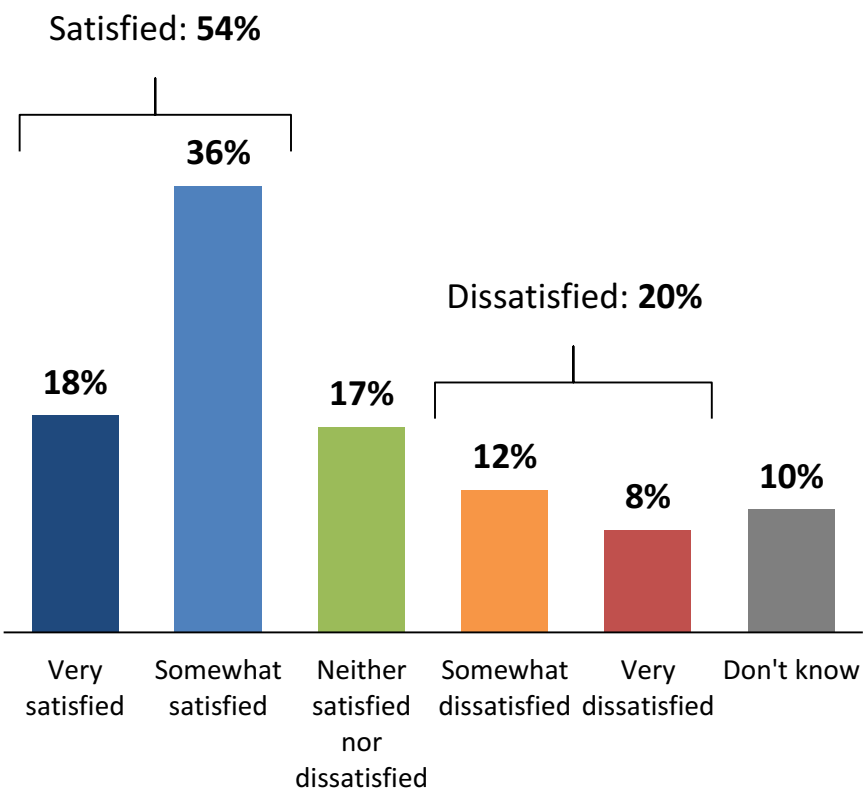
Satisfaction with OPG

Satisfaction with OPG

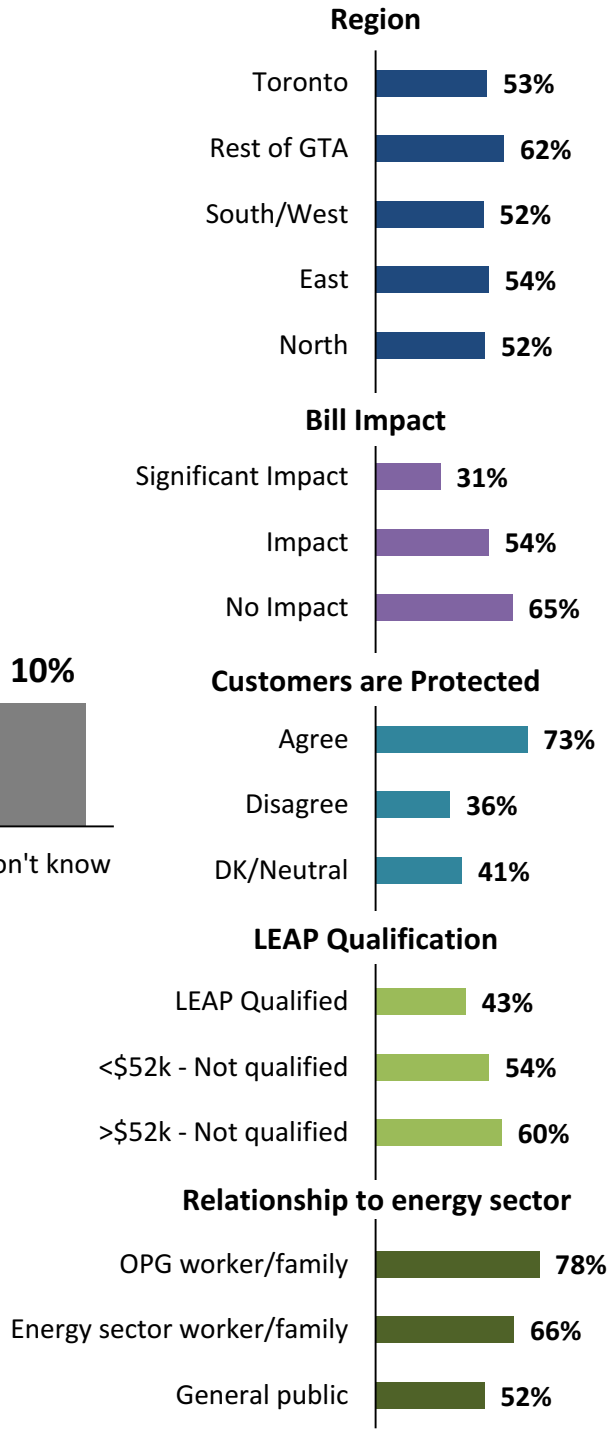
Residential

Q Now that you've read a bit more about OPG and how it fits into Ontario's electricity system, how satisfied are you with OPG's performance?
[asked of all respondents, n=4,288]



Segmentation

*Those who say "**Satisfied**":*



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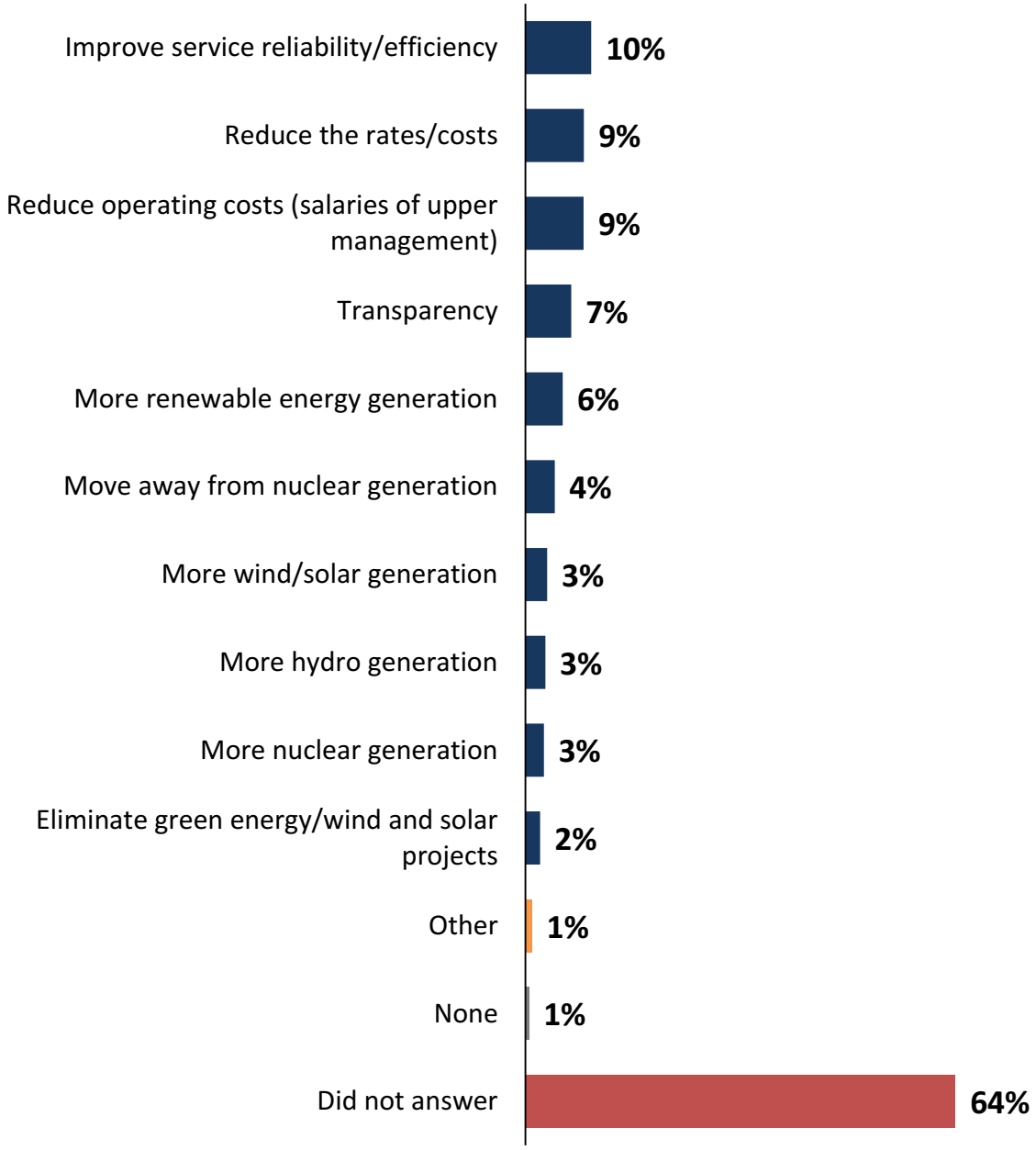
Suggestions for Improvement

Residential

Q Is there anything in particular that OPG could do better for [you/your organization]?
[asked of all respondents, up to 3 responses coded, n=4,288]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

INNOVATIVE RESEARCH GROUP

Making Choices

Rate Smoothing Options

Residential

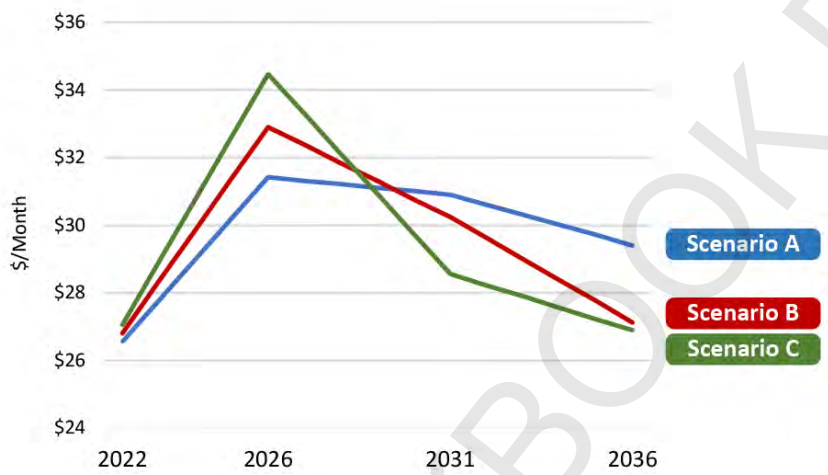
Although it takes years of construction before a major generating station is ready to produce electricity, consumers only pay for those costs once a station is completed and operating. This can create "spikes" in electricity prices. To avoid those spikes, OPG is legally required to propose some form of "rate smoothing" in its next application to the OEB.

OPG wants to hear from you how much rate smoothing you would like to see—a little or a lot?

What does rate smoothing mean?

Rate-smoothing spreads costs over a longer period, avoiding spikes in electricity rates in particular years. OPG can smooth-out increases in its rates by borrowing money to pay for some costs, instead of collecting the cost from customers. However, OPG must pay interest on that borrowed money, which is eventually paid through electricity prices.

The basic trade-off is: Would you prefer paying more now, but less over time? Or less now, but more overall? The chart below shows three example rate smoothing scenarios:



This smoothing only applies to OPG's share of the bill, based on a period of time until 2036. The typical customer bill is based on a typical household monthly consumption (750kWh) and on the OEB "Bill Calculator" for estimating monthly electricity bills.

Q9. Which of the rate smoothing options presented above would you prefer?

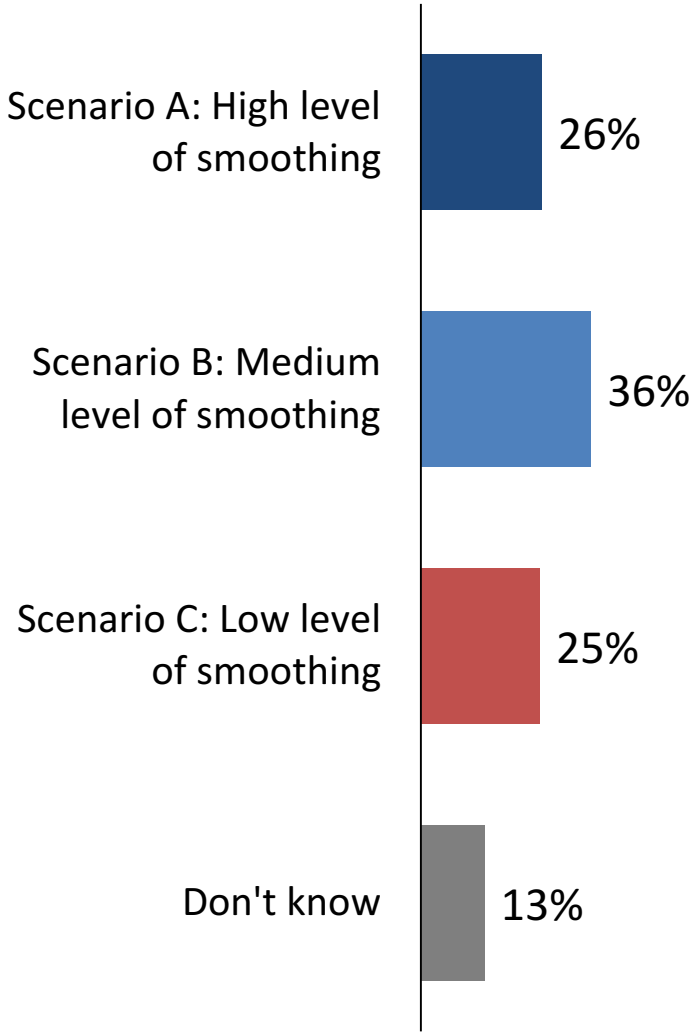
	Scenario	Bill increase	Interest cost
☐	Scenario A: High level of smoothing	Produces the steadiest bills.	Highest total interest costs (approx. $500M higher than Scenario B and approx. $1B higher than Scenario C).
☐	Scenario B: Medium level of smoothing	Produces steadier bills than Scenario C, but less steady bills than Scenario A	Total interest costs that are approx. $500M less than Scenario A, but approx. $500M higher than Scenario C.
☐	Scenario C: Low level of smoothing	Produces higher bills in the 2020s, but lower bills in the 2030s.	Lowest total interest costs of the three scenarios (approx. $500M lower than Scenario B and approx. $1B lower than Scenario A).
☐	Don't know		

WORKBOOK PAGE

Rate Smoothing Options

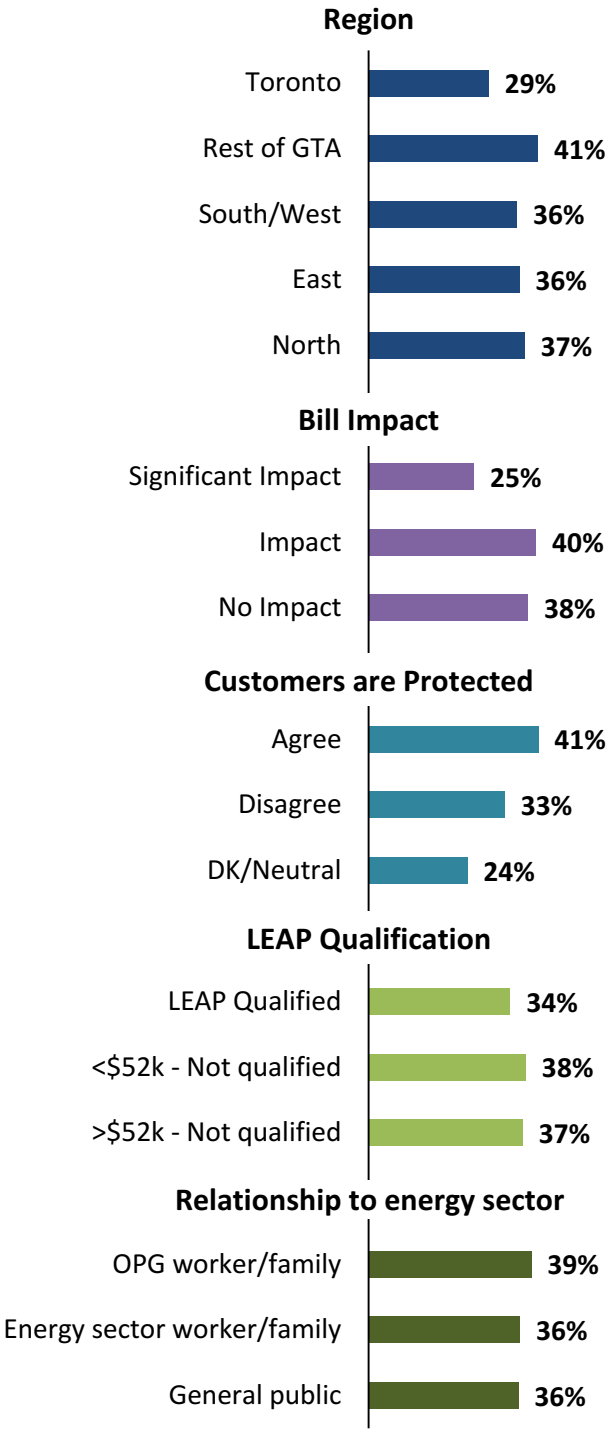
Residential

Q Which of the rate smoothing options presented above would you prefer?
[asked of all respondents, n=4,288]



Segmentation

*Those who say "**Scenario B**":*



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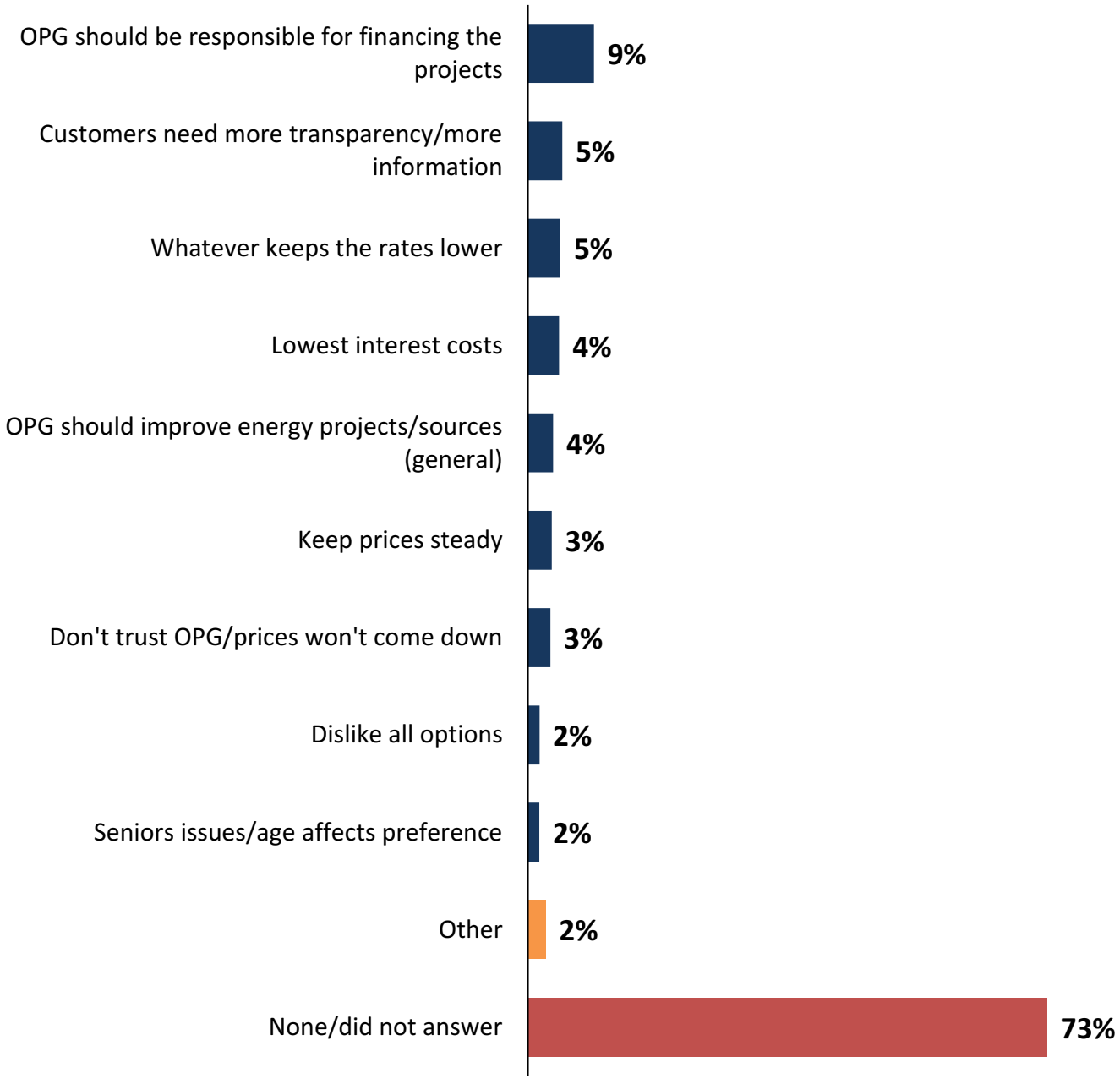
Rate Smoothing Options

Residential

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=4,288]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Investing in OPG's Hydroelectric Stations

Residential

How does OPG typically invest in its Hydroelectric Stations?

Every year, OPG invests in maintaining its Hydroelectric Stations across the province.
It also invests to increase the amount of electricity produced at some existing hydroelectric stations.

When making investment decisions, OPG has certain options but needs to remember some basic facts:

- Hydroelectric stations use water to generate very low-cost, low-emissions electricity. If these facilities aren't operating, other, more expensive or less clean generation methods may be needed.
- Hydroelectric generation equipment consists of large, custom-made parts. Ordering and installing replacement parts requires significant lead time.
- **Ontario currently has an energy surplus**. However, the province is likely to need more power in about 5 years. Click here to learn more.
- That means, increasing the capacity of existing hydroelectric stations is not absolutely necessary in the short term. However, because the system is currently not strained, now could be a good time to do the work on long-term projects that require hydroelectric stations to shut down while the work is underway.
- Doing the work sooner, rather than later, would reduce the risk of equipment failure and make the total cost more predictable, and possibly lower. However, doing the work now would also mean making major investments now and raising rates rather than delaying the costs.

For the 2020-2026 period, OPG must make decisions about the timing and pace of investments in its Hydroelectric Stations.

BOOK PAGE

Overhauling Hydroelectric Stations

Residential

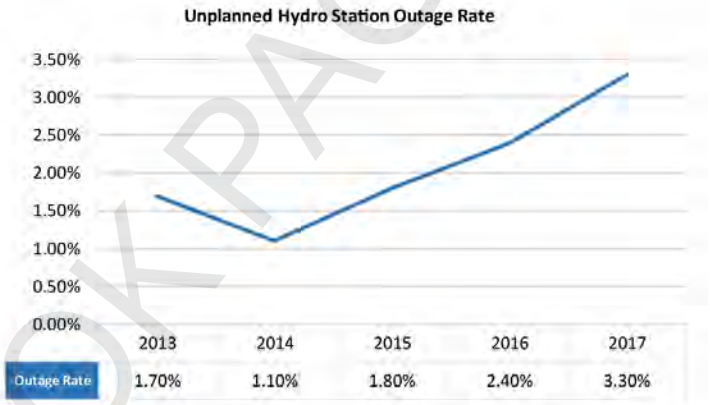
Overhauling Hydroelectric Stations

OPG must periodically take its Hydroelectric Stations out of service to do major maintenance and repair work. Whenever OPG takes its generators off-line, it is called an "outage." Outages can be planned in advance, or they can happen because of unexpected equipment issues.

The graph below shows how often OPG has had to take generators off-line unexpectedly. When OPG has to do unplanned maintenance work, it is generally more expensive than work that is planned in advance.

As shown in this graph, the frequency of these unplanned outages has been increasing at OPG's Hydroelectric Stations since 2014.

OPG believes it can reverse this trend and restore these outages to historic levels by increasing the pace of major maintenance projects (called "overhauls") at its Hydroelectric Stations.



Q11. In the 2020 to 2026 period, OPG plans to increase the number of overhauls it does each year. OPG must also decide on the right *pace* for that overhaul program. Which approach would you prefer?

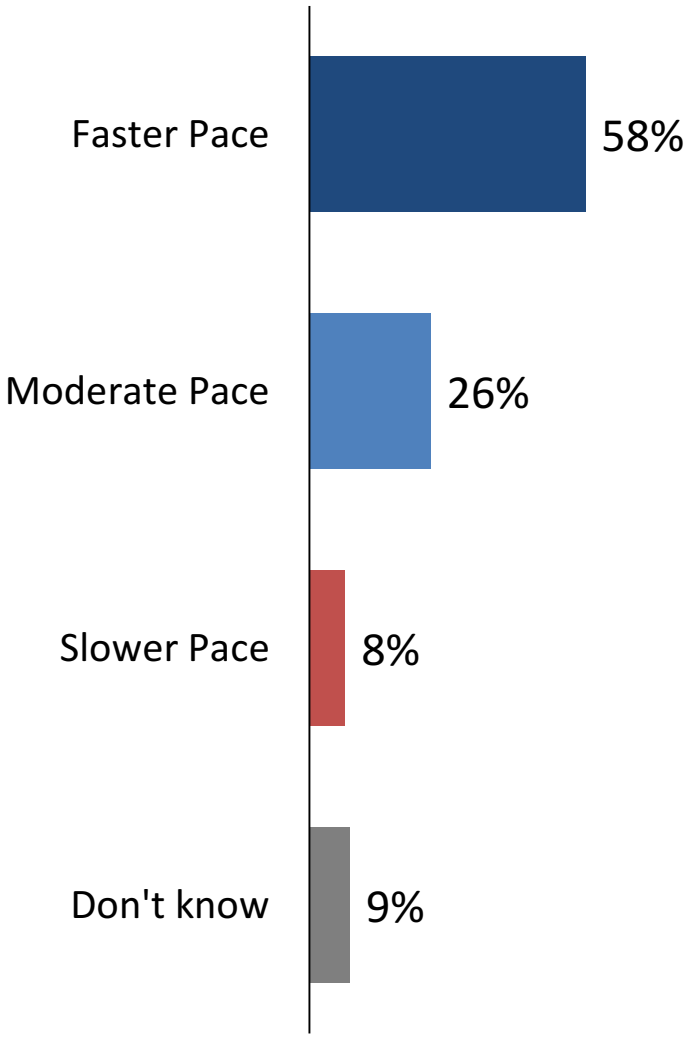
	Options	Pros	Cons
☐	**Faster pace** Average investment: **$86M** per year Bill impact*: **33 cents** per month	Most reliable hydroelectric generation at the fastest pace; good timing for major repairs	Higher investment costs in the short-term than other approaches
☐	**Moderate Pace** Average investment: **$72M** per year Bill impact*: **27 cents** per month	More reliable hydroelectric generation; repairs come at a reasonable time; lower investment costs in the short-term than in the faster pace	Less reliable hydroelectric generation; lower investment in overhauls will lead to higher costs and bills in the future
☐	**Slower Pace** Average investment: **$57M** per year Bill impact*: **22 cents** per month	Lower investment costs in the short-term than other approaches	Least reliable hydroelectric generation; lower investment in overhauls will lead to higher costs and bills in the future
☐	**Don't know**		

WORKBOOK PAGE

Overhauling Hydroelectric Stations

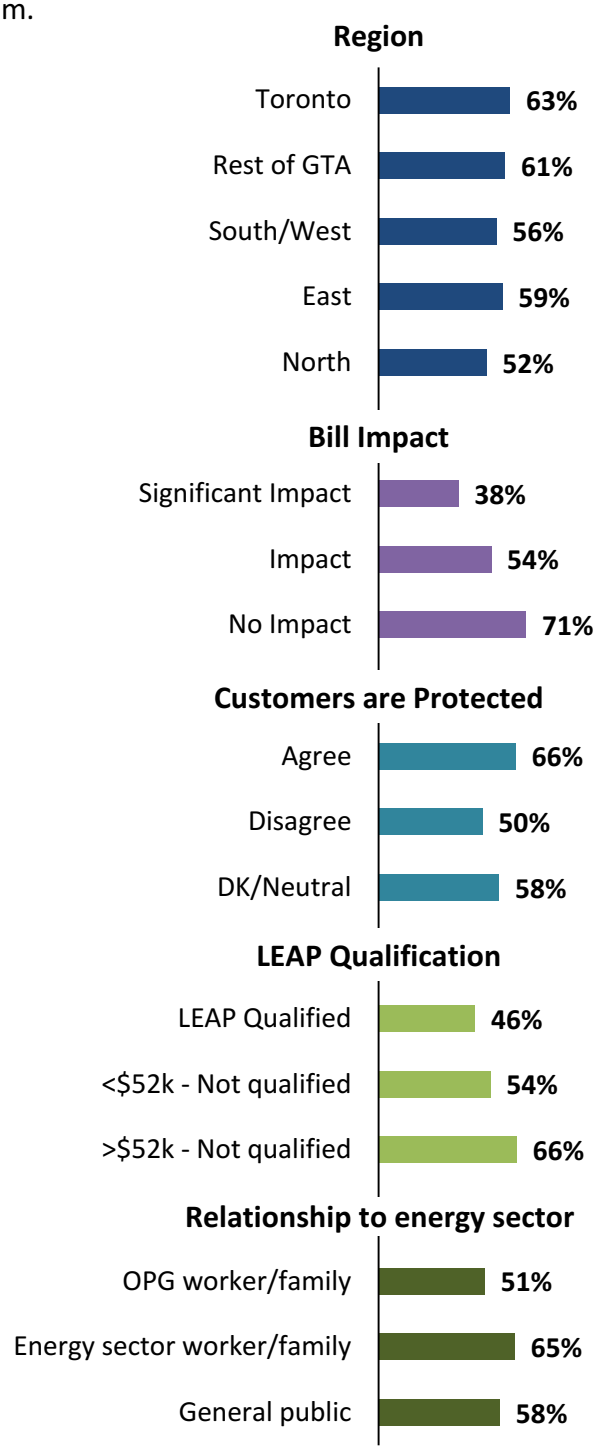
Residential

Q In the 2020 to 2026 period, OPG plans to increase the number of overhauls it does each year. OPG must also decide on the right pace for that overhaul program. Which approach would you prefer?
[asked of all respondents, n=4,288]



Segmentation

Those who say "Faster Pace":



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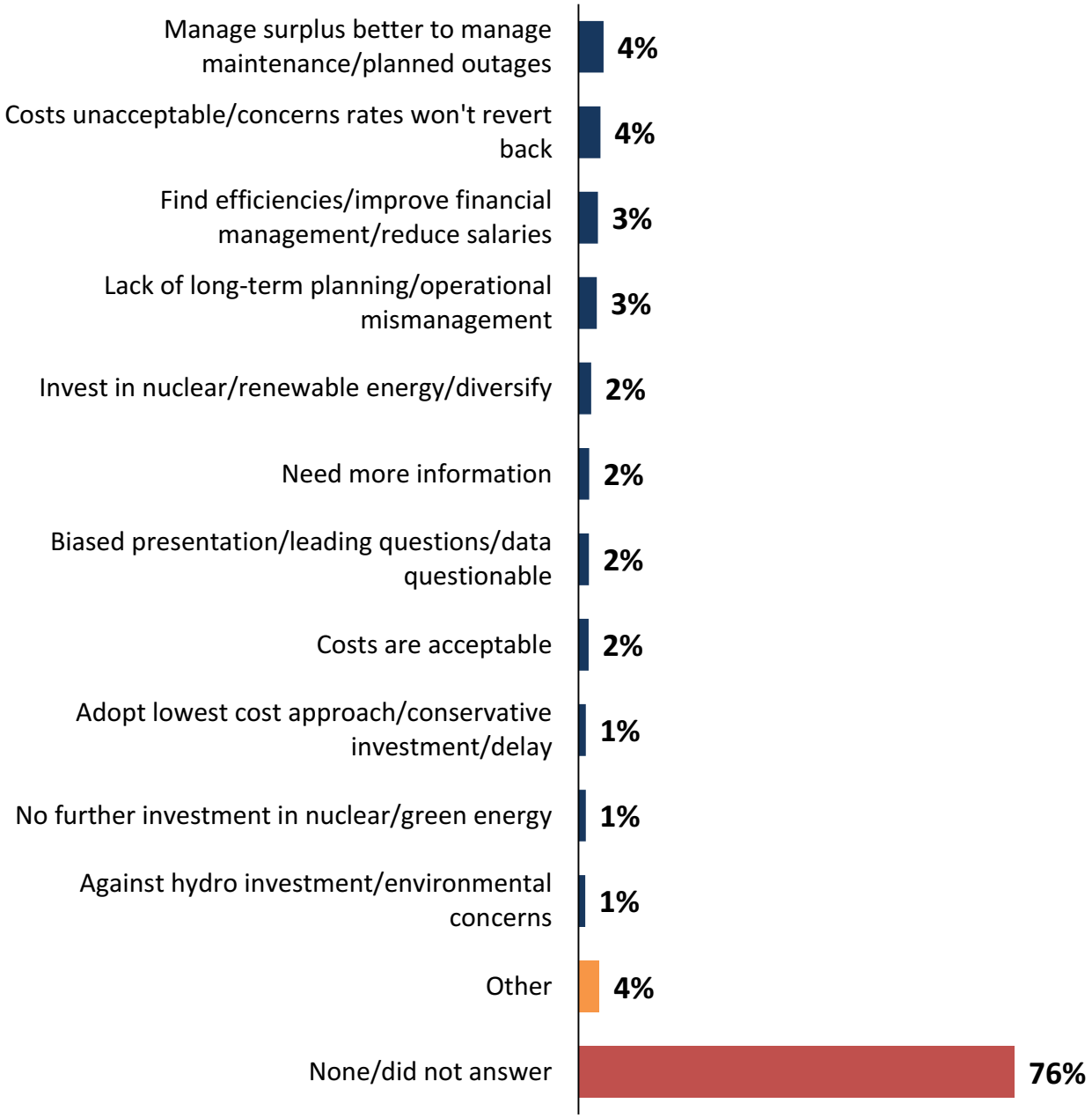
Overhauling Hydroelectric Stations

Residential

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=4,288]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Niagara Frequency Conversion Project

Niagara Frequency Conversion Project

This is a project where the timing is flexible.

OPG's Sir Adam Beck I Station was the first hydroelectric station at Niagara Falls.

When the station started operating in 1922, North America's electric grid ran at a frequency of 25 Hz. In the 1950s, the grid converted to the 60 Hz standard that is still used today.

OPG converted most of the "units" at the Sir Adam Beck I station to the new standard, but kept two units on the old 25 Hz standard to power steel plants and other large industrial customers who continued to use the old frequency. The last of these customers were converted to the new standard in 2009. Since that time, the two 25 Hz units have been disconnected, because they are incompatible with the modern grid.

While in previous years, there was no room in the transmission system for more 60 Hz power, the system has recently been expanded. OPG has to decide whether to proceed with the project now or later.

Q13. OPG is planning to convert the two 25 Hz units to the modern 60 Hz standard, and it needs to decide when to do the work. Which of the following options do you prefer?

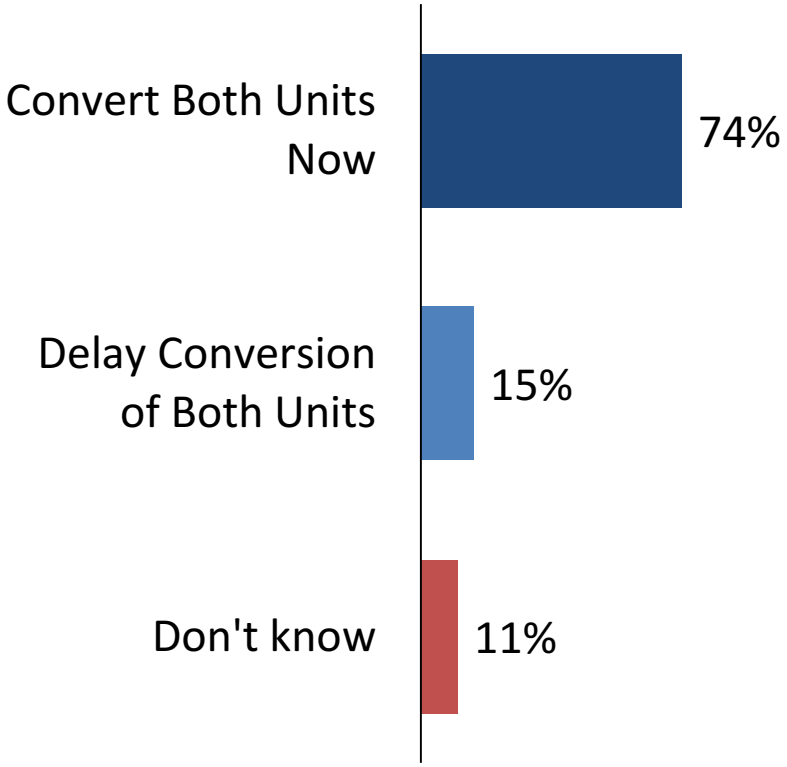
	Options	Pros	Cons
☐	**Convert both units now**	Increase the amount of power that can be generated at the station; access to unused capacity sooner, allowing more flexibility in the system while nuclear stations undergo refurbishment; additional power could help offset reduced production when Pickering Station is closed	Replacement costs of approximately $120 million would occur now, resulting in 10 cents more on a typical customer's monthly bill. The new power will be added while the provincial system may still have a surplus of power.
☐	**Delay conversion of both units**	Replacement costs would be deferred in the short-term. Depending on the provincial demand for electricity in the early 2020s, the delayed approach may better align with the needs of the grid.	Potentially higher total replacement costs; less opportunity to offset energy production while nuclear stations undergo refurbishment; additional power may not be available to offset reduced production when Pickering Station is closed
☐	**Don't know**		

WORKBOOK IMAGE

Niagara Frequency Conversion Project

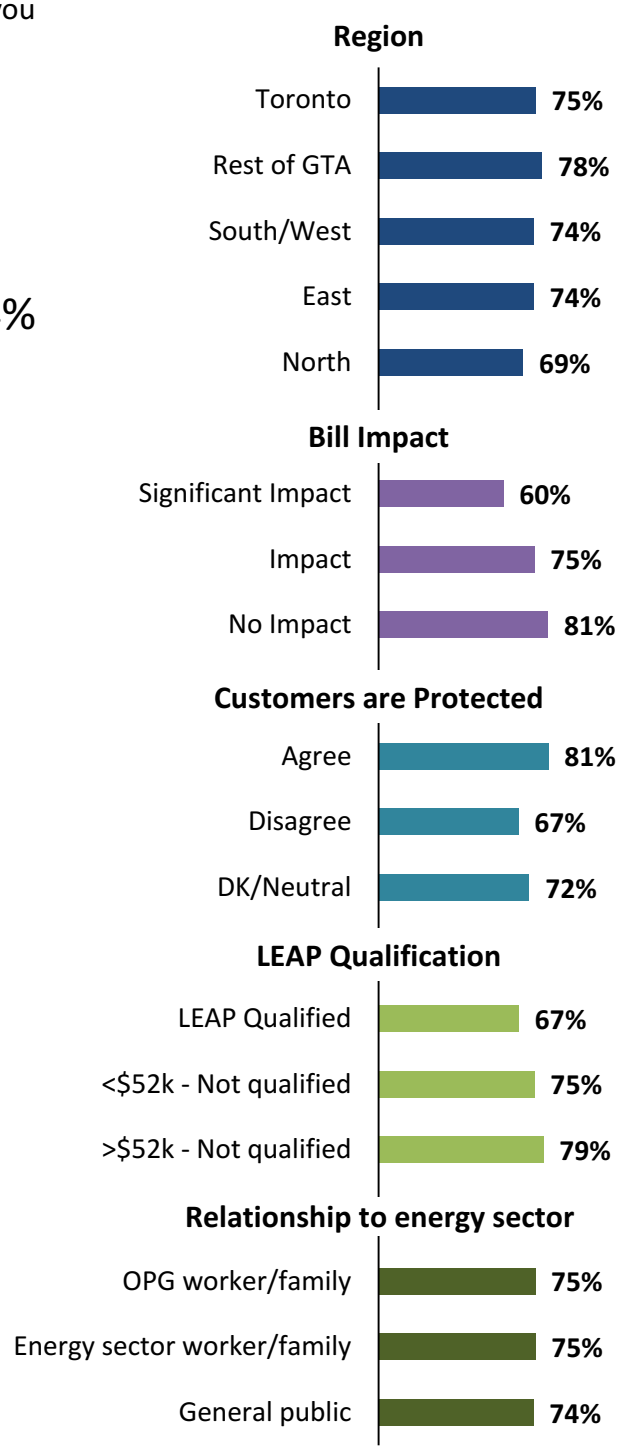
Residential

Q OPG is planning to convert the two 25 Hz units to the modern 60 Hz standard, and it needs to decide when to do the work. Which of the following options do you prefer? [asked of all respondents, n=4,288]



Segmentation

*Those who say "**Convert Now**":*



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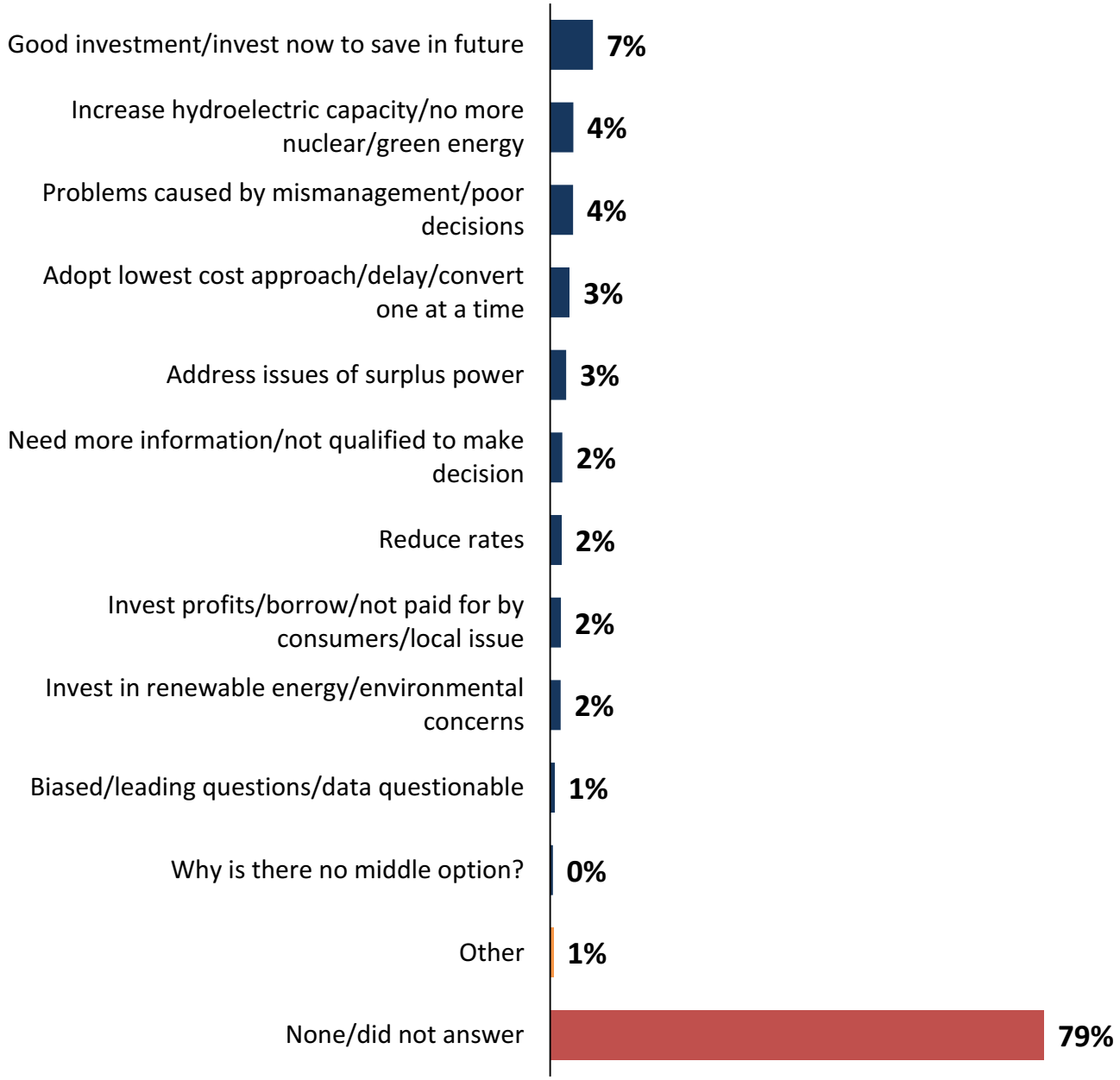
Niagara Frequency Conversion Project

Residential

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=4,288]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Making the Pickering Station Site Available for Other Uses

Residential

What is Pickering Station?

Pickering Nuclear Generating Station is located on the shore of Lake Ontario, just east of Toronto.

The station has served Ontario for almost five decades, and currently provides approximately 14% of the province's electricity – enough to power a city of 1.5 million people. Pickering Station is also a major employer and contributes approximately $1.5 billion to Ontario's GDP each year.

Pickering Station will soon be reaching the end of its life and is scheduled to shut down in 2024.

Making the Pickering Station site available for other uses

Pickering Station occupies a large, valuable site on the shores of Lake Ontario on the east side of the GTA, which encompasses approximately 500 acres of land and 250 acres of water lots.

After the station shuts down, the site will be returned to a state that allows it to be used for many different purposes. The current **standard approach** to get there takes about **45 years**.

OPG has done some research that indicates the total time to safely shut down a nuclear station could be reduced to about **25 years**. That would allow the site to be put back to use for other purposes sooner.

This public benefit would come at a cost though. Early OPG estimates suggest the cost of accelerated shut-down at Pickering Station would be about $500 million to $1.5 billion. This may result in a typical customer paying about $1 to $3 more on their monthly bill over the remaining operating life of Pickering Station.

Repurposing Pickering

OPG has held a public consultation to gather information and ideas from the community to develop a long-term plan for redeveloping available site lands during and after shutting down Pickering Station.
To learn more, click here.

What is involved in safely shutting down a nuclear site?

- De-energizing the nuclear systems and components
- Removing irradiated nuclear fuel and water from the reactor core
- Monitoring the site for approximately 30 years after removal to allow nuclear radiation fields to decay naturally
- Dismantling the reactor and removing radioactive components
- Safely demolishing the site structures

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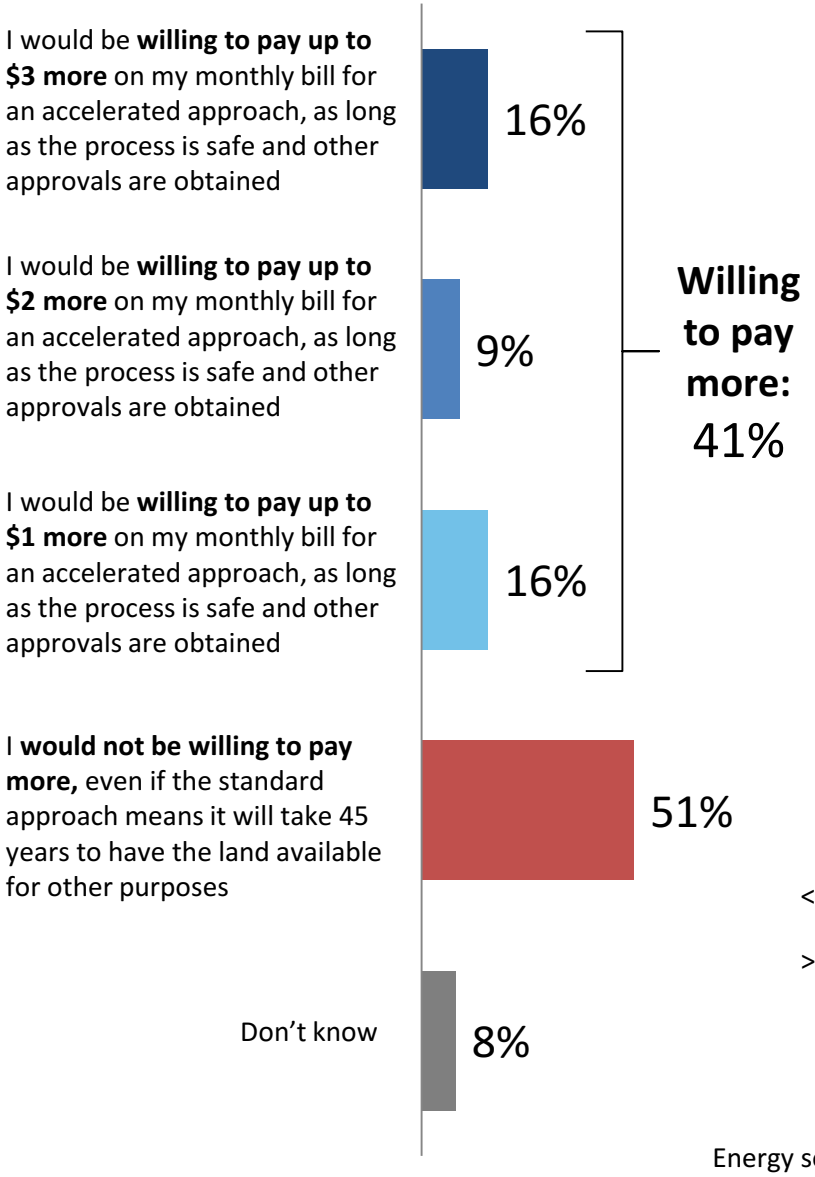
Making the Pickering Station Site Available for Other Uses

Residential

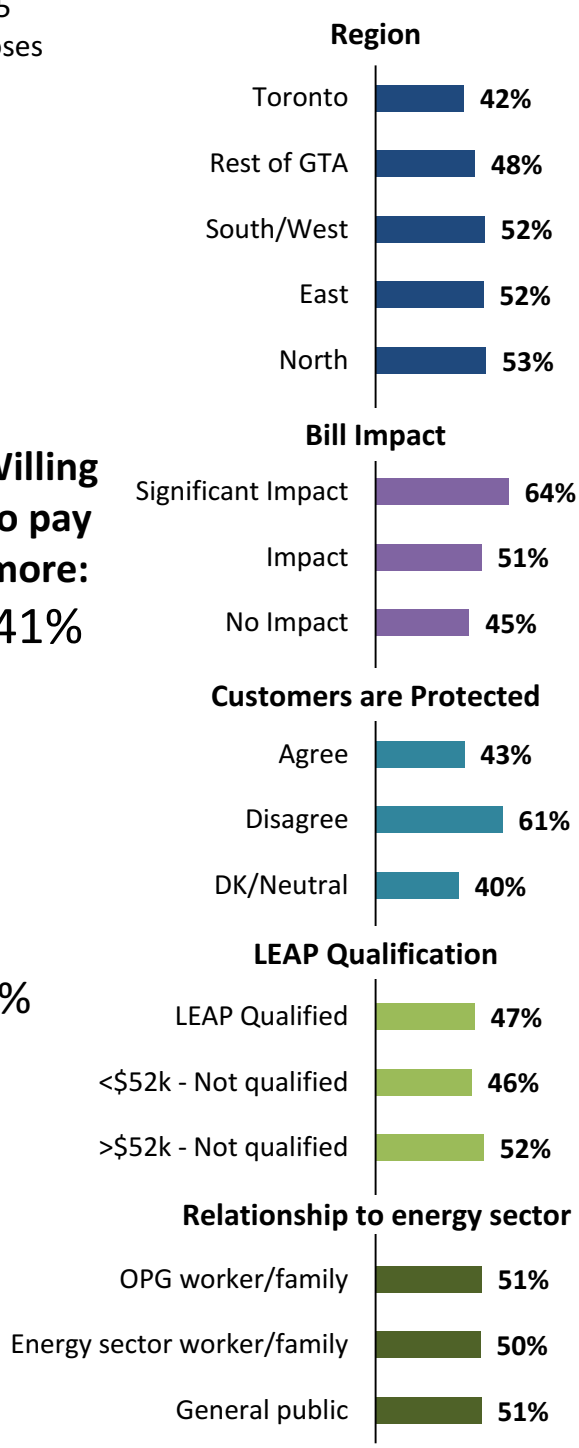
Q Would you be willing to pay more on your monthly bill until the end of Pickering Station's operations, to reduce the shut-down period to approximately 25 years and have the land available for other purposes sooner?

[asked of all respondents, n=4,288]



Segmentation

*Those **not willing to pay more**:*



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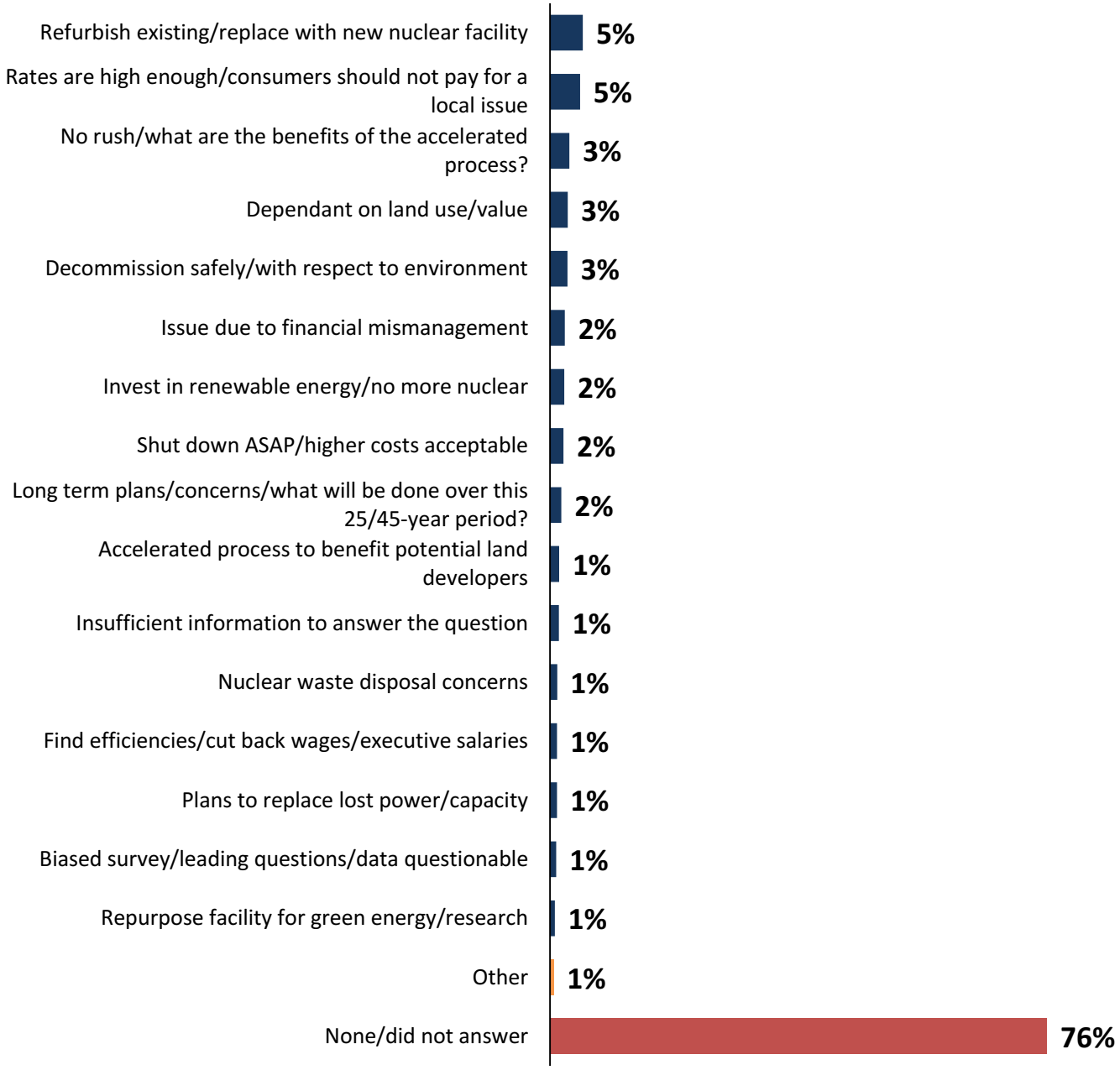
Making the Pickering Station Site Available for Other Uses

Residential

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=4,288]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Darlington Vapour Recovery System Improvement

Residential

This project is to improve the efficiency and reliability of the Vapour Recovery System (VRS) at Darlington Station.

What is the VRS?

This is one of the systems responsible for controlling the tritium emissions at the station.

The VRS requires improvement or replacement, as its efficiency and reliability are challenged by changing external factors, such as:

- Rising lake temperatures affect the system's air-water coolers, leading to higher radiation doses from tritium to workers and higher tritium emissions to the environment. However, both remain well within the regulatory limit.
- The Darlington Refurbishment Program requires the presence of more personnel at the station than the VRS was originally designed for.
- Some components within the VRS have no back-up, which makes it impossible to maintain them without impacting operations or emissions.

To address these challenges, OPG has two options. Both options deliver tritium levels well below the regulatory standard.

What does the VRS do?

- Recover water containing tritium to minimize losses
- Minimize radiation doses to workers in the reactor
- Minimize tritium emissions to the environment

What is tritium?

Tritium is a radioactive form of hydrogen that is a by-product of nuclear power generation.

Darlington Station's airborne tritium emissions are well within the regulatory limits (less than 1% of what is legally allowed).

Historically, the station has also performed better than average when compared to other nuclear plants with the same technology worldwide.

Historic and Target Airborne Tritium Emissions at Darlington Station	
2014	
2015	
2016	
2017	
2018	
2019-21	
2026	

Legend	
	Best performers (top 25 percent)
	Worst performers (bottom 25 percent)

WORKBOOK PAGE

Darlington Vapour Recovery System Improvement

Residential

Q17. OPG needs to decide whether to improve the existing system or replace the system with a higher capacity system. In either case, OPG expects to be within the top 25% of nuclear generators with the same reactor technology for airborne tritium emissions. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Improve existing VRS**	Improve vapour removal capability of the VRS, leading to lower tritium levels in containment and confinement, lower doses to workers, and lower emissions to the environment	Improvement costs of approximately $30 million, resulting in 2 cents more on a typical customer's monthly bill; OPG's performance results may not be as favourable as in OPG's alternative option but will still be well below regulatory standards
☐	**Replace VRS with a higher capacity system**	Larger dryers can take more tritium out, resulting in even lower emissions and radiation compared to the above option; OPG's performance results will be more favorable compared to the above option and will continue to be well below the regulatory standards	Replacement costs of approximately $65 million, resulting in 4 cents more on a typical customer's monthly bill
☐	**Don't know**		

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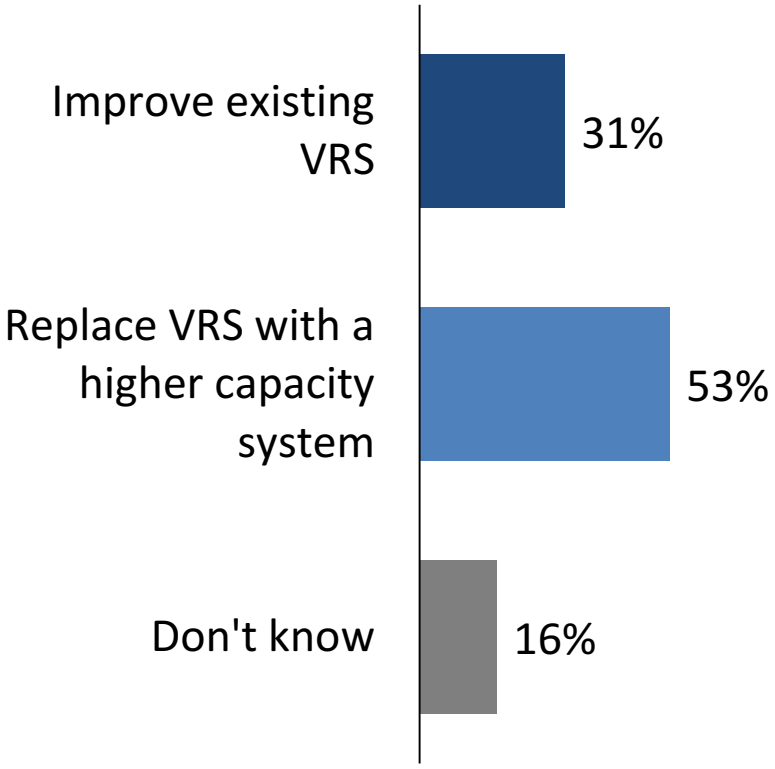
Darlington Vapour Recovery System Improvement

Residential

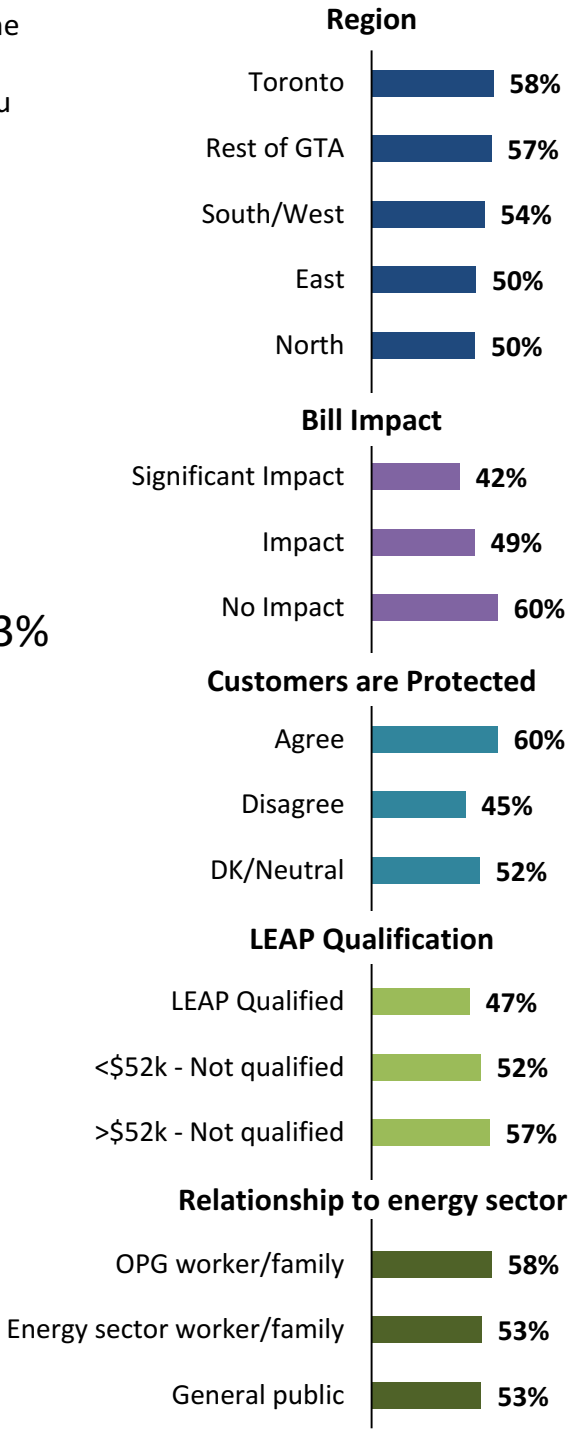
Q

OPG needs to decide whether to improve the existing system or replace the system with a higher capacity system. In either case, OPG expects to be within the top 25% of nuclear generators with the same reactor technology for airborne tritium emissions. Which of the following options do you prefer? [asked of all respondents, n=4,288]



Segmentation

*Those who say "**Replace VRS…**":*

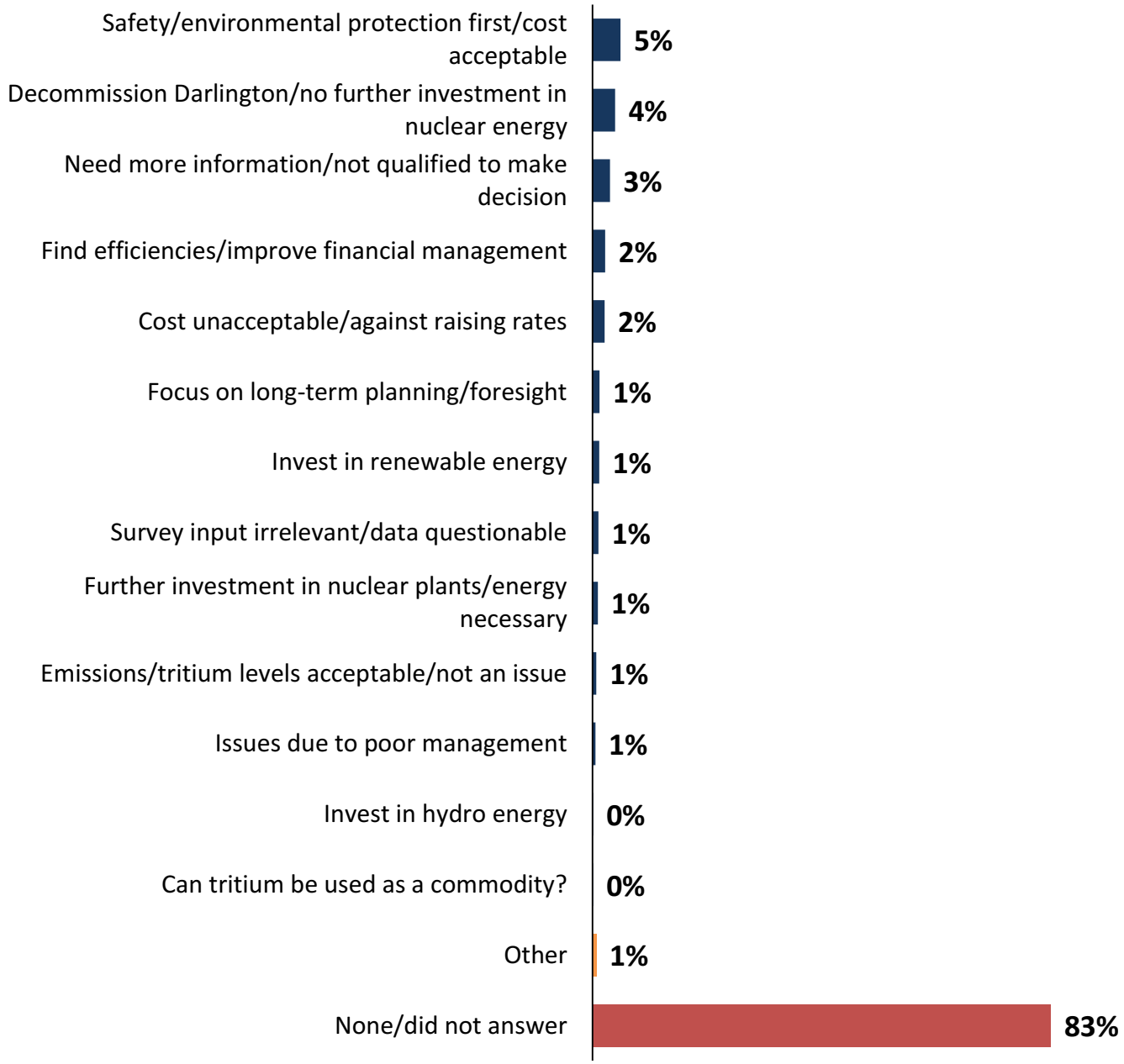


INNOVATIVE RESEARCH GROUP

Darlington Vapour Recovery System Improvement

Residential

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=4,288]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Darlington Air Compressor Replacement

Residential

This project is to replace the 19 air compressors used to supply compressed air at Darlington Station. The current compressors have been in-service for over 30 years and their current condition is rated as fair.

The equipment manufacturer no longer makes parts for the model of compressor in use at Darlington Station. Eventually, OPG will have to replace all 19 compressors. However, the company has a choice in how quickly it does the replacement.

The table below shows what compressed air is used for at Darlington Station and what happens if compressors fail.

Purpose	What the system does	Risks if compressors fail
Service Air	This system supplies air-powered tools and hoists throughout the station.	Service air unavailability would impact the operation of tools and hoists needed to maintain station equipment. This could result in additional outages as back-up solutions are implemented.
Breathing Air	This system supplies air for worker protection from radioactive contamination in the reactor vault. Breathing air is used for air-supplied masks for airborne contamination and for plastic suits, which protect against airborne, liquid and surface contamination.	Unavailability of breathing air compressors would restrict the ability of operators and maintenance personnel to work in areas of high contamination. This could result in impacts on production due to inability to operate or maintain equipment in these areas.
Instrument Air	This system supplies very dry high pressure air that is used to operate valves in various systems throughout the station.	Instrument air unavailability would affect the operation of valves with important process and safety functions in the station. While these valves are designed to fail in their safe position upon loss of instrument air, increasing unreliability of the instrument air due to failure of compressors would result in operational upsets up to and including additional forced outages and costs.

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Darlington Air Compressor Replacement

Residential

Q19. OPG needs to decide whether to proactively replace all of the air compressors or purchase some spares and replace as the existing compressors fail. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Proactively replace all 19 air compressors**	Improved reliability of air compressors; reduced probability of forced outages or extensions to planned outages; reduced worker tritium doses; reduced maintenance complexity by standardizing on one make and model of air compressor; reduced spare parts inventory requirements by standardizing on one make and model of air compressor	Replacement costs of approximately $30 million, resulting in 2 cents more on a typical customer's monthly bill
☐	**Acquire 4 spare air compressors initially and replace as in-service compressors fail. Acquire and replace compressors until all 19 are replaced.**	Initial costs of approximately $5 million, resulting in no noticeable bill increase in the short run; other replacements will be deferred to a later date	Added costs to replace compressors as they fail over time; long-term costs likely higher, totalling up to $50 million; increased chance of unplanned or extended planned outages; potential impact on worker radiation doses; potential risk that replacement parts will not be available later in replacement cycle, resulting in increased maintenance complexity and spare parts inventory requirements
☐	**Don't know**		

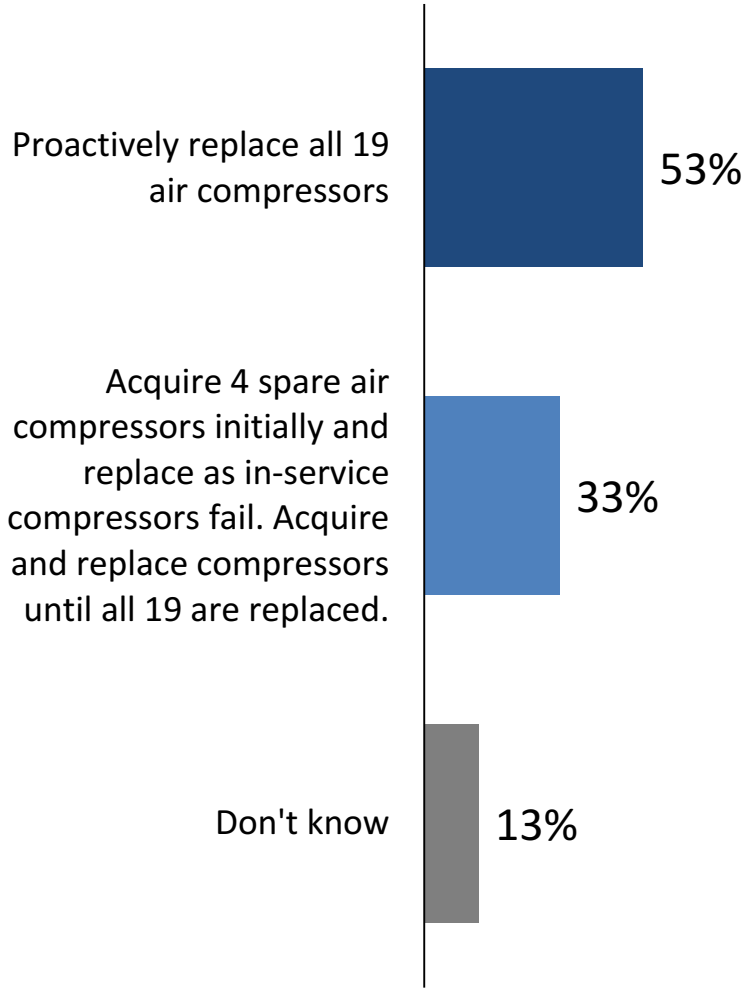
WORKBOOK PAGE

Darlington Air Compressor Replacement

Residential

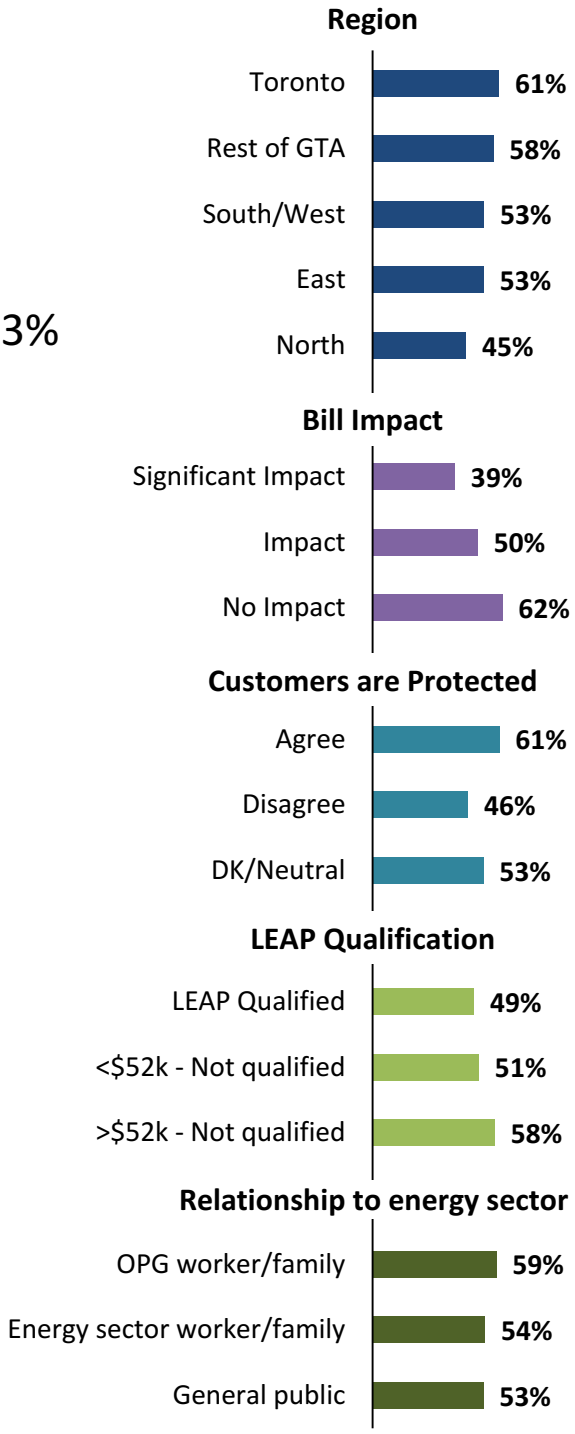
Q

OPG needs to decide whether to proactively replace all of the air compressors or purchase some spares and replace as the existing compressors fail. Which of the following options do you prefer?
[asked of all respondents, n=4,288]



Segmentation

*Those who say "**Proactively Replace**":*

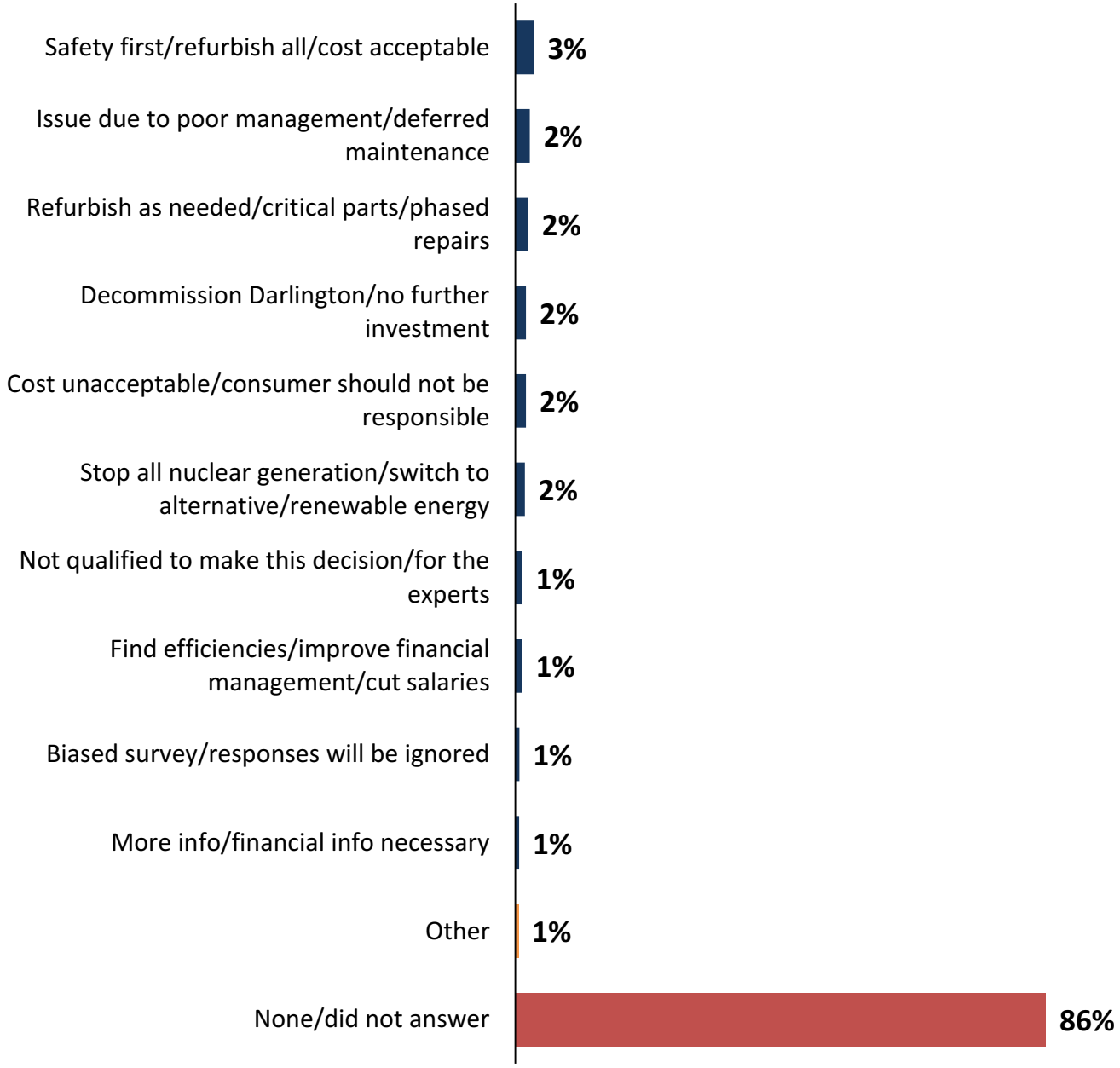


INNOVATIVE RESEARCH GROUP

Darlington Air Compressor Replacement

Residential

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=4,288]



INNOVATIVE RESEARCH GROUP

Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Darlington Crane Group Project

Residential

This project is to refurbish the 20 major cranes at Darlington Station, with capacities up to 200,000 kg, that are used to support operations, maintenance and refurbishment activities. The function of these cranes is to safely lift and move material, equipment and irradiated fuel.

These cranes have been in-service since the 1980's. A third party assessment of station cranes concluded that the cranes are in fair to poor condition and will require refurbishment to provide reliable service until the end of Darlington Station's commercial service.

Experience from other utilities indicates that major cranes such as these are refurbished when they have been in-service for 30 years.

The work involved with refurbishing the cranes includes:

- Controls upgrade including addition of remote pendant
- Inspection of rails
- Replacement of motors, gear boxes, brakes and wire ropes

Q27. OPG needs to decide whether to refurbish all of the cranes or only the 14 most critical ones. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Refurbish all 20 major cranes**	Ensure reliable operation to end of Darlington Station's commercial service; eliminate risk of mechanical failure that could result in dropped loads and damage to surrounding equipment; ensure improved availability of replacement parts and manufacturer service support	Refurbishment costs of approximately $75 million, resulting in 5 cents more on a typical customer's monthly bill
☐	**Refurbish the 14 critical cranes now and the other 6 later**	Same as Option 1 for the 14 refurbished cranes; reduced immediate refurbishment costs of approximately $65 million ($10 million lower than Option 1), resulting in 4 cents more on a typical customer's monthly bill	Reliability of the 6 non-refurbished cranes is likely to decrease with time; spare parts necessary to maintain the 6 non-refurbished cranes may not be available in the future; potential risk of damage to the facility if failure results in a load being dropped
☐	**Don't know**		

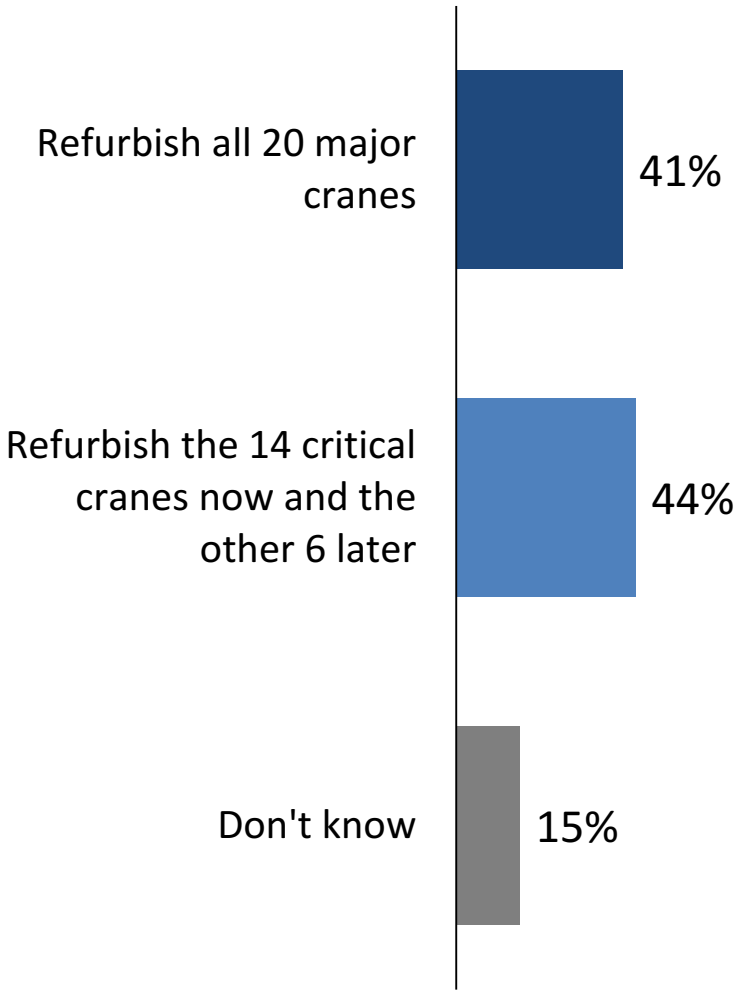
WORKBOOK PAGE

Darlington Crane Group Project

Residential

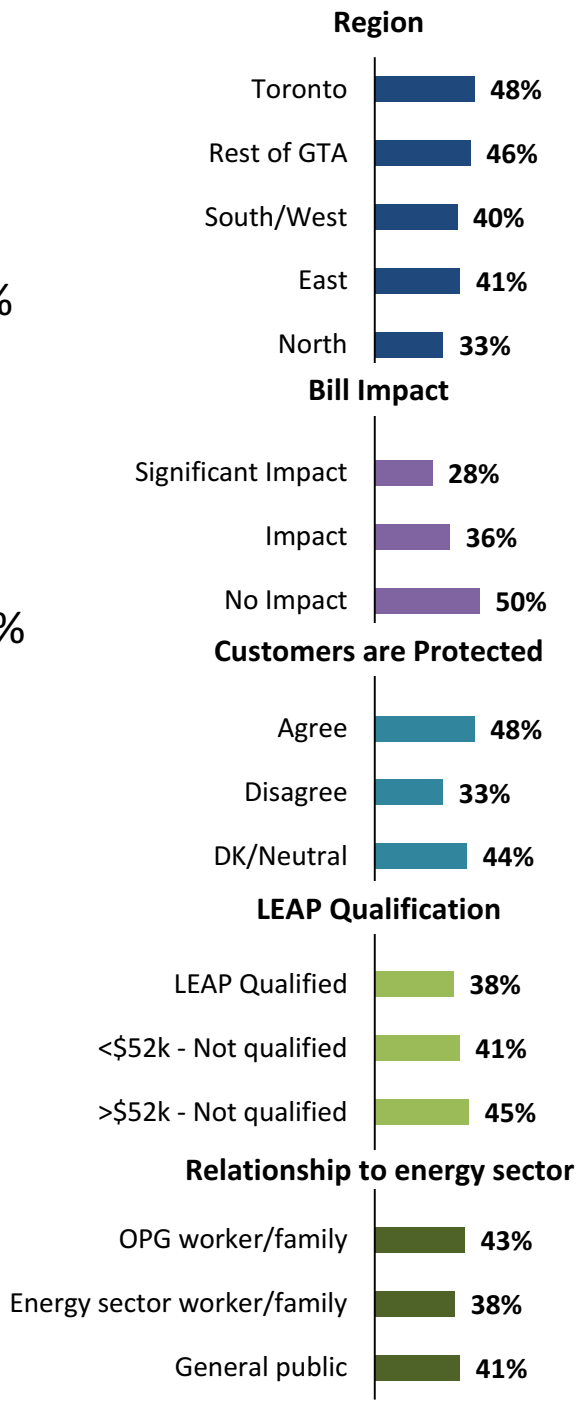
Q

OPG needs to decide whether to refurbish all of the cranes or only the 14 most critical ones. Which of the following options do you prefer?
[asked of all respondents, n=4,288]



Segmentation

*Those who say "**Refurbish all 20…**":*

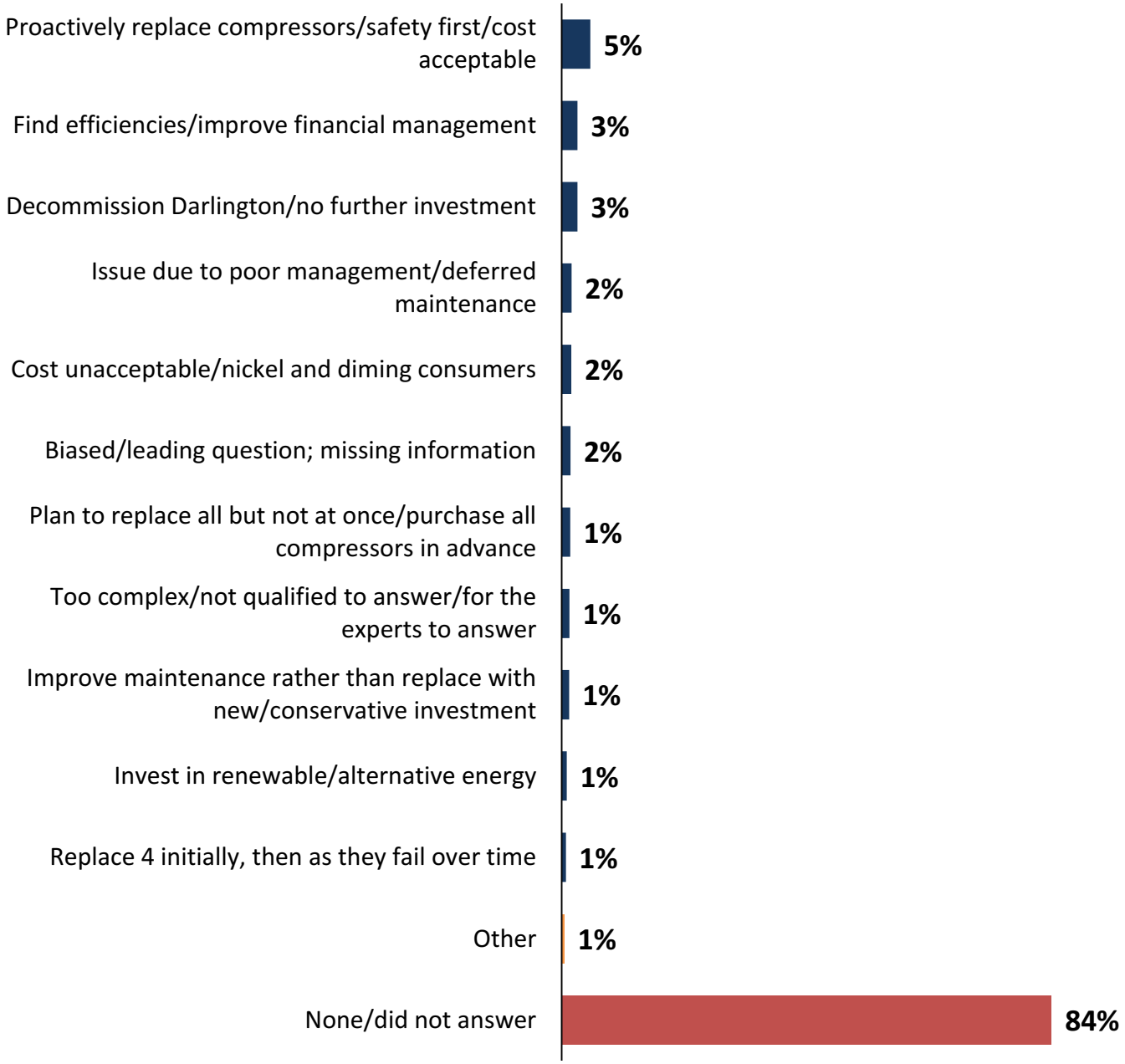


INNOVATIVE RESEARCH GROUP

Darlington Crane Group Project

Residential

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=4,288]



INNOVATIVE RESEARCH GROUP

Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Investing in Technology to Create Efficiencies

Residential

Efficiency Initiatives

OPG is also developing initiatives that will reduce costs and create efficiencies throughout the company. OPG expects that these investments will **increase the reliability of its stations**, **improve safety**, and allow it to plan its **work more efficiently**.

Over the 2020 to 2026 period**, OPG is considering investing between $30 million and $60 million on these initiatives. OPG expects that these investments will save or avoid $50 million to $100 million in costs.**

Increased use of data and innovative technology

- OPG is actively looking for areas where better data and innovative technological solutions can deliver value for money. For example, OPG is in the process of creating a **Monitoring & Diagnostic Centre**, which will use advanced sensors and data analysis to improve the performance and reliability of OPG's nuclear generating equipment.
- OPG is also planning to use new technologies to improve safety and efficiency at its nuclear stations. As an example, OPG is testing a program to use drones to monitor the radiation levels around its nuclear plants.
- In order to operate and maintain its hydroelectric stations in the most cost-effective manner, OPG is looking to invest in technologies that would allow these stations to be monitored for safety and maintenance requirements remotely and proactively identify maintenance needs.

OPG will only invest in technologies that would deliver value for money. OPG would only proceed with new technologies that are expected to more than pay for themselves.

Q29. Which of the following statements best reflects your own point of view?

- ☐ Option 1: OPG should make do with what it has and only replace technology as it breaks down
- ☐ Option 2: OPG should only invest in new and innovative technologies if there is proof that these technologies will lead to guaranteed savings
- ☐ Option 3: OPG should pursue Option 2 and also invest money in pilot projects in cases where no previous evidence of guaranteed savings exists, but where the company sees a good chance that it would lead to savings
- ☐ Don't know

Q30. Do you have any comments you wish to add?

WORKBOOK PAGE

Investing in Technology to Create Efficiencies

Residential

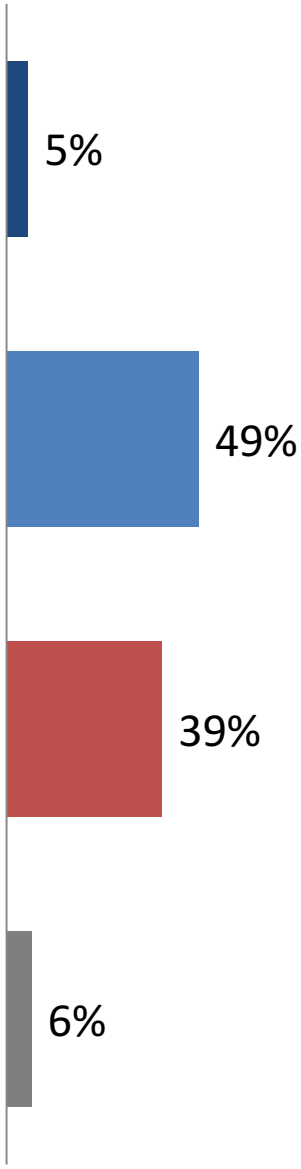
Q Which of the following statements best reflects your own point of view?

[asked of all respondents, n=4,288]

Option 1:
OPG should make do with what it has and only replace technology as it breaks down

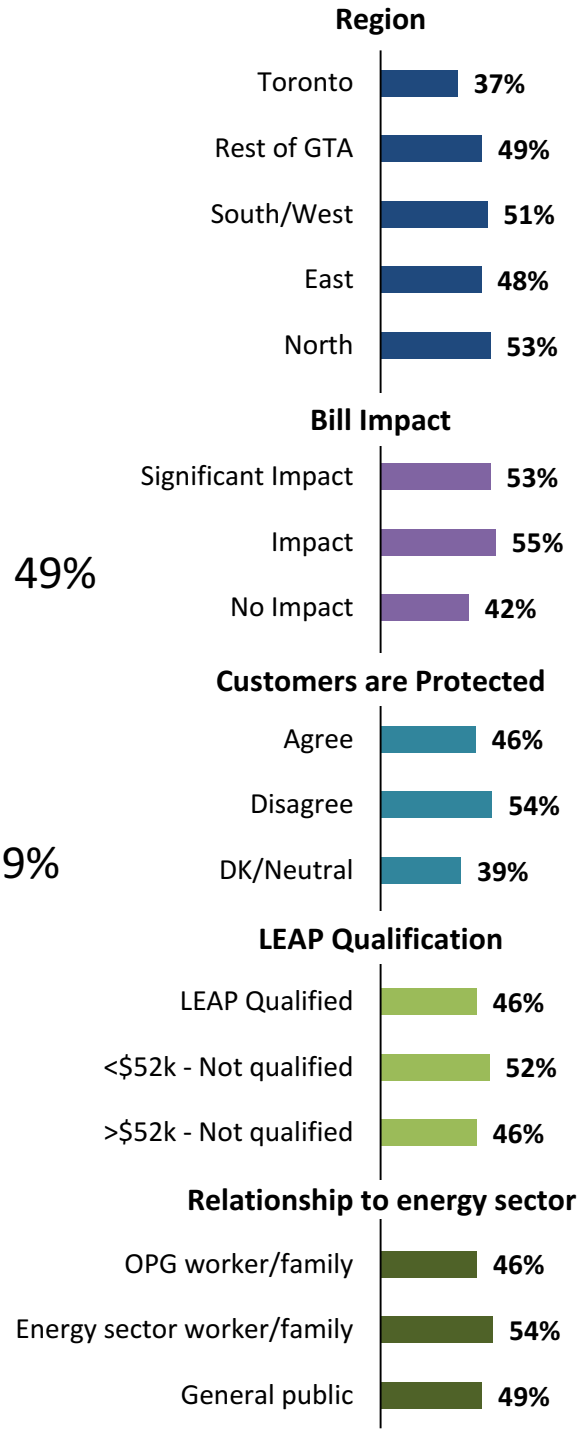
Option 2:
OPG should only invest in new and innovative technologies if there is proof that these technologies will lead to guaranteed savings

Option 3:
OPG should pursue Option 2 and also invest money in pilot projects in cases where no previous evidence of guaranteed savings exists, but where the company sees a good chance that it would lead to savings



Segmentation

*Those who say **"Option 2"**:*

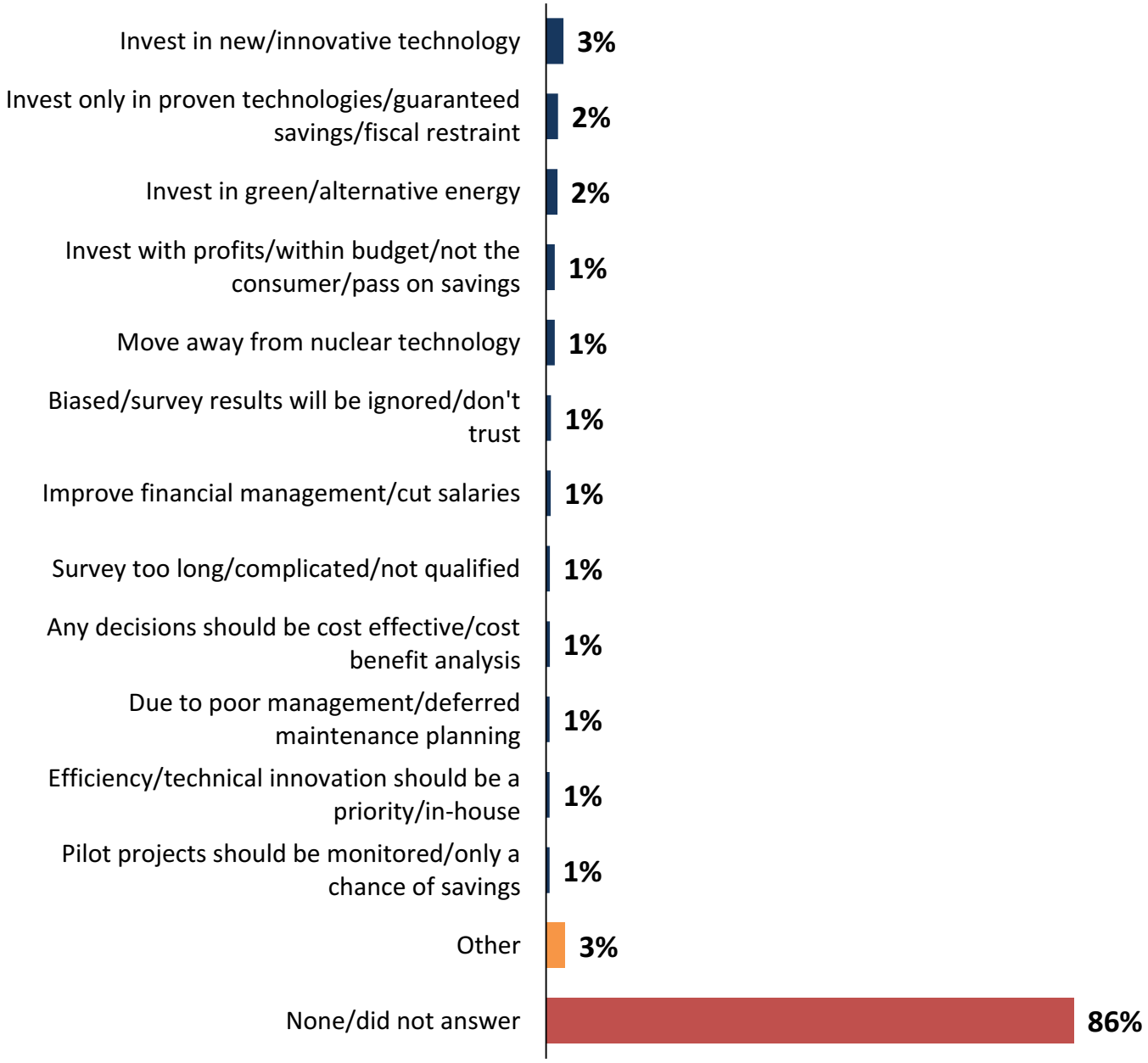


INNOVATIVE RESEARCH GROUP

Investing in Technology to Create Efficiencies

Residential

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=4,288]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

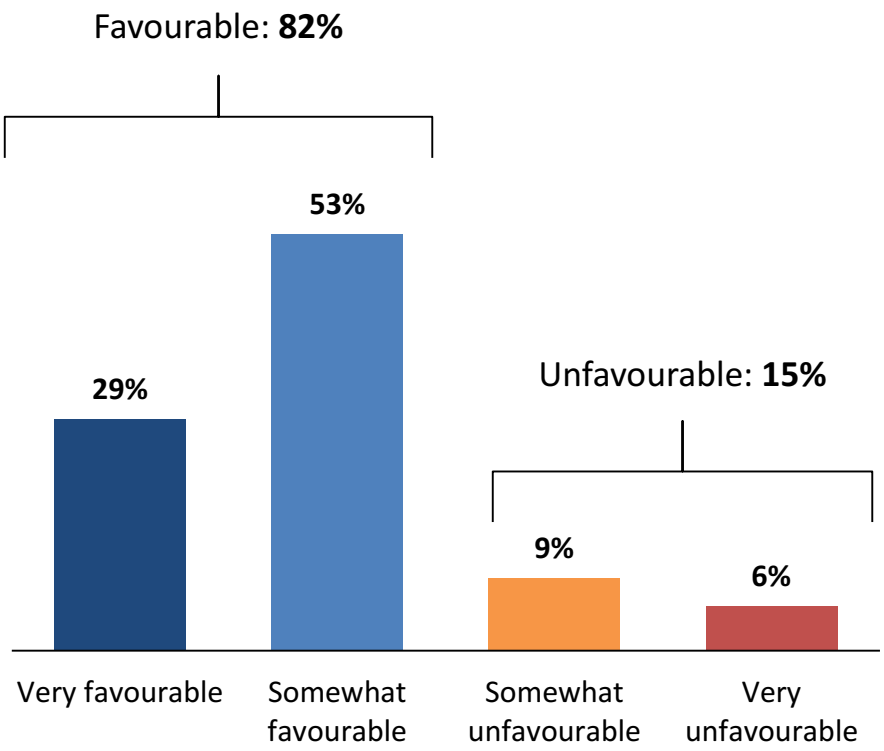
INNOVATIVE RESEARCH GROUP

Workbook Diagnostics

Overall Impression of the Workbook

Residential

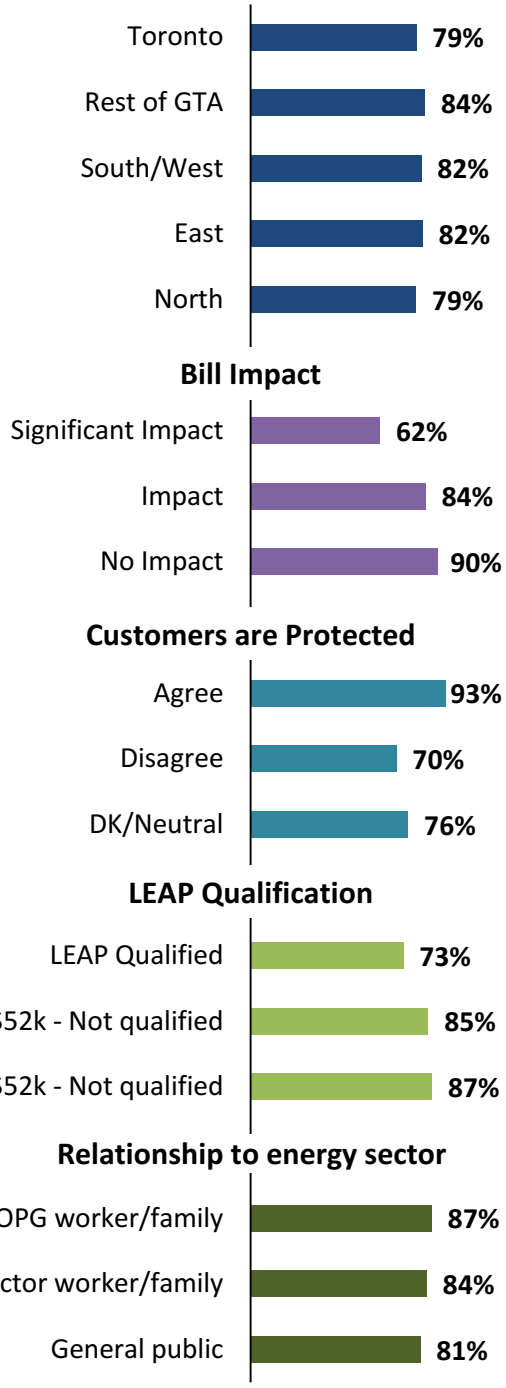
Q Do you have a favourable or unfavourable impression of the workbook?
[asked of all respondents, n=4,288]



Note: 'Don't know' (3%) not shown.

Segmentation

*Those who say "**Favourable**":*

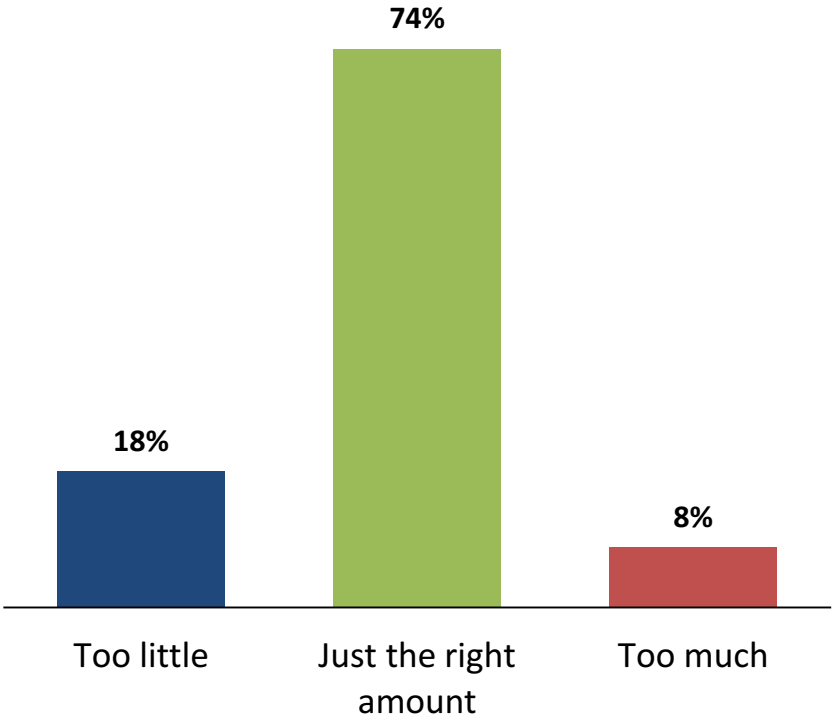


INNOVATIVE RESEARCH GROUP

Volume of Information

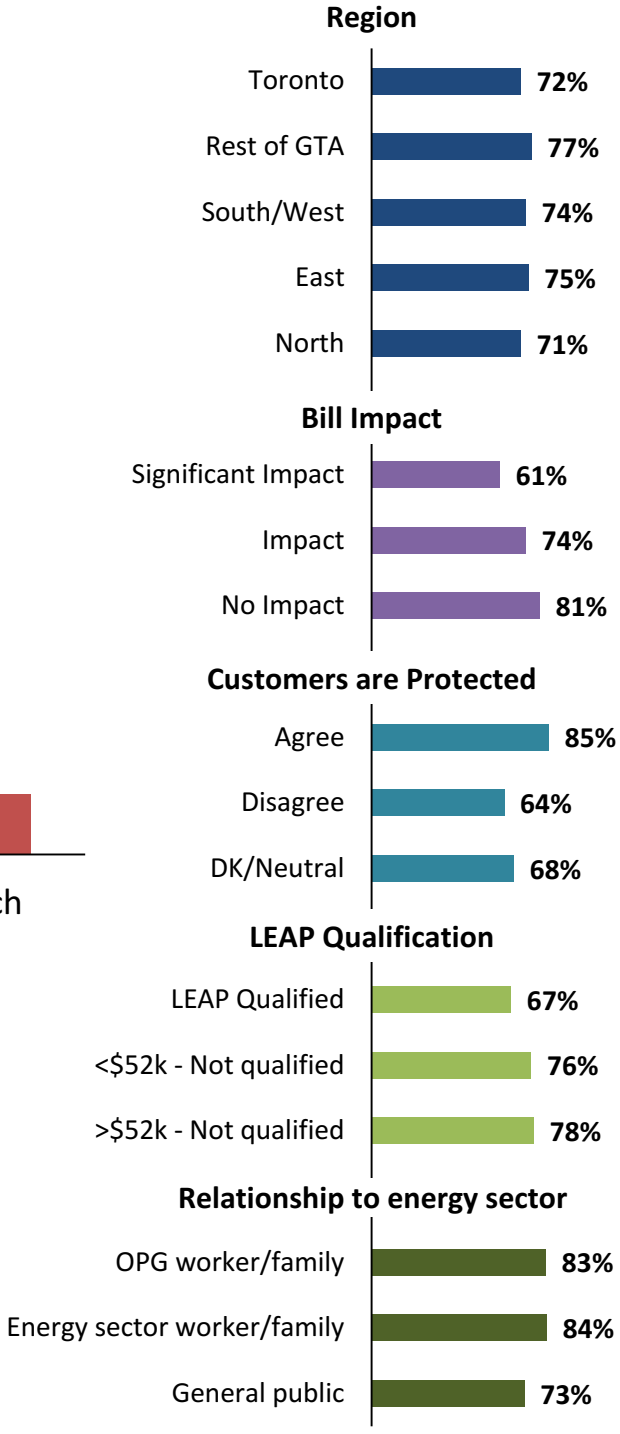
Residential

Q Did OPG provide too much information, not enough, or just the right amount?
[asked of all respondents, n=4,288]



Segmentation

*Those who say "**Just the right amount**":*

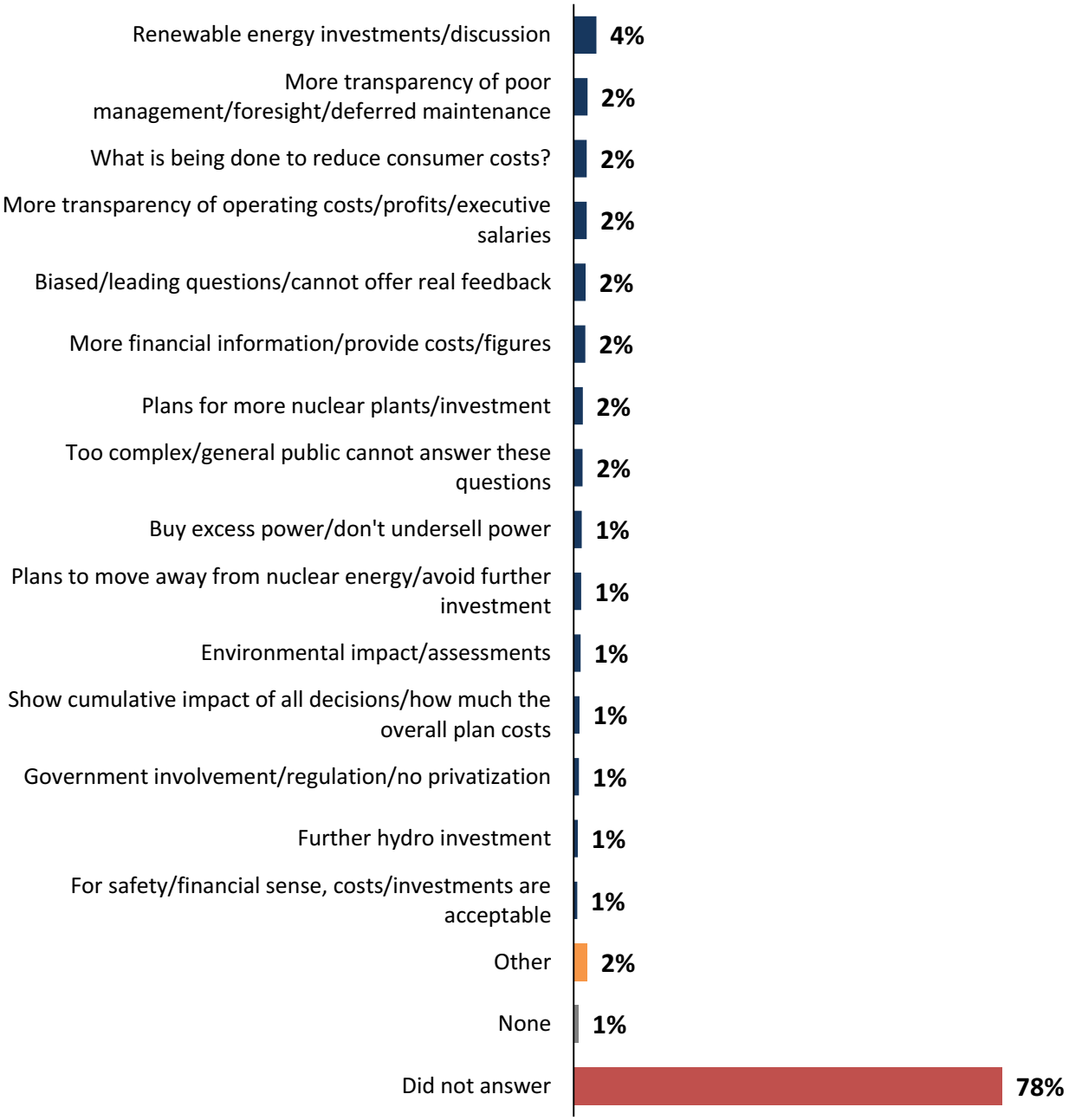


INNOVATIVE RESEARCH GROUP

Outstanding Questions

Residential

Q Do you have any questions about OPG you would still like answered?
[asked of all respondents, up to 3 responses coded, n=4,288]



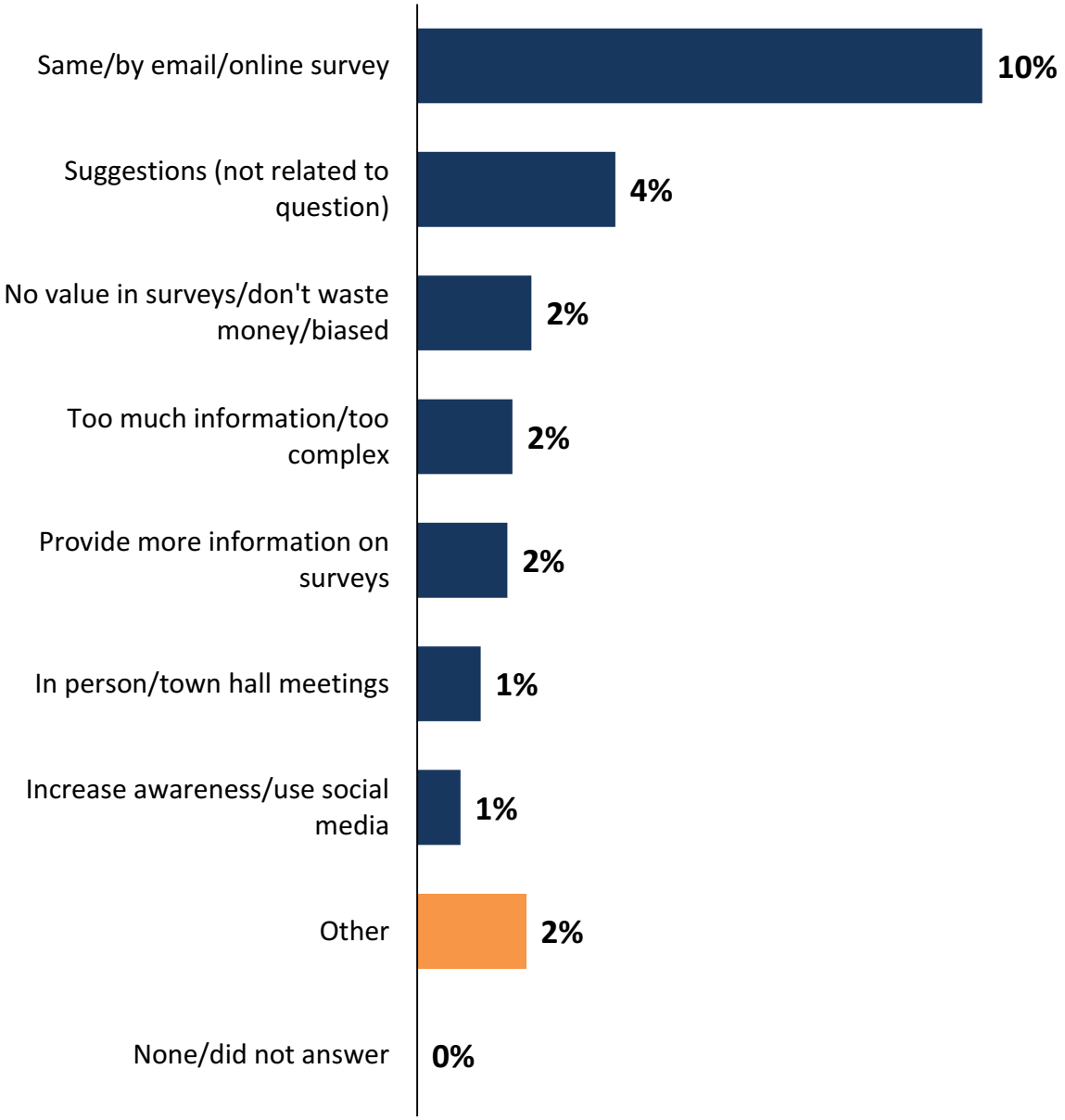
INNOVATIVE RESEARCH GROUP

Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Suggestions for Future Consultations

Residential

Q How would you prefer to participate in future consultations?
[asked of all respondents, up to 3 responses coded, n=4,288]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

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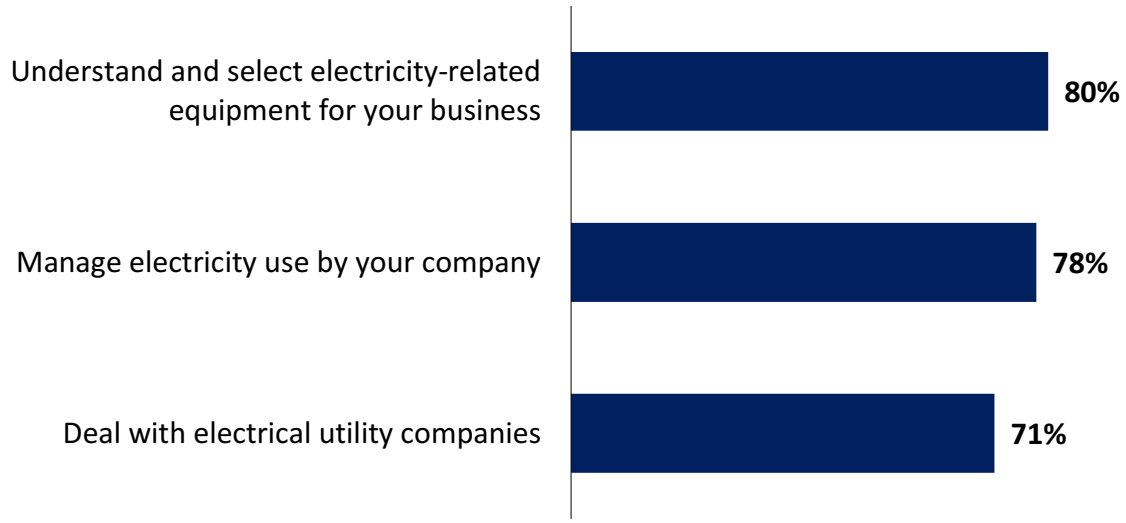
Business Workbook

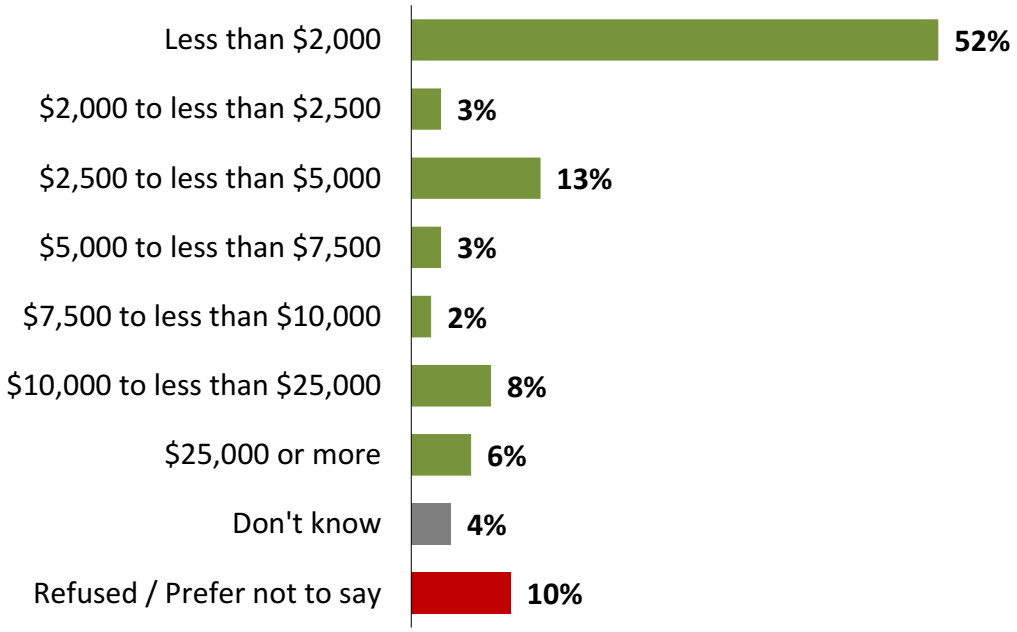
Firmographics
Respondent Profile

Business

Involvement in Electricity-Related Matters Within Organization



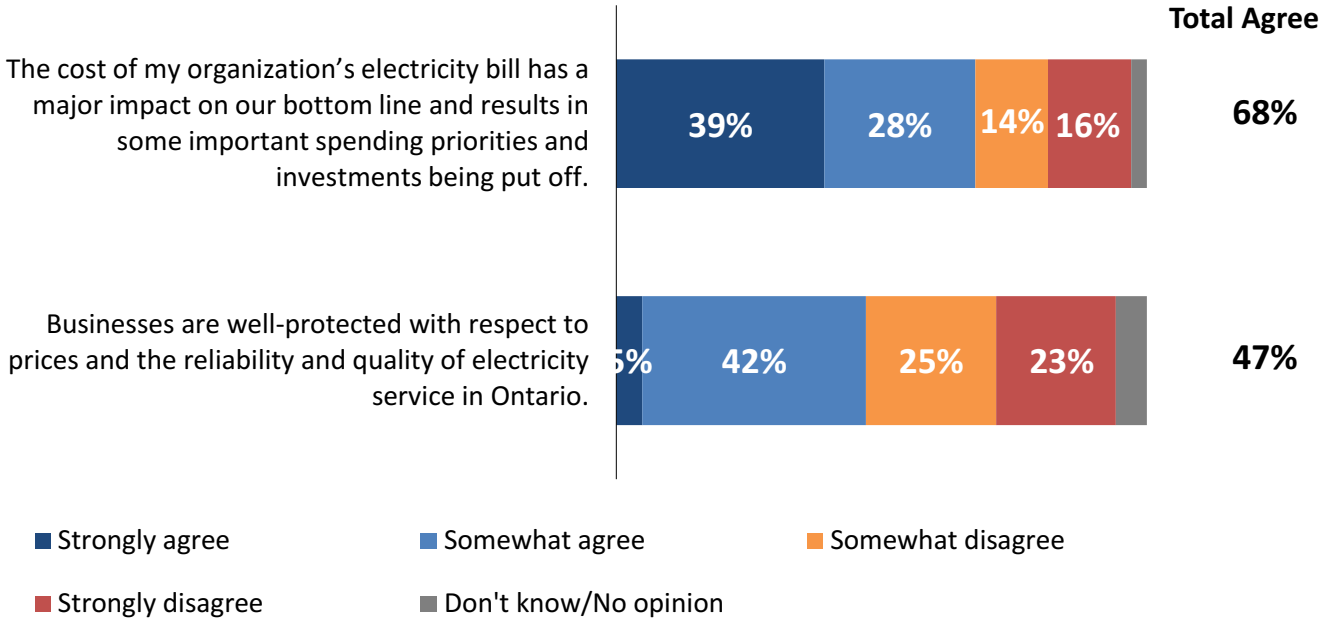
Organization's Bill Size



Segmentation

Business

Q To what extent do you agree or disagree with the following statement?
[asked of all small business respondents, n=102]



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Background Information

Electricity 101

Understanding OPG's Role in Ontario's Electricity System

Business

Ontario's electricity system is owned and operated by provincial, municipal, and private corporations across the province. It is made up of three key components: **generation**, **transmission** and **distribution**.

Generation

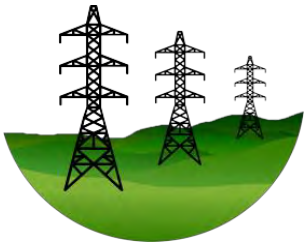
Where electricity comes from.

Ontario gets its electricity from a mix of energy sources. About half of our electricity comes from nuclear power. The remainder comes from a mix of hydroelectric, natural gas, wind and solar.

Most of Ontario's electricity generating stations are located in the southern part of the province close to where the demand for power is greatest. The majority of these power stations are owned and operated by **OPG**, a government owned company that generates about half of Ontario's electricity. The other half comes from multiple generators who have contracts with the grid operator to provide power from a variety of sources.

Transmission

Electricity travels across Ontario.



Once electricity is generated, it must be transported to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. The province has more than 30,000 km of transmission lines.

Local Distribution

Delivering power to homes and businesses in your community.

Your local utility is responsible for the distribution of electricity. This local distribution system includes transformer stations of various sizes and designs that decrease the voltage of the electricity so it can be used in your home or business.

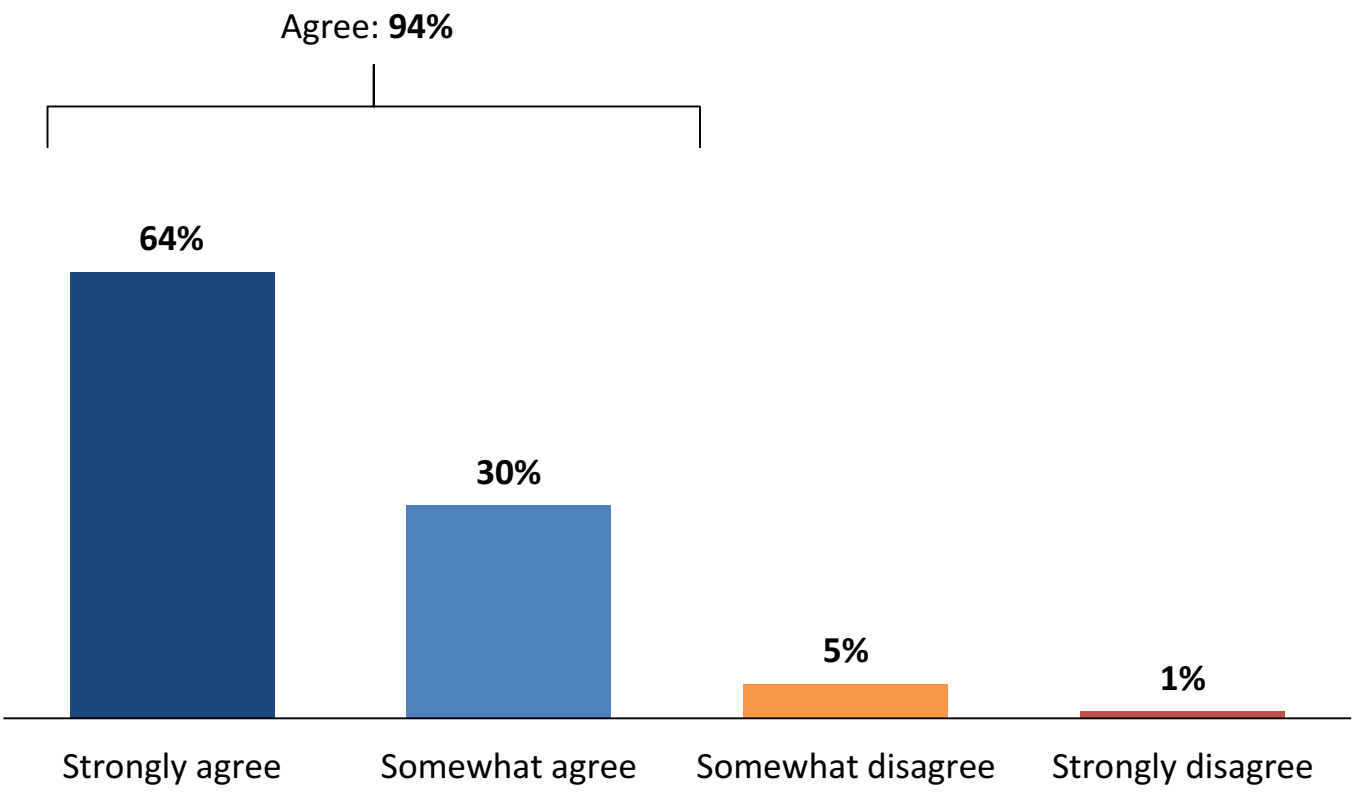
WORKBOOK PAGE

Electricity 101

Understanding OPG's Role in the Electricity System

Business

Q To what extent do you agree or disagree with the following statement?
I generally understand how the various parts of the electricity system work together.
[asked of all respondents, n=102]



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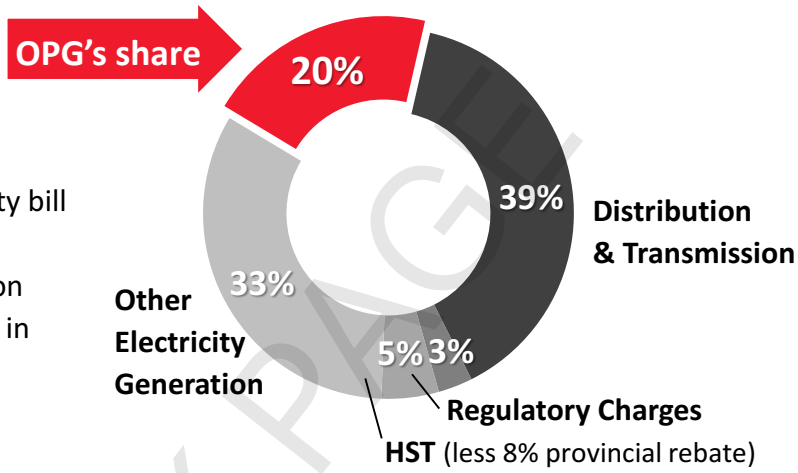
How much does electricity generation cost me?

Business

How much of my bill goes to OPG?

For the typical small business customer:

- About half of the monthly electricity bill goes to pay for power generation.
- Historically, 20% of the monthly electricity bill goes to pay for OPG's power generation. However, OPG's share entirely depends on consumption and can be higher or lower in any given month.
- The rest of the bill goes to pay for other generators, transmission companies, distribution companies, regulatory agencies, and government taxes.



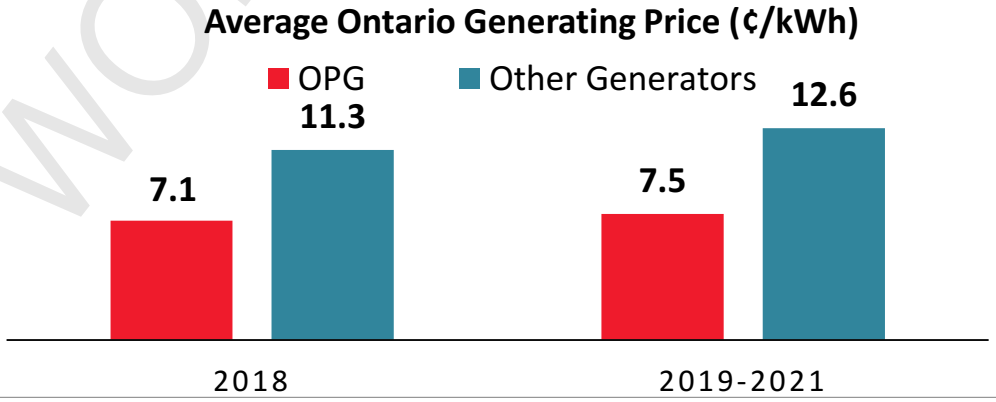
Click here if you want to learn more about the other 80% of your bill.

Who sets electricity rates?

The Ontario Energy Board sets the prices that OPG can charge its customers for most of the electricity it generates. OPG is the only "regulated" electricity generator in Ontario. For the other generators, electricity prices are set in their contracts.

How much does OPG's energy cost compared to others?

The electricity OPG generates costs you about 40% less than the average price paid to other generators in the province.



Note: Residential Workbook example shown. See Appendix for example from Small Business Workbook.

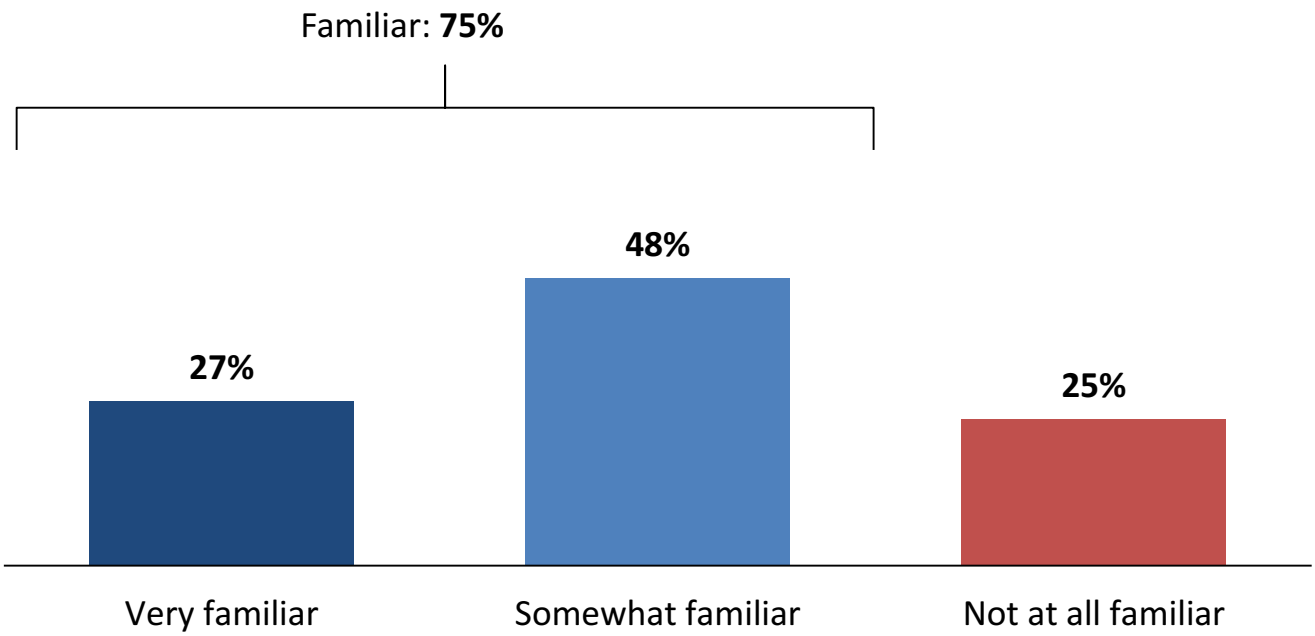
WORKBOOK PAGE

How much does electricity generation cost me?

Business

Q Before this workbook, how familiar were you with the percentage of your organization's electricity bill that goes to OPG?

[asked of all respondents, n=102]



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Who is OPG?

- Ontario Power Generation is owned by the Province of Ontario.
- It was established in 1999 to operate the electricity generation facilities of the utility that was previously known as Ontario Hydro.
- Today, OPG is one of the largest and most complex generating companies in North America with about 9,000 employees across the province.

OPG's regulated electricity comes from two sources:

Hydroelectric

More than one third of the electricity that OPG produces comes from hydroelectric facilities located across the province.

This renewable resource has fueled Ontario's economic growth since the beginning of the 20th century and it remains an important contributor of clean, low-cost power in the province.

Click here to learn more about:
- How hydroelectric power generation works
- Water safety
- Environmental impacts

Nuclear

OPG's two nuclear generating stations play a significant role in Ontario's energy mix. **Darlington** and **Pickering Stations** operate continuously to meet the minimum level of power demand for the province while emitting virtually no air pollution.

OPG began the refurbishment of Darlington Station in October 2016. The Darlington Refurbishment is a ten-year mega project that will extend the station's life by about another 30 years.

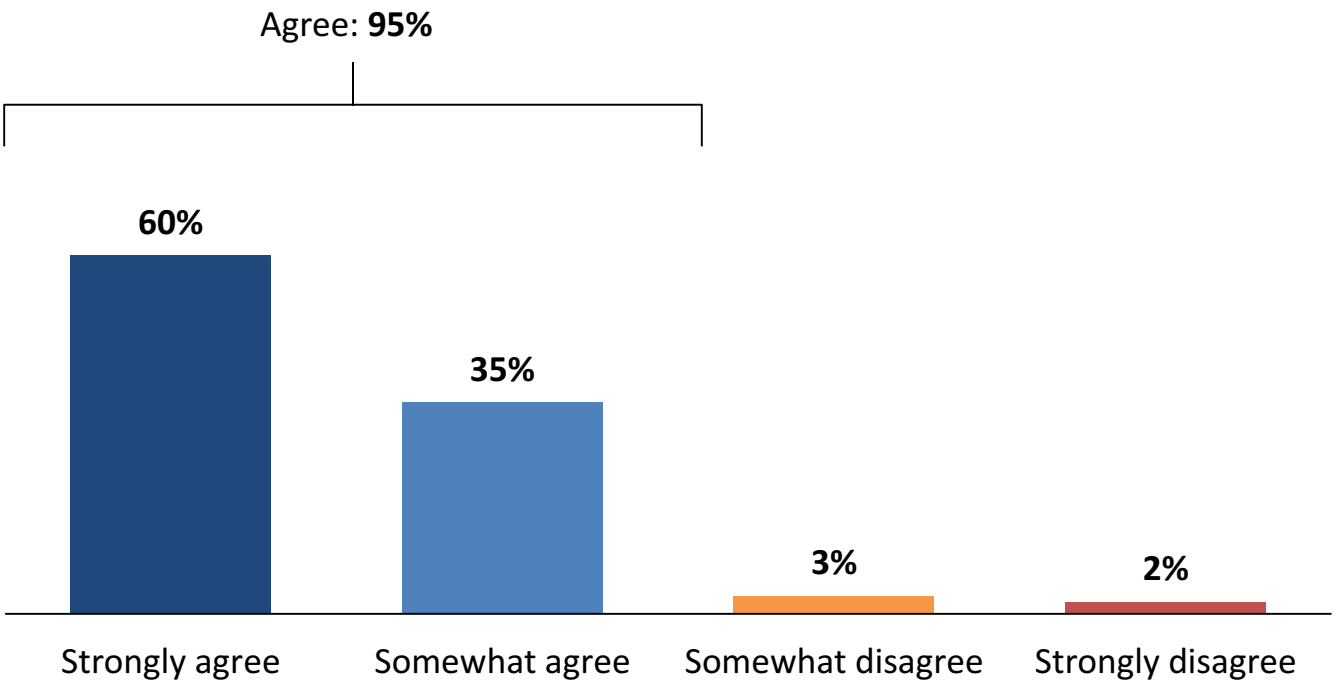
Click here to learn more about:
- How OPG deals with nuclear waste
- The Darlington Refurbishment
- Why refurbish as opposed to other forms of generation?

WORKBOOK IMAGE

Who is OPG?

Business

Q To what extent do you agree or disagree with the following statement?
I have a general understanding of who OPG is.
[asked of all respondents, n=102]



INNOVATIVE RESEARCH GROUP

Building OPG's Plan

Business

The purpose of this consultation is to get your input as OPG prepares its plan.

This plan must satisfy OPG's mandate as stated in the Memorandum of Agreement with the Province.

The goals in OPG's plan must follow the policy direction set by Ontario's Ministry of Energy. This includes OPG's role in Ontario's Long-Term Energy Plan.

As required by the Ontario Energy Board, OPG must also consider the views of customers like you as it develops its plan.

How does OPG consider customers' views in its plan?

OPG has developed a five phase approach to gathering and responding to customer feedback:

- ✔ **1. Identify customer priorities:** In 2018 OPG asked customers from across Ontario about their needs and priorities for electricity generation.
- ✔ **2. Use customer feedback to guide development of plan:** Key findings from the initial customer engagement informed the planning process.
- **You are here** → **3. Collect customer feedback on specific decisions**
  Now OPG is returning to customers to get feedback on specific business choices it needs to make.
- **4. Preparing the detailed plan:** Prepare detailed plan based on customer feedback.
- **5. Submit the plan to the Ontario Energy Board:** File the plan, this workbook, and a summary report with the OEB where it will be examined by the OEB, consumer advocates, and other independent parties in a public hearing on OPG's regulated prices.

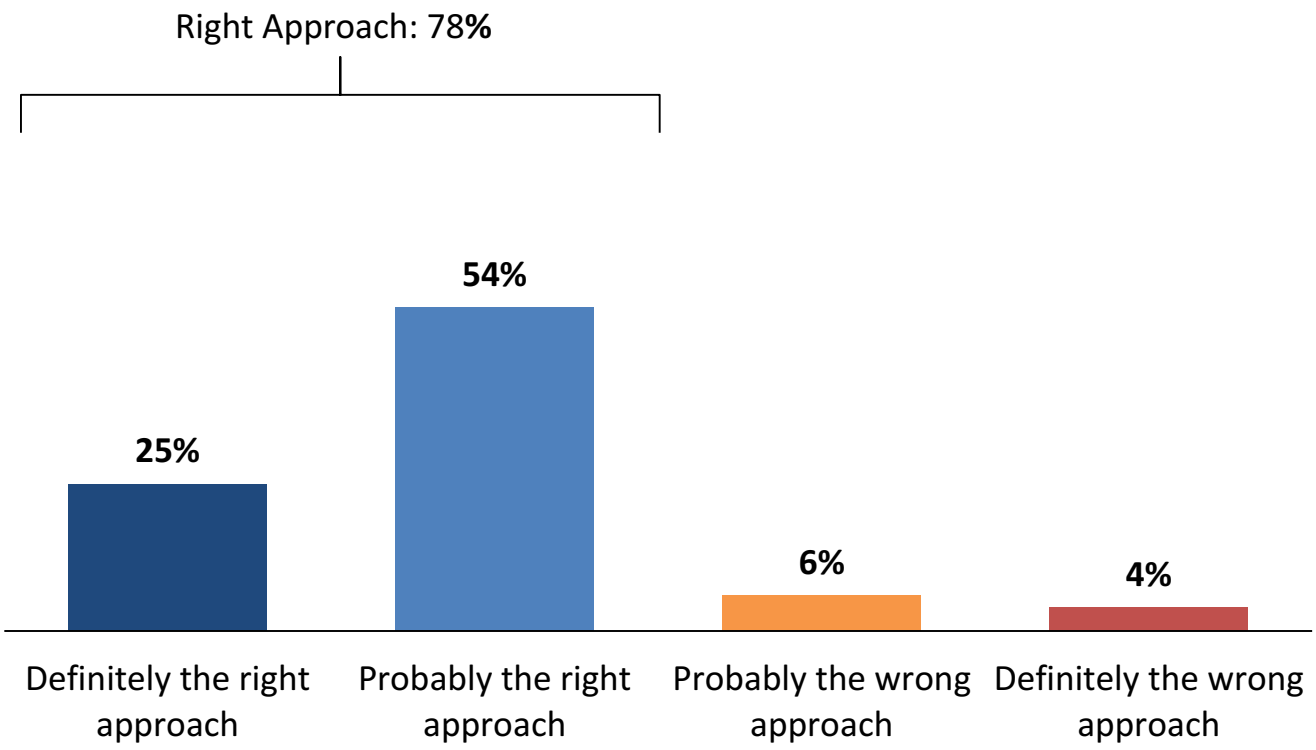
WORKBOOK PAGE

Building OPG's Plan

Business

Q Does this seem like the right approach or the wrong approach to building OPG's plan?

[asked of all respondents, n=102]



Note: 'Don't know' (3%) and 'Not sure' (9%) not shown.

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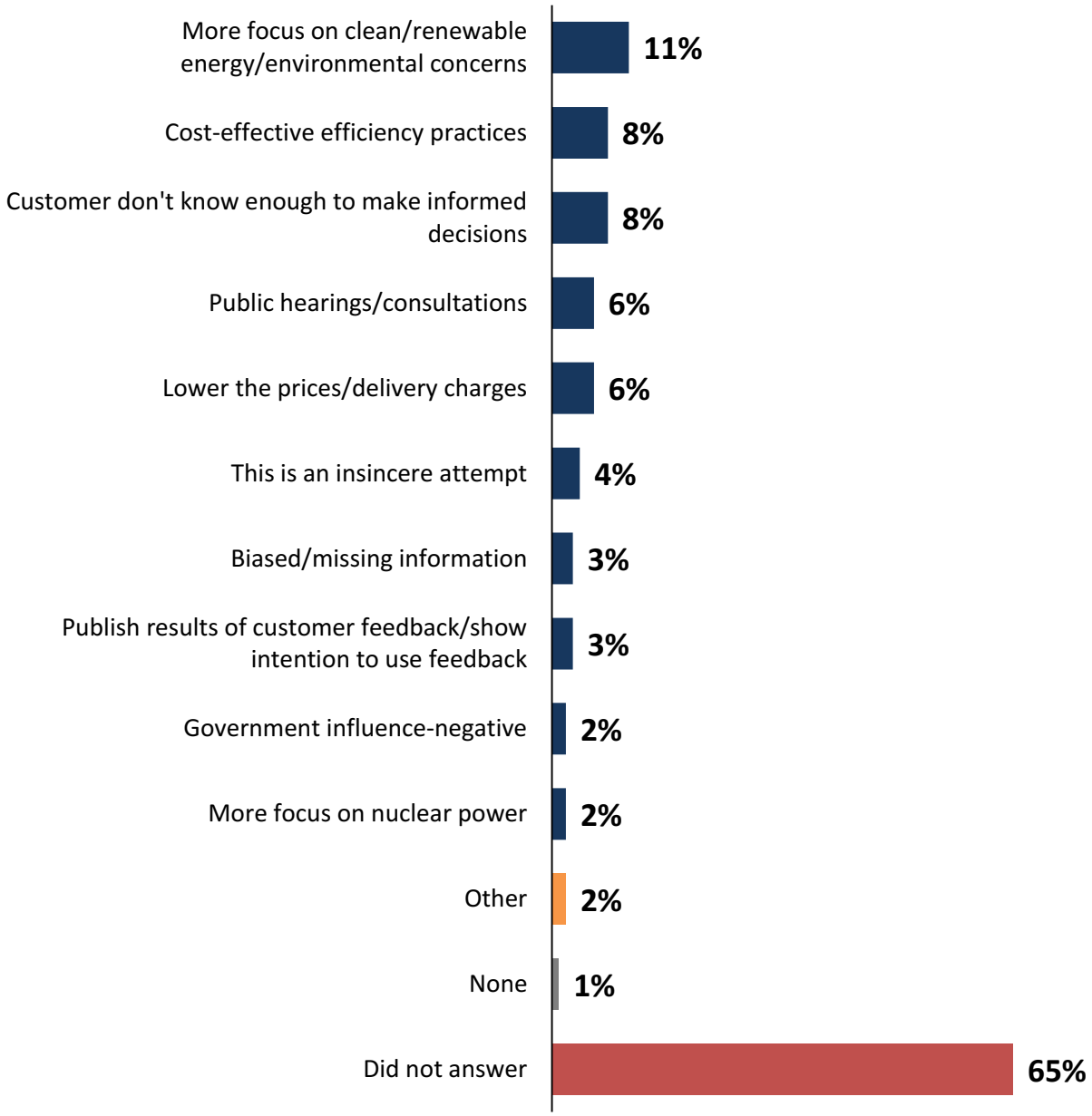
Building OPG's Plan

Business

Q Is there anything in particular you would change about this approach or any other comments you would like to make?

[asked of all respondents, up to 3 responses coded, n=102]



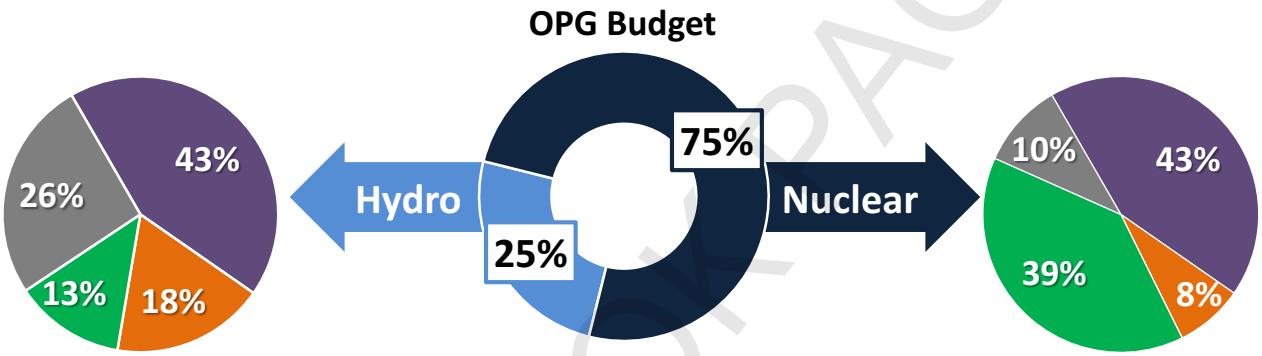
INNOVATIVE RESEARCH GROUP

Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Where does the money go?

The efficient and cost-effective operation of its facilities is one of OPG's key objectives established by government. OPG is also mandated to operate its generating assets safely and in accordance with all applicable safety and environmental regulations and standards. Any profits are either reinvested in the business or paid out to the Province of Ontario.

OPG manages separate budgets for hydroelectric and nuclear generation. The cost of OPG's Hydro business is $1.3 billion per year. The nuclear business costs a total of $3.2 billion per year.



Maintenance	Spending required to keep the existing stations and equipment working at the current level, including both normal daily costs and project investments.
Value Enhancing	Spending that would allow OPG to get more out of existing stations (e.g. refurbishment of Darlington Station), by reducing costs, improving efficiency, or increasing the amount of power generated.
Operating Expenses	Ongoing costs to run the business (e.g. nuclear and hydroelectric station operations, security, engineering, radiation protection services, and support functions such as leased real estate, IT services, finance, human resources, and procurement). More people are needed to run nuclear than hydroelectric stations, so operating expenses represent a larger share of the nuclear budget.
Taxes, Fuel, and Other	Income tax, property tax, corporate insurance, water usage taxes and uranium costs, as well as cost of nuclear station shutdown and handling and disposal of used nuclear fuels and other nuclear waste.

WORKBOOK PAGE

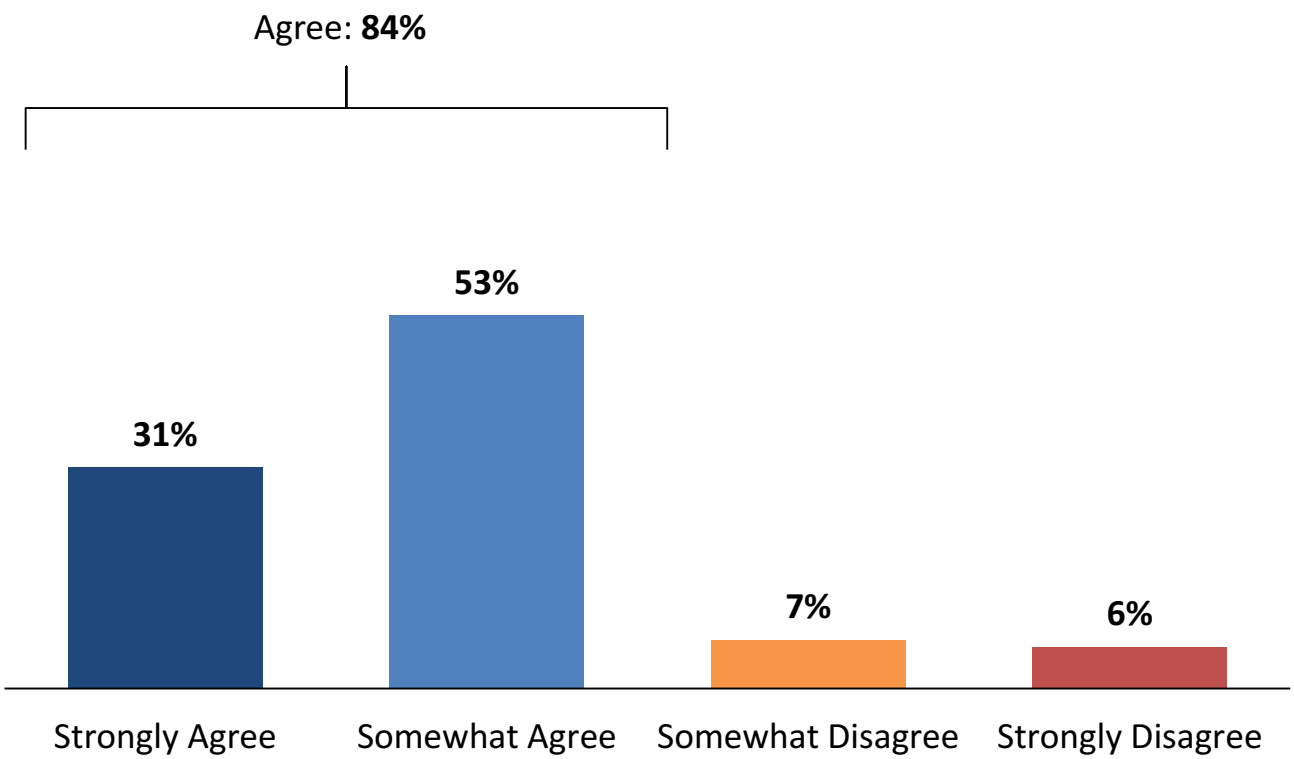
Where does the money go?

Business

Q

To what extent do you agree or disagree with the following statement?
I have a general understanding of how OPG spends the rates my organization pays.

[asked of all respondents, n=102]



Note: 'Don't know' (3%) not shown.

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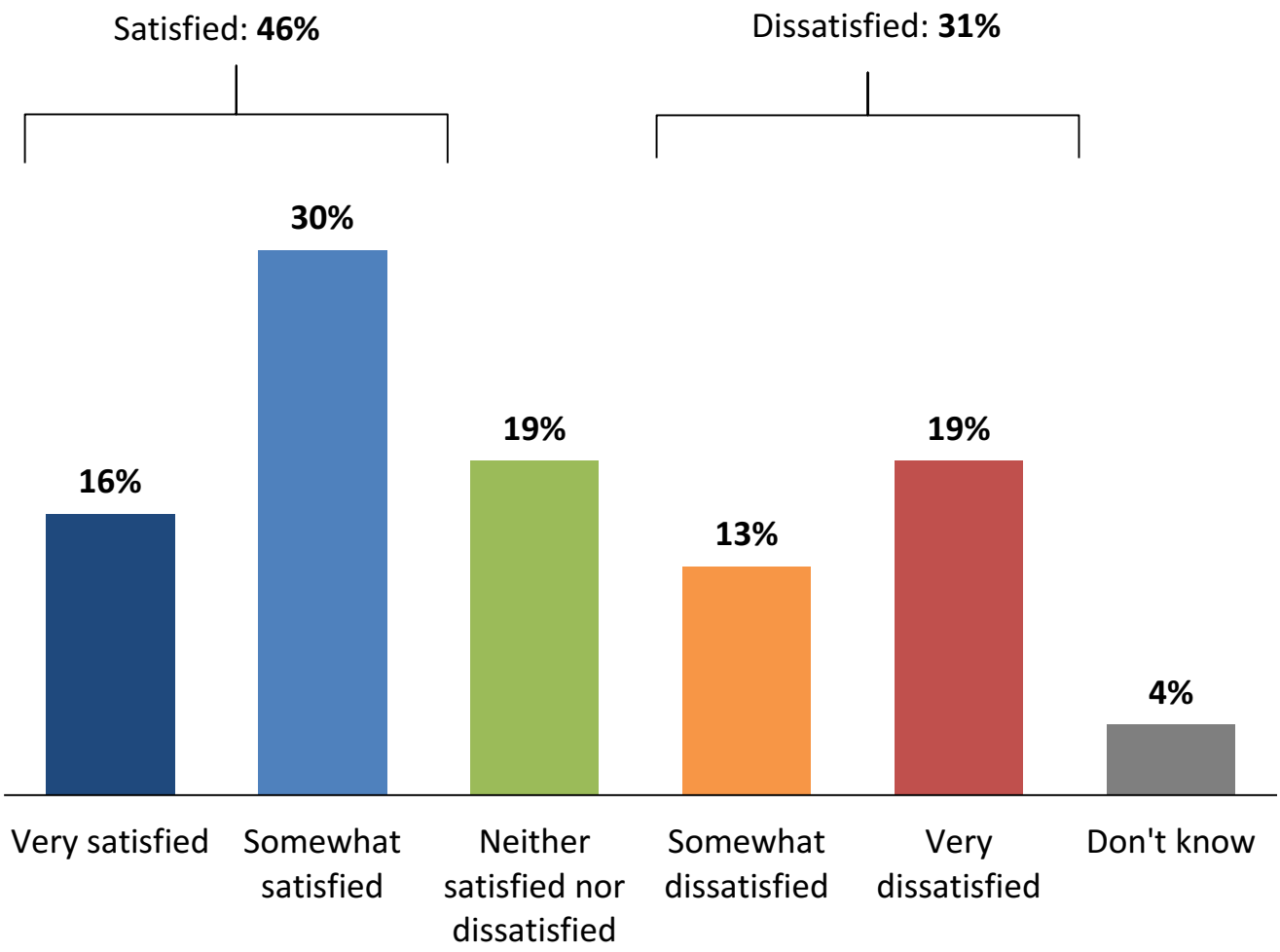
INNOVATIVE RESEARCH GROUP

Satisfaction with OPG

Satisfaction with OPG

Business

Q Now that you've read a bit more about OPG and how it fits into Ontario's electricity system, how satisfied are you with OPG's performance?
[asked of all respondents, n=102]



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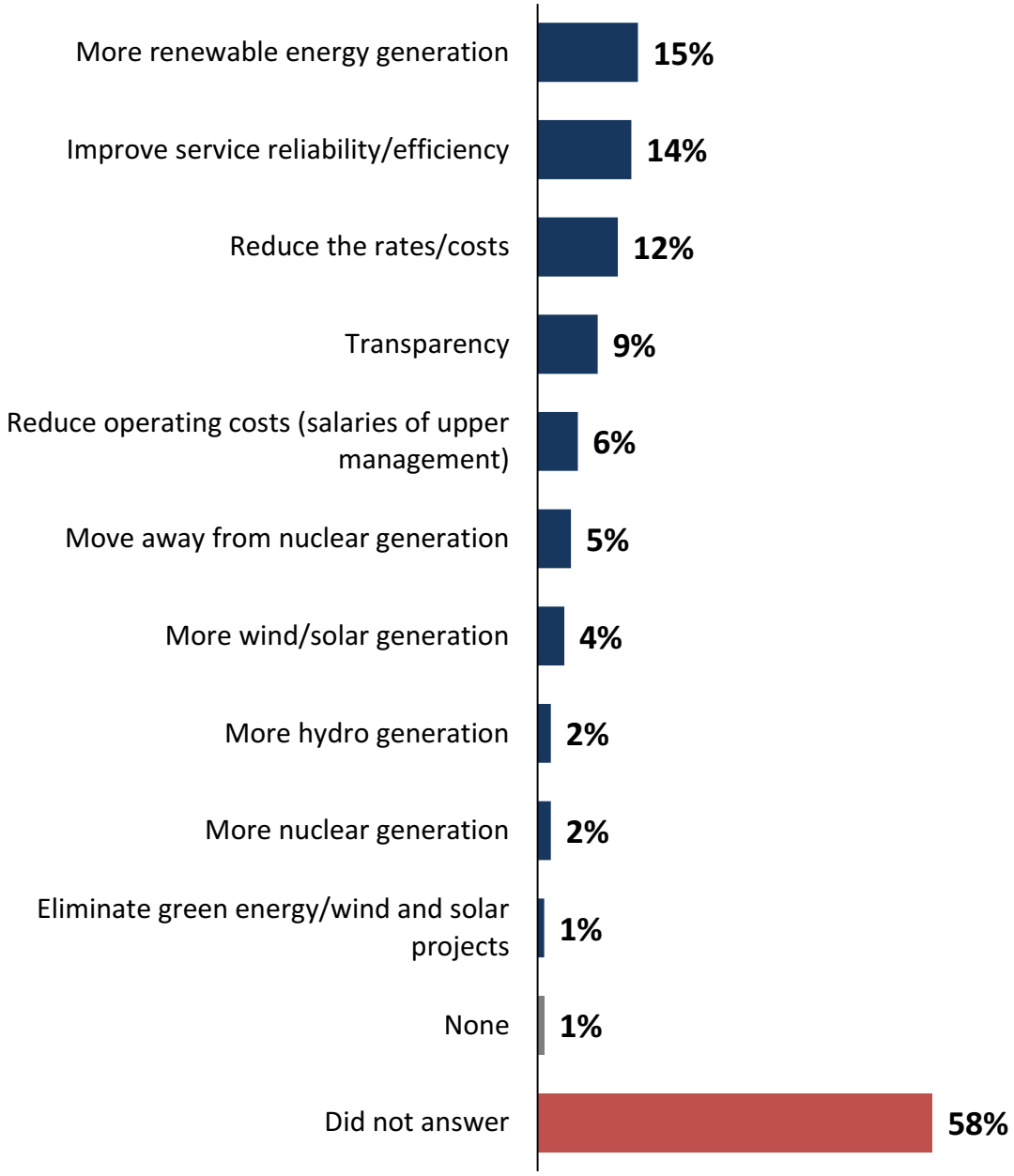
Suggestions for Improvement

Business

Q Is there anything in particular that OPG could do better for [you/your organization]?
[asked of all respondents, up to 3 responses coded, n=102]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

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Making Choices

Rate Smoothing Options

Business

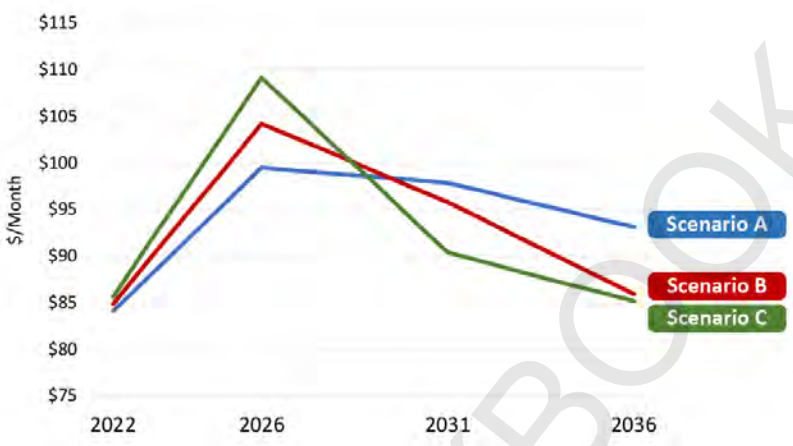
Although it takes years of construction before a major generating station is ready to produce electricity, consumers only pay for those costs once a station is completed and operating. This can create "spikes" in electricity prices. To avoid those spikes, OPG is legally required to propose some form of "rate smoothing" in its next application to the OEB.

OPG wants to hear from you how much rate smoothing you would like to see—a little or a lot?

What does rate smoothing mean?

Rate-smoothing spreads costs over a longer period, avoiding spikes in electricity rates in particular years. OPG can smooth-out increases in its rates by borrowing money to pay for some costs, instead of collecting the cost from customers. However, OPG must pay interest on that borrowed money, which is eventually paid through electricity prices.

The basic trade-off is: Would you prefer paying more now, but less over time? Or less now, but more overall? The chart below shows three example rate smoothing scenarios:



This smoothing only applies to OPG's share of the bill, based on a period of time until 2036. The typical customer bill is based on a typical small business monthly consumption (2,500kWh) and on the OEB "Bill Calculator" for estimating monthly electricity bills.

Q9. Which of the rate smoothing options presented above would you prefer?

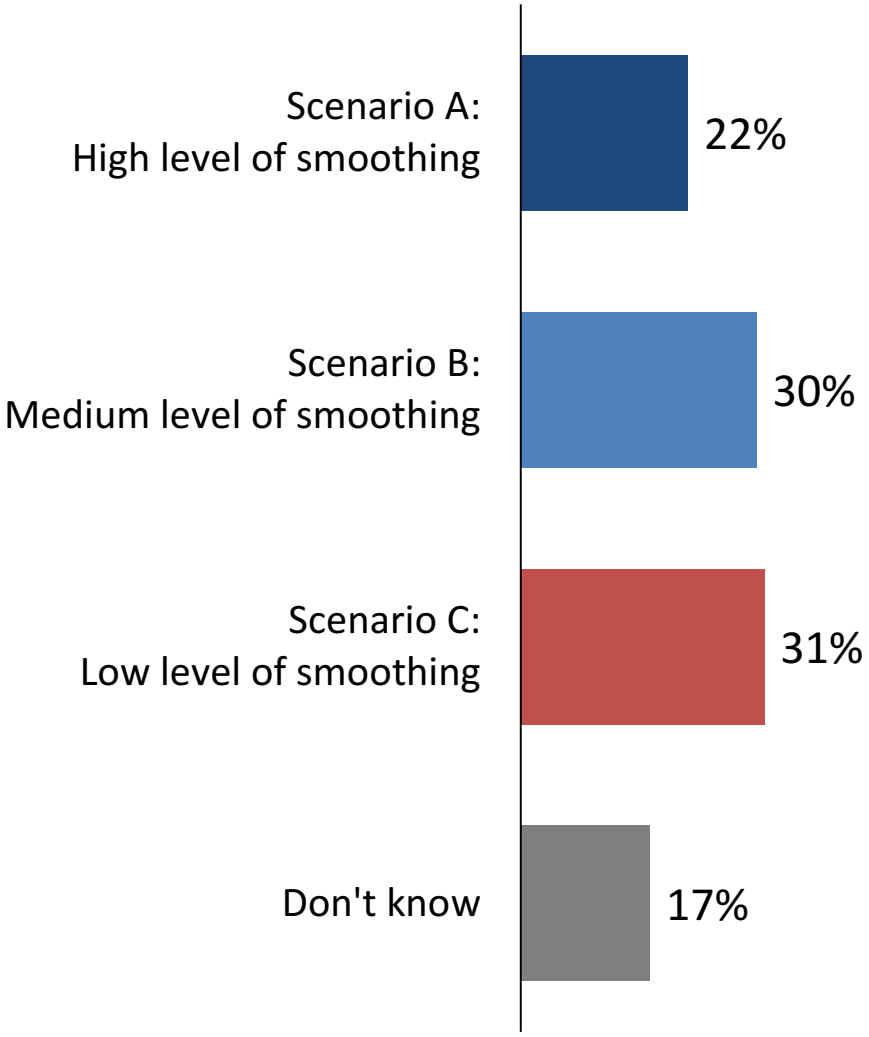
	Scenario	Bill increase	Interest cost
☐	Scenario A: High level of smoothing	Produces the steadiest bills.	Highest total interest costs (approx. $500M higher than Scenario B and approx. $1B higher than Scenario C).
☐	Scenario B: Medium level of smoothing	Produces steadier bills than Scenario C, but less steady bills than Scenario A	Total interest costs that are approx. $500M less than Scenario A, but approx. $500M higher than Scenario C.
☐	Scenario C: Low level of smoothing	Produces higher bills in the 2020s, but lower bills in the 2030s.	Lowest total interest costs of the three scenarios (approx. $500M lower than Scenario B and approx. $1B lower than Scenario A).
☐	Don't know		

WORKBOOK PAGE

Rate Smoothing Options

Business

Q Which of the rate smoothing options presented above would you prefer?
[asked of all respondents, n=102]



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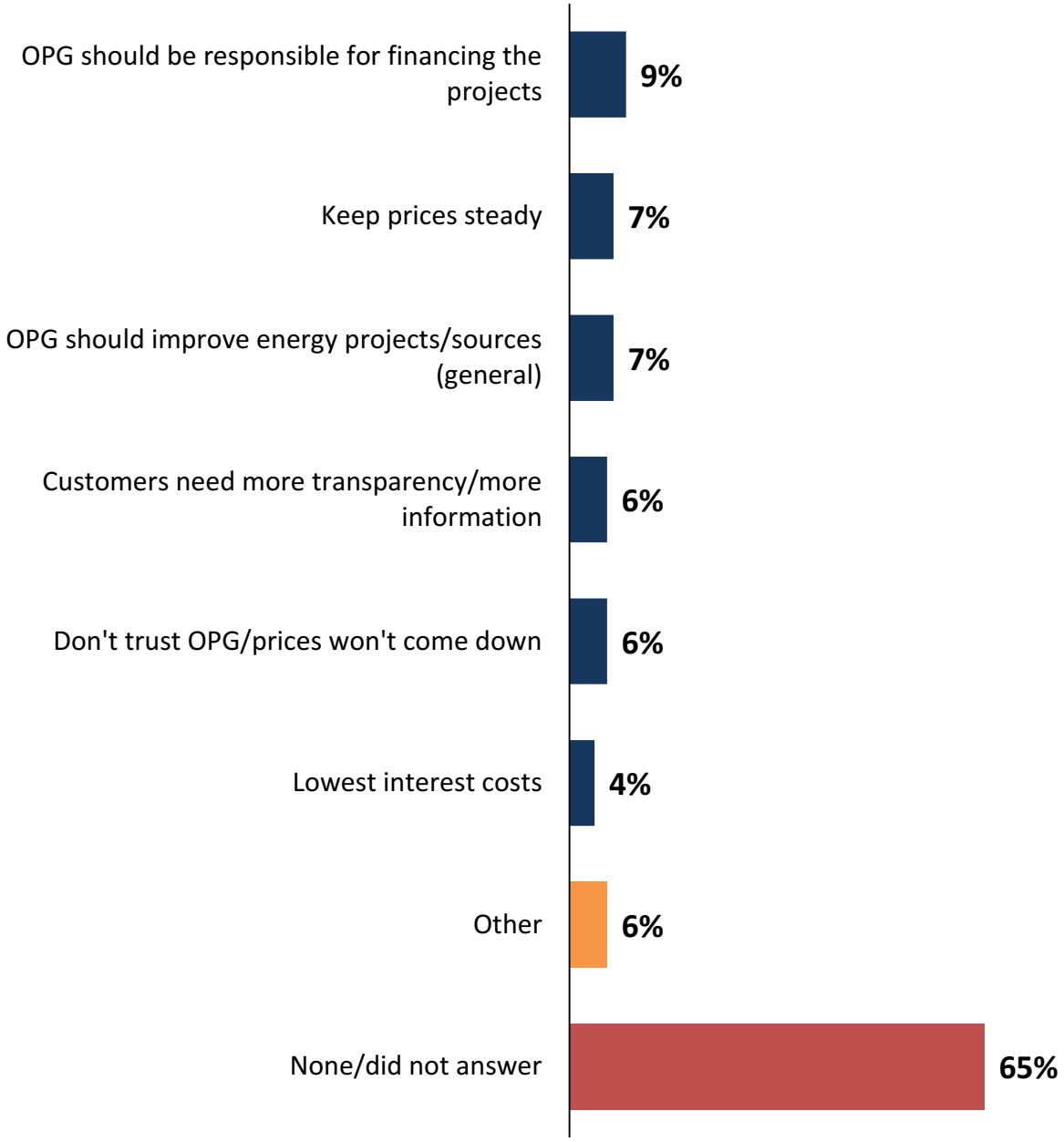
Rate Smoothing Options

Business

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=102]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Investing in OPG's Hydroelectric Stations

How does OPG typically invest in its Hydroelectric Stations?

Every year, OPG invests in maintaining its Hydroelectric Stations across the province.
It also invests to increase the amount of electricity produced at some existing hydroelectric stations.

When making investment decisions, OPG has certain options but needs to remember some basic facts:

- Hydroelectric stations use water to generate very low-cost, low-emissions electricity. If these facilities aren't operating, other, more expensive or less clean generation methods may be needed.
- Hydroelectric generation equipment consists of large, custom-made parts. Ordering and installing replacement parts requires significant lead time.
- **Ontario currently has an energy surplus**. However, the province is likely to need more power in about 5 years. Click here to learn more.
- That means, increasing the capacity of existing hydroelectric stations is not absolutely necessary in the short term. However, because the system is currently not strained, now could be a good time to do the work on long-term projects that require hydroelectric stations to shut down while the work is underway.
- Doing the work sooner, rather than later, would reduce the risk of equipment failure and make the total cost more predictable, and possibly lower. However, doing the work now would also mean making major investments now and raising rates rather than delaying the costs.

For the 2020-2026 period, OPG must make decisions about the timing and pace of investments in its Hydroelectric Stations.

BOOK PAGE

Overhauling Hydroelectric Stations

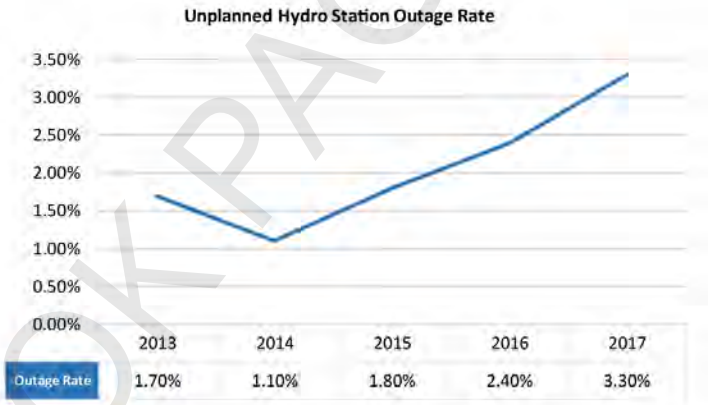
Overhauling Hydroelectric Stations

OPG must periodically take its Hydroelectric Stations out of service to do major maintenance and repair work. Whenever OPG takes its generators off-line, it is called an "outage." Outages can be planned in advance, or they can happen because of unexpected equipment issues.

The graph below shows how often OPG has had to take generators off-line unexpectedly. When OPG has to do unplanned maintenance work, it is generally more expensive than work that is planned in advance.

As shown in this graph, the frequency of these unplanned outages has been increasing at OPG's Hydroelectric Stations since 2014.

OPG believes it can reverse this trend and restore these outages to historic levels by increasing the pace of major maintenance projects (called "overhauls") at its Hydroelectric Stations.



Q11. In the 2020 to 2026 period, OPG plans to increase the number of overhauls it does each year. OPG must also decide on the right *pace* for that overhaul program. Which approach would you prefer?

	Options	Pros	Cons
☐	**Faster pace** Average investment: **$86M** per year Bill impact*: **$1.02** per month	Most reliable hydroelectric generation at the fastest pace; good timing for major repairs	Higher investment costs in the short-term than other approaches
☐	**Moderate Pace** Average investment: **$72M** per year Bill impact*: **85 cents** per month	More reliable hydroelectric generation; repairs come at a reasonable time; lower investment costs in the short-term than in the faster pace	Less reliable hydroelectric generation; lower investment in overhauls will lead to higher costs and bills in the future
☐	**Slower Pace** Average investment: **$57M** per year Bill impact*: **68 cents** per month	Lower investment costs in the short-term than other approaches	Least reliable hydroelectric generation; lower investment in overhauls will lead to higher costs and bills in the future
☐	**Don't know**		

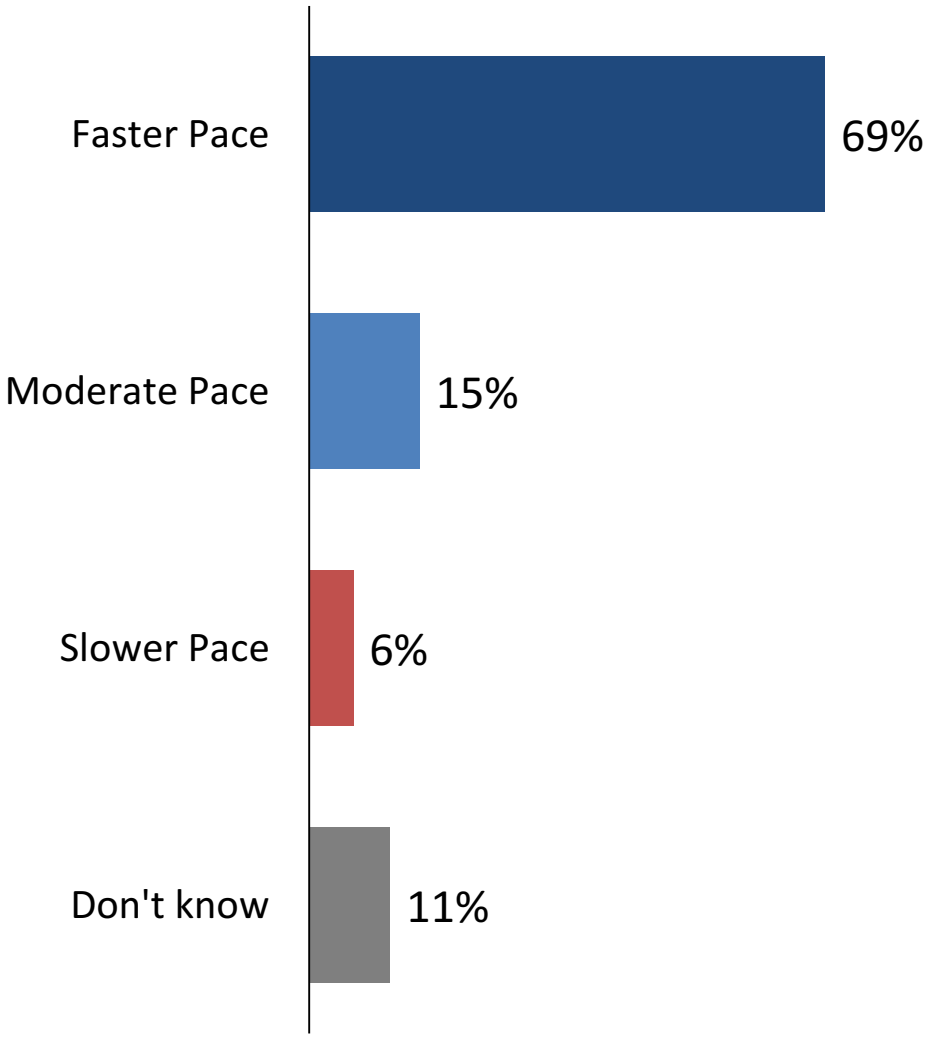
WORKBOOK PAGE

Overhauling Hydroelectric Stations

Business

Q In the 2020 to 2026 period, OPG plans to increase the number of overhauls it does each year. OPG must also decide on the right pace for that overhaul program. Which approach would you prefer?

[asked of all respondents, n=102]



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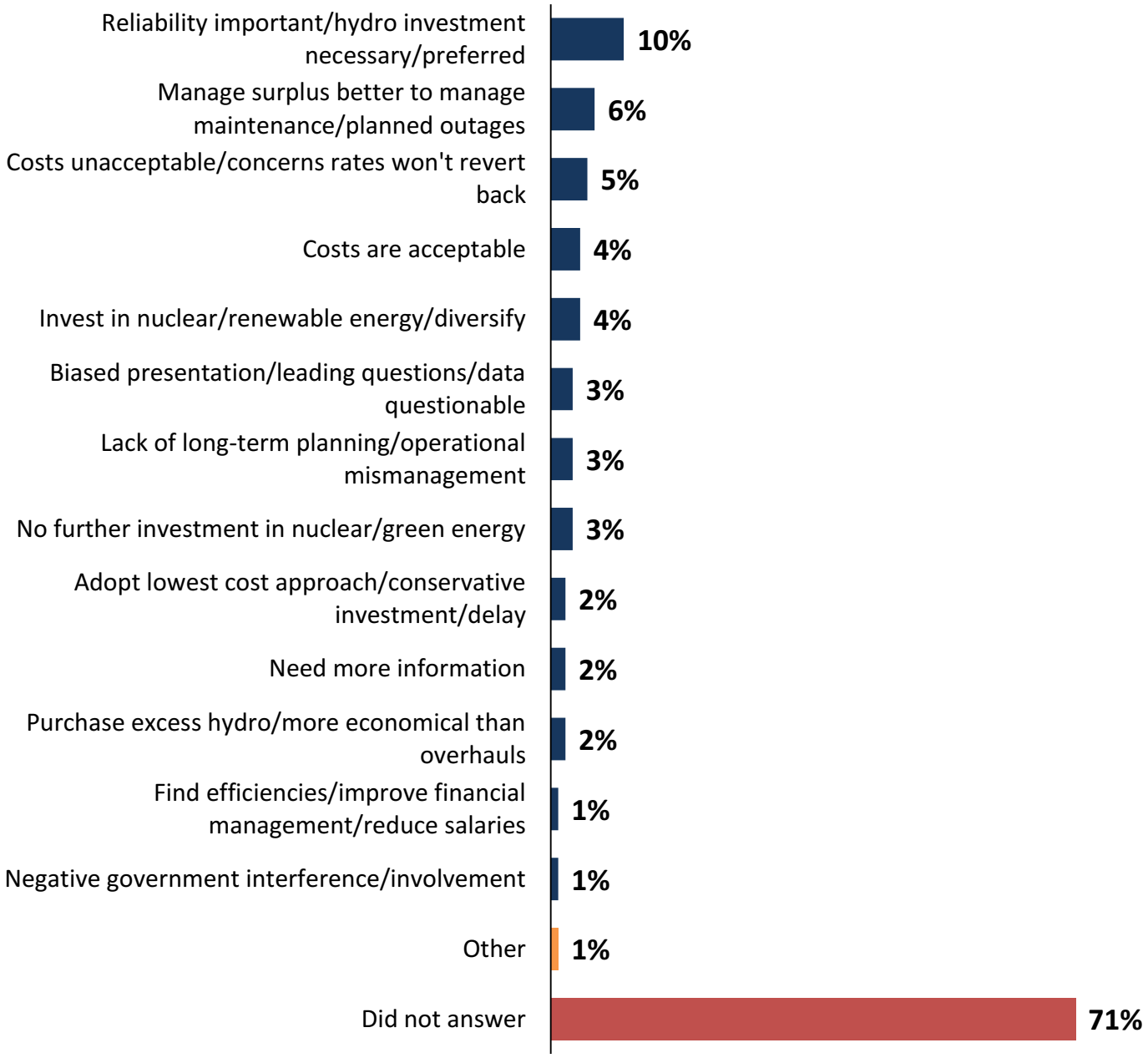
Overhauling Hydroelectric Stations

Business

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=102]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Niagara Frequency Conversion Project

Business

This is a project where the timing is flexible.

OPG's Sir Adam Beck I Station was the first hydroelectric station at Niagara Falls.

When the station started operating in 1922, North America's electric grid ran at a frequency of 25 Hz. In the 1950s, the grid converted to the 60 Hz standard that is still used today.

OPG converted most of the "units" at the Sir Adam Beck I station to the new standard, but kept two units on the old 25 Hz standard to power steel plants and other large industrial customers who continued to use the old frequency. The last of these customers were converted to the new standard in 2009. Since that time, the two 25 Hz units have been disconnected, because they are incompatible with the modern grid.

While in previous years, there was no room in the transmission system for more 60 Hz power, the system has recently been expanded. OPG has to decide whether to proceed with the project now or later.

Q13. OPG is planning to convert the two 25 Hz units to the modern 60 Hz standard, and it needs to decide when to do the work. Which of the following options do you prefer?

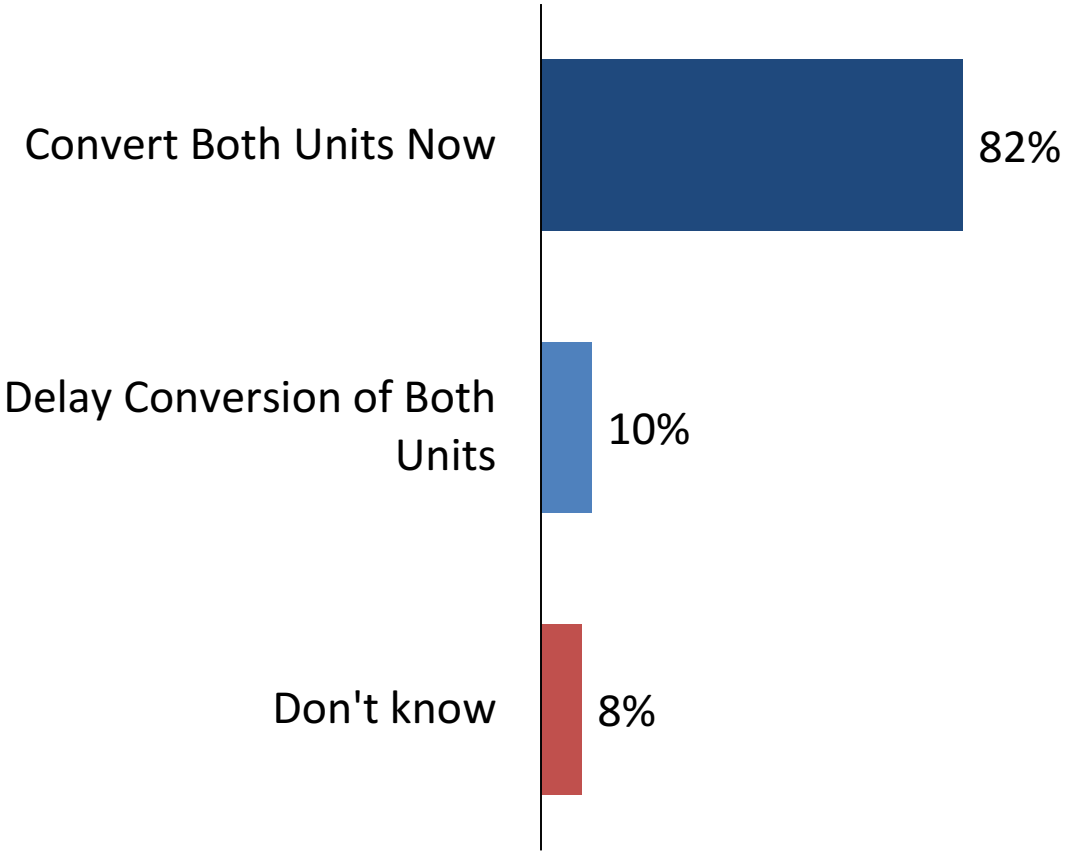
	Options	Pros	Cons
☐	**Convert both units now**	Increase the amount of power that can be generated at the station; access to unused capacity sooner, allowing more flexibility in the system while nuclear stations undergo refurbishment; additional power could help offset reduced production when Pickering Station is closed	Replacement costs of approximately $120 million would occur now, resulting in 25 cents more on a typical customer's monthly bill. The new power will be added while the provincial system may still have a surplus of power.
☐	**Delay conversion of both units**	Replacement costs would be deferred in the short-term. Depending on the provincial demand for electricity in the early 2020s, the delayed approach may better align with the needs of the grid.	Potentially higher total replacement costs; less opportunity to offset energy production while nuclear stations undergo refurbishment; additional power may not be available to offset reduced production when Pickering Station is closed
☐	**Don't know**		

WORKBOOK PAGE

Niagara Frequency Conversion Project

Business

Q OPG is planning to convert the two 25 Hz units to the modern 60 Hz standard, and it needs to decide when to do the work. Which of the following options do you prefer? [asked of all respondents, n=102]



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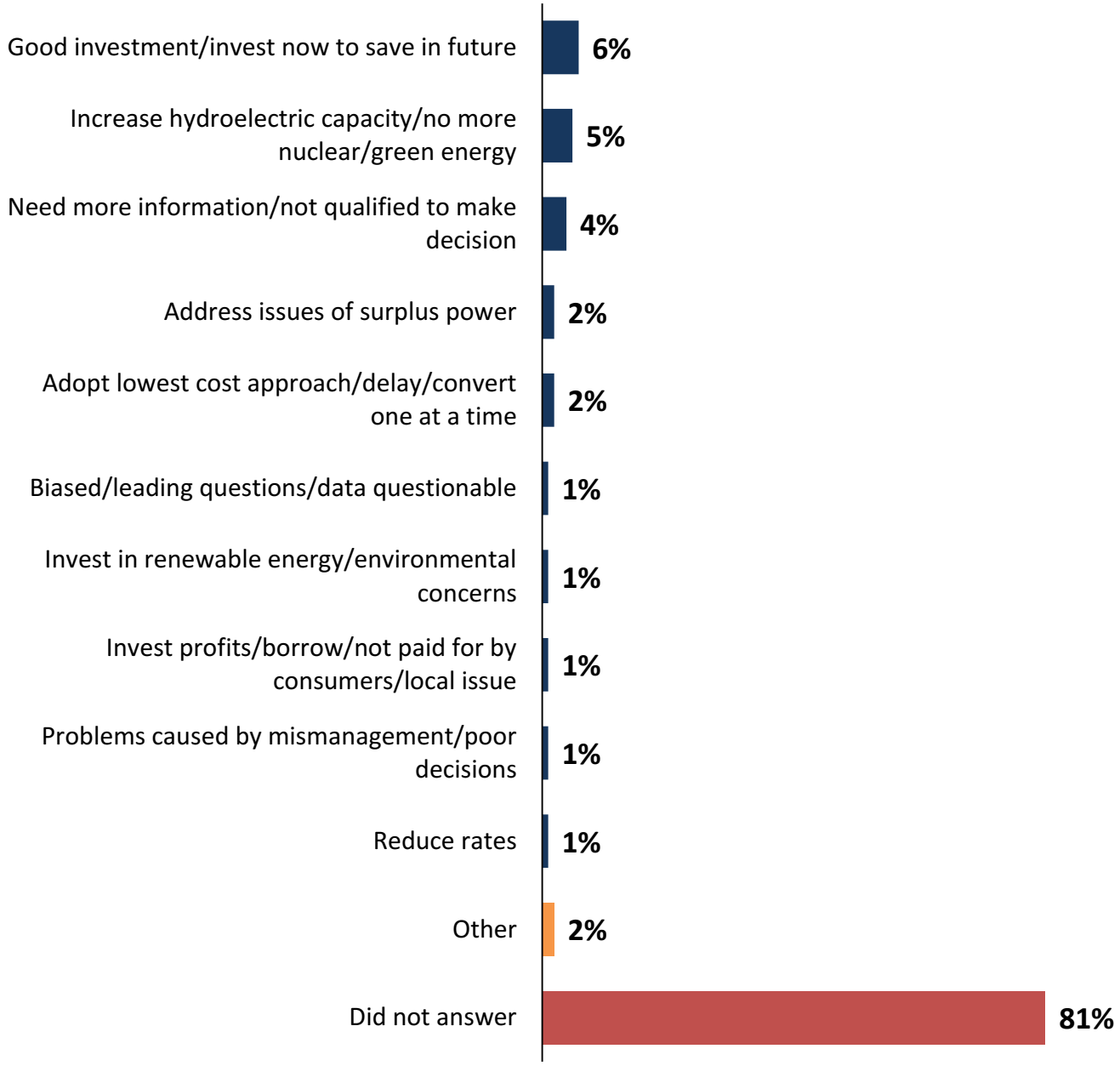
Niagara Frequency Conversion Project

Business

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=102]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Making the Pickering Station Site Available for Other Uses

Business

What is Pickering Station?

Pickering Nuclear Generating Station is located on the shore of Lake Ontario, just east of Toronto.

The station has served Ontario for almost five decades, and currently provides approximately 14% of the province's electricity – enough to power a city of 1.5 million people. Pickering Station is also a major employer and contributes approximately $1.5 billion to Ontario's GDP each year.

Pickering Station will soon be reaching the end of its life and is scheduled to shut down in 2024.

Making the Pickering Station site available for other uses

Pickering Station occupies a large, valuable site on the shores of Lake Ontario on the east side of the GTA, which encompasses approximately 500 acres of land and 250 acres of water lots.

After the station shuts down, the site will be returned to a state that allows it to be used for many different purposes. The current **standard approach** to get there takes about **45 years**.

OPG has done some research that indicates the total time to safely shut down a nuclear station could be reduced to about **25 years**. That would allow the site to be put back to use for other purposes sooner.

This public benefit would come at a cost though. Early OPG estimates suggest the cost of accelerated shut-down at Pickering Station would be about $500 million to $1.5 billion. This may result in a typical customer paying about $3 to $9 more on their monthly bill over the remaining operating life of Pickering Station.

Repurposing Pickering

OPG has held a public consultation to gather information and ideas from the community to develop a long-term plan for redeveloping available site lands during and after shutting down Pickering Station.
To learn more, click here.

What is involved in safely shutting down a nuclear site?

- De-energizing the nuclear systems and components
- Removing irradiated nuclear fuel and water from the reactor core
- Monitoring the site for approximately 30 years after removal to allow nuclear radiation fields to decay naturally
- Dismantling the reactor and removing radioactive components
- Safely demolishing the site structures

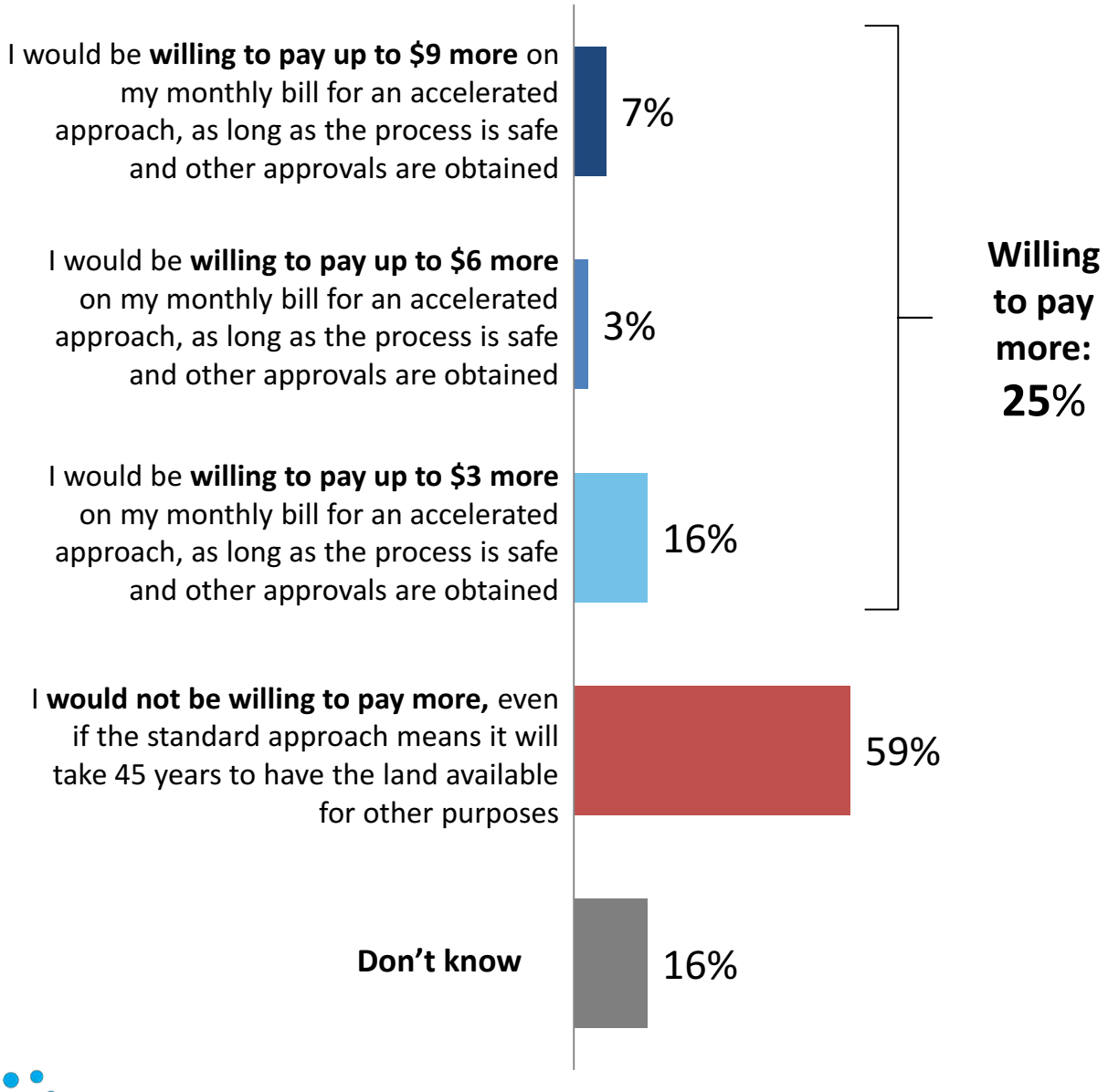
WORKBOOK PAGE

Making the Pickering Station Site Available for Other Uses

Business

Q Would you be willing to pay more on your monthly bill until the end of Pickering Station's operations, to reduce the shut-down period to approximately 25 years and have the land available for other purposes sooner?

[asked of all respondents, n=102]



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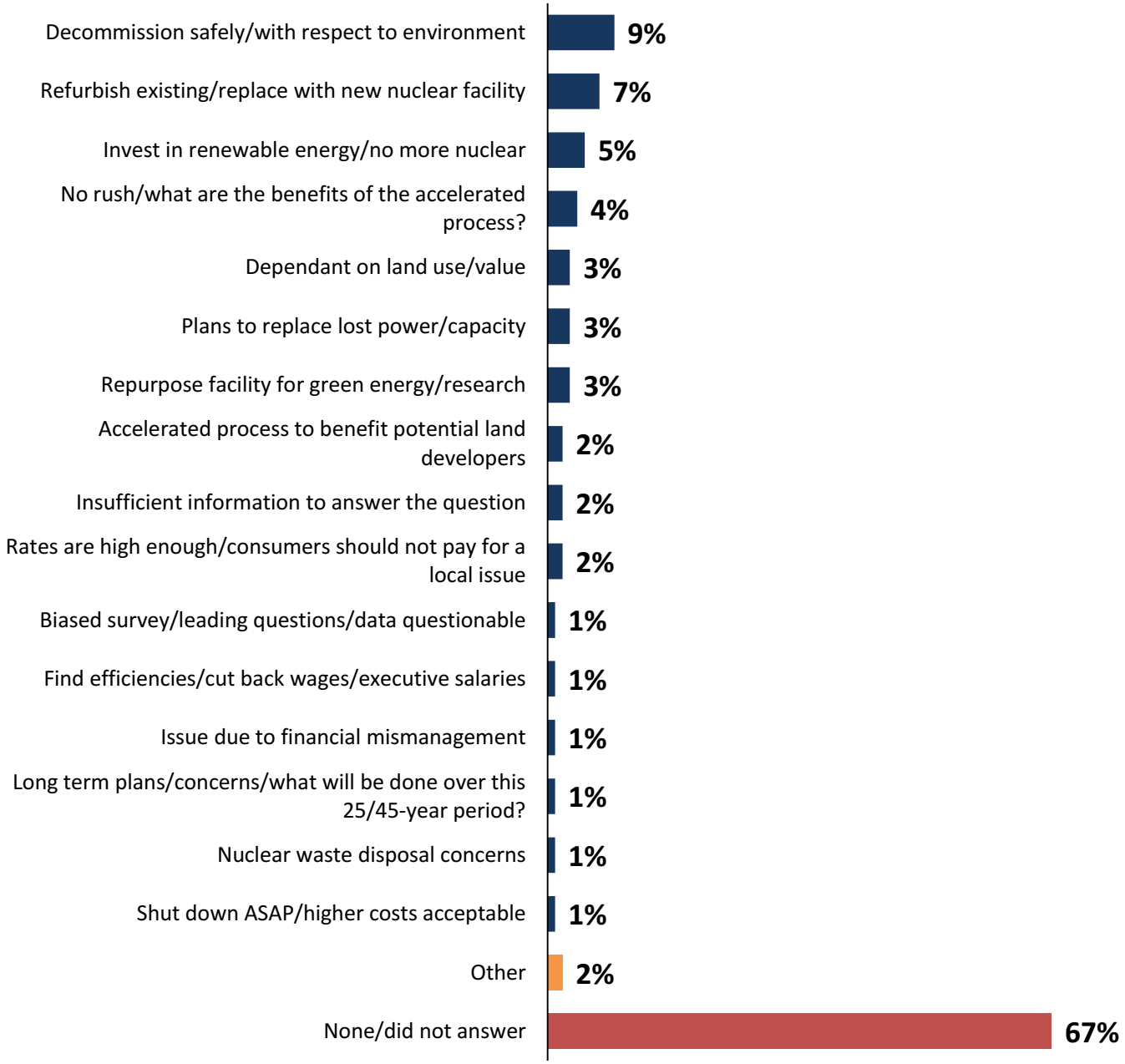
Making the Pickering Station Site Available for Other Uses

Business

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=102]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Darlington Vapour Recovery System Improvement

Business

This project is to improve the efficiency and reliability of the Vapour Recovery System (VRS) at Darlington Station.

What is the VRS?

This is one of the systems responsible for controlling the tritium emissions at the station.

The VRS requires improvement or replacement, as its efficiency and reliability are challenged by changing external factors, such as:

- Rising lake temperatures affect the system's air-water coolers, leading to higher radiation doses from tritium to workers and higher tritium emissions to the environment. However, both remain well within the regulatory limit.
- The Darlington Refurbishment Program requires the presence of more personnel at the station than the VRS was originally designed for.
- Some components within the VRS have no back-up, which makes it impossible to maintain them without impacting operations or emissions.

To address these challenges, OPG has two options. Both options deliver tritium levels well below the regulatory standard.

What does the VRS do?

- Recover water containing tritium to minimize losses
- Minimize radiation doses to workers in the reactor
- Minimize tritium emissions to the environment

What is tritium?

Tritium is a radioactive form of hydrogen that is a by-product of nuclear power generation.

Darlington Station's airborne tritium emissions are well within the regulatory limits (less than 1% of what is legally allowed).

Historically, the station has also performed better than average when compared to other nuclear plants with the same technology worldwide.

Historic and Target Airborne Tritium Emissions at Darlington Station	
2014	
2015	
2016	
2017	
2018	
2019-21	
2026	

Legend	
	Best performers (top 25 percent)
	Worst performers (bottom 25 percent)

WORKBOOK PAGE

Darlington Vapour Recovery System Improvement

Business

Q17. OPG needs to decide whether to improve the existing system or replace the system with a higher capacity system. In either case, OPG expects to be within the top 25% of nuclear generators with the same reactor technology for airborne tritium emissions. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Improve existing VRS**	Improve vapour removal capability of the VRS, leading to lower tritium levels in containment and confinement, lower doses to workers, and lower emissions to the environment	Improvement costs of approximately $30 million, resulting in 6 cents more on a typical customer's monthly bill; OPG's performance results may not be as favourable as in OPG's alternative option but will still be well below regulatory standards
☐	**Replace VRS with a higher capacity system**	Larger dryers can take more tritium out, resulting in even lower emissions and radiation compared to the above option; OPG's performance results will be more favorable compared to the above option and will continue to be well below the regulatory standards	Replacement costs of approximately $65 million, resulting in 12 cents more on a typical customer's monthly bill
☐	**Don't know**		

WORKBOOK PAGE

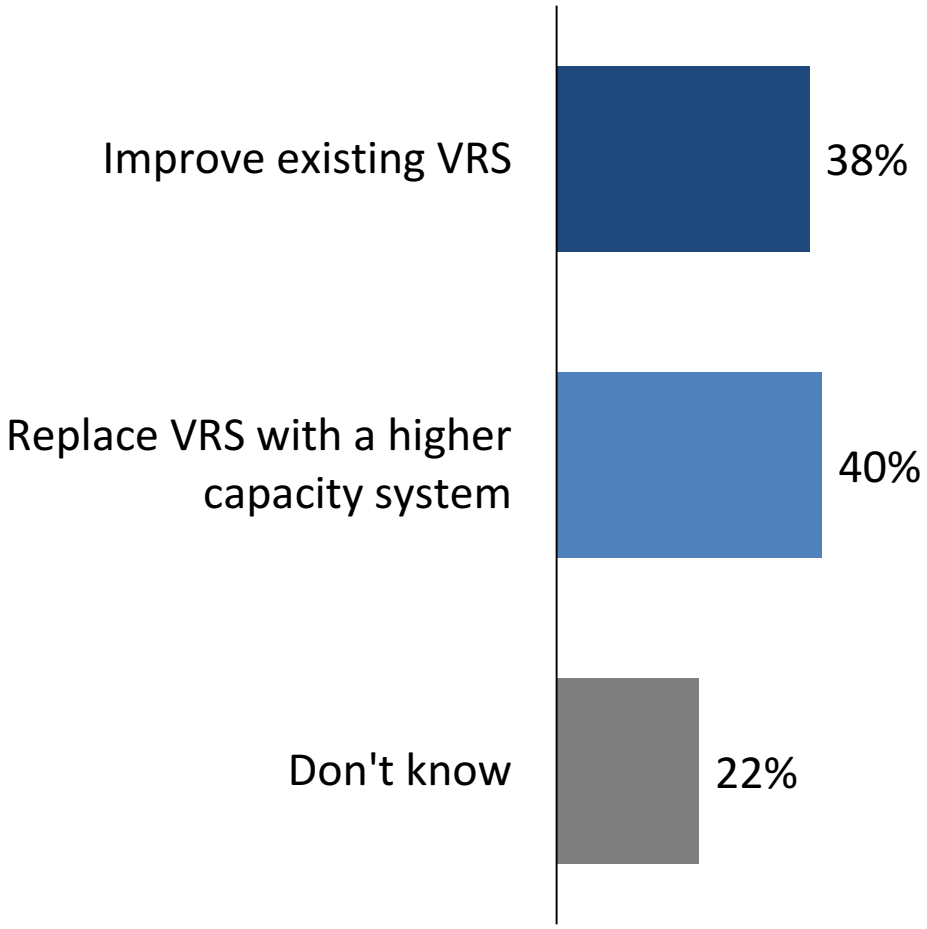
Darlington Vapour Recovery System Improvement

Business

Q

OPG needs to decide whether to improve the existing system or replace the system with a higher capacity system. In either case, OPG expects to be within the top 25% of nuclear generators with the same reactor technology for airborne tritium emissions. Which of the following options do you prefer?

[asked of all respondents, n=102]



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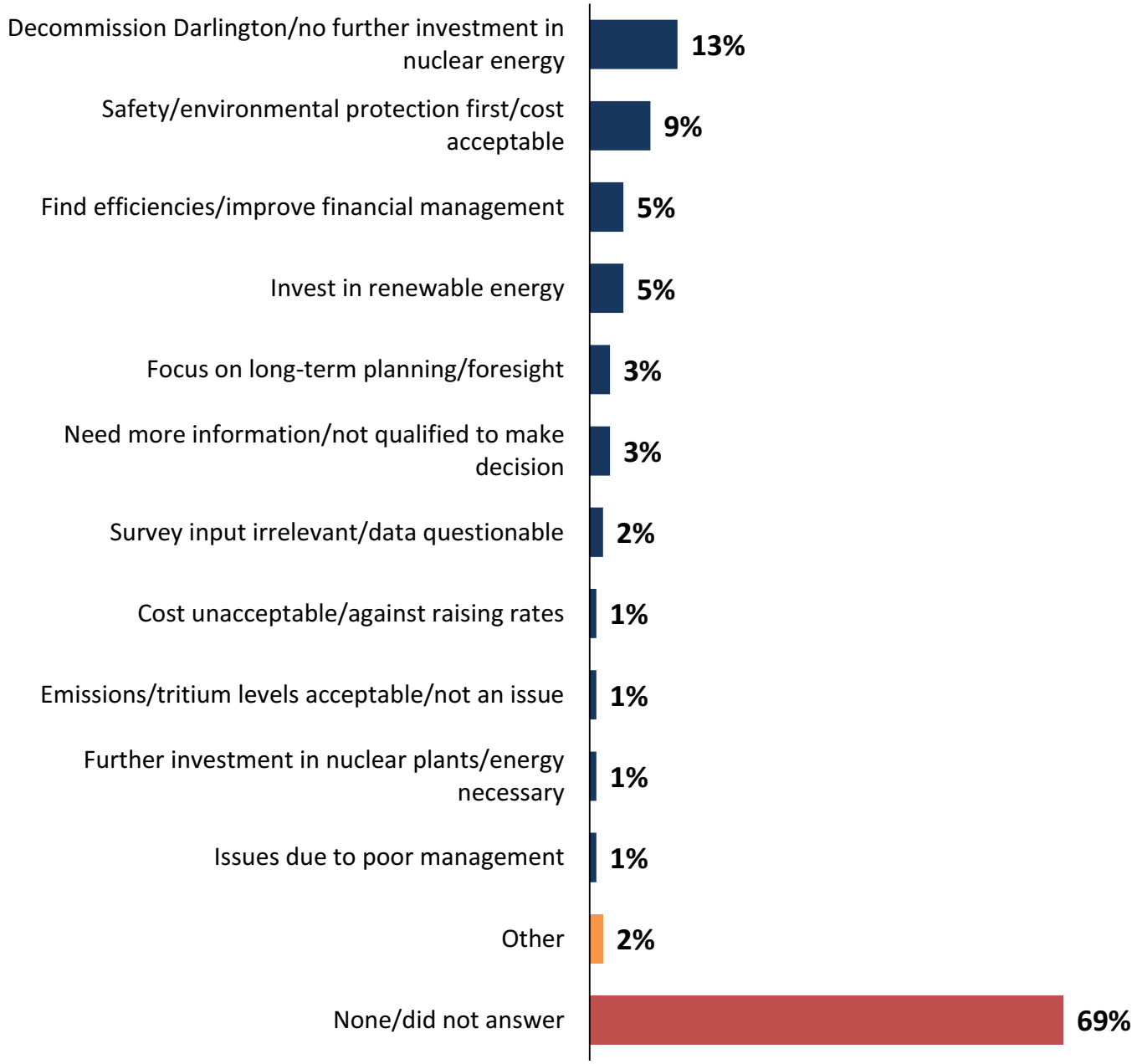
Darlington Vapour Recovery System Improvement

Business

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=102]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Darlington Air Compressor Replacement

Business

This project is to replace the 19 air compressors used to supply compressed air at Darlington Station. The current compressors have been in-service for over 30 years and their current condition is rated as fair.

The equipment manufacturer no longer makes parts for the model of compressor in use at Darlington Station. Eventually, OPG will have to replace all 19 compressors. However, the company has a choice in how quickly it does the replacement.

The table below shows what compressed air is used for at Darlington Station and what happens if compressors fail.

Purpose	What the system does	Risks if compressors fail
Service Air	This system supplies air-powered tools and hoists throughout the station.	Service air unavailability would impact the operation of tools and hoists needed to maintain station equipment. This could result in additional outages as back-up solutions are implemented.
Breathing Air	This system supplies air for worker protection from radioactive contamination in the reactor vault. Breathing air is used for air-supplied masks for airborne contamination and for plastic suits, which protect against airborne, liquid and surface contamination.	Unavailability of breathing air compressors would restrict the ability of operators and maintenance personnel to work in areas of high contamination. This could result in impacts on production due to inability to operate or maintain equipment in these areas.
Instrument Air	This system supplies very dry high pressure air that is used to operate valves in various systems throughout the station.	Instrument air unavailability would affect the operation of valves with important process and safety functions in the station. While these valves are designed to fail in their safe position upon loss of instrument air, increasing unreliability of the instrument air due to failure of compressors would result in operational upsets up to and including additional forced outages and costs.

WORKBOOK PAGE

Darlington Air Compressor Replacement

Business

Q19. OPG needs to decide whether to proactively replace all of the air compressors or purchase some spares and replace as the existing compressors fail. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Proactively replace all 19 air compressors**	Improved reliability of air compressors; reduced probability of forced outages or extensions to planned outages; reduced worker tritium doses; reduced maintenance complexity by standardizing on one make and model of air compressor; reduced spare parts inventory requirements by standardizing on one make and model of air compressor	Replacement costs of approximately $30 million, resulting in 6 cents more on a typical customer's monthly bill
☐	**Acquire 4 spare air compressors initially and replace as in-service compressors fail. Acquire and replace compressors until all 19 are replaced.**	Initial costs of approximately $5 million, resulting in 1 cent more on a typical customer's bill; other replacements will be deferred to a later date	Added costs to replace compressors as they fail over time; long-term costs likely higher, totalling up to $50 million; increased chance of unplanned or extended planned outages; potential impact on worker radiation doses; potential risk that replacement parts will not be available later in replacement cycle, resulting in increased maintenance complexity and spare parts inventory requirements
☐	**Don't know**		

WORKBOOK PAGE

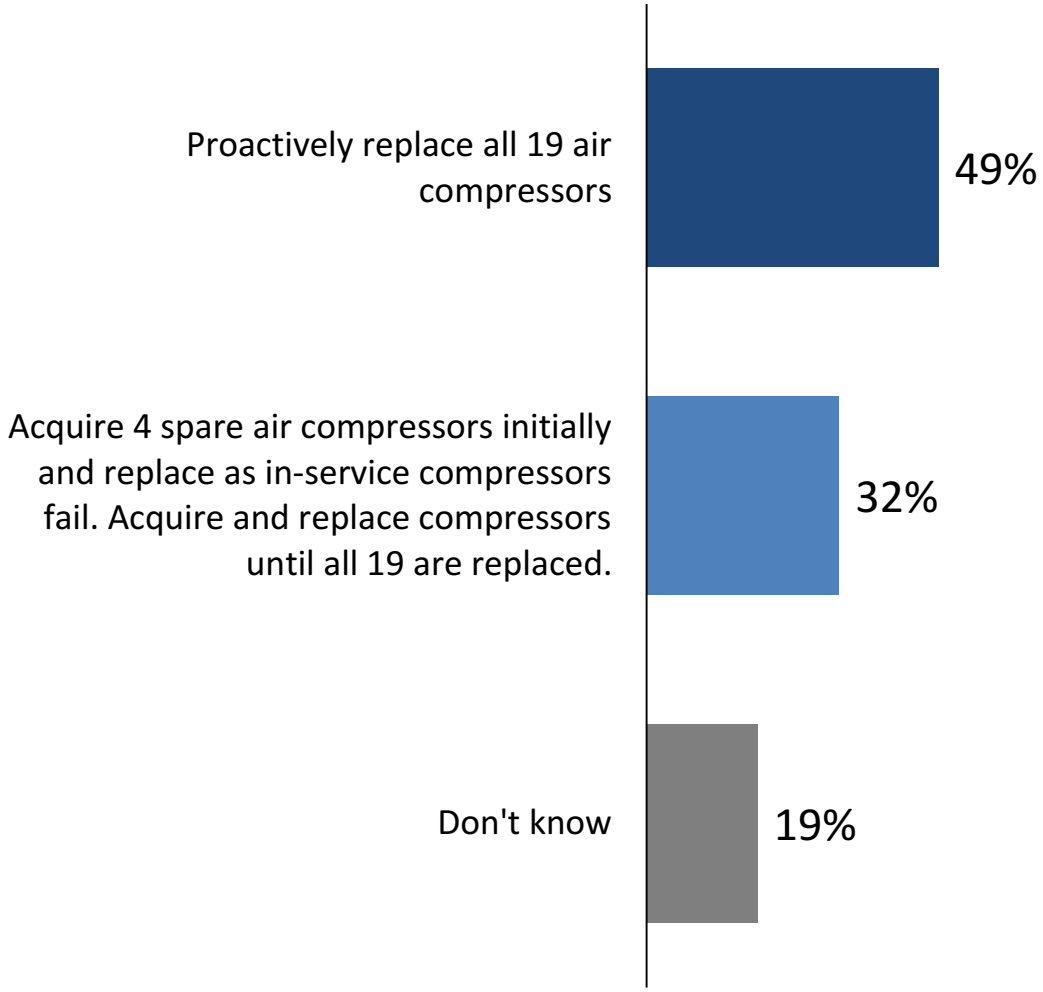
Darlington Air Compressor Replacement

Business

Q

OPG needs to decide whether to proactively replace all of the air compressors or purchase some spares and replace as the existing compressors fail. Which of the following options do you prefer?

[asked of all respondents, n=102]



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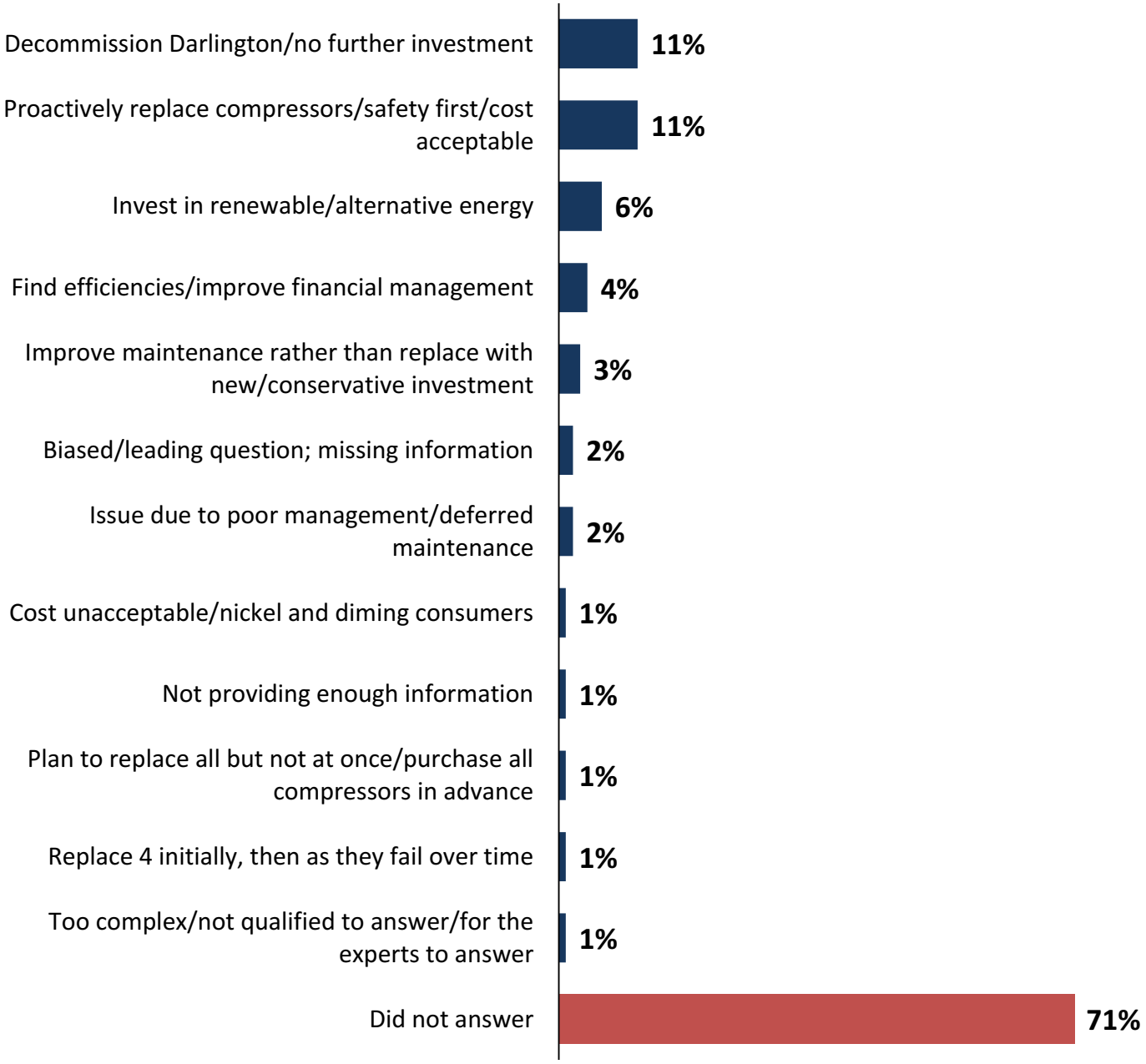
Darlington Air Compressor Replacement

Business

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=102]



INNOVATIVE RESEARCH GROUP

Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Darlington Crane Group Project

Business

This project is to refurbish the 20 major cranes at Darlington Station, with capacities up to 200,000 kg, that are used to support operations, maintenance and refurbishment activities. The function of these cranes is to safely lift and move material, equipment and irradiated fuel.

These cranes have been in-service since the 1980's. A third party assessment of station cranes concluded that the cranes are in fair to poor condition and will require refurbishment to provide reliable service until the end of Darlington Station's commercial service.

Experience from other utilities indicates that major cranes such as these are refurbished when they have been in-service for 30 years.

The work involved with refurbishing the cranes includes:

- Controls upgrade including addition of remote pendant
- Inspection of rails
- Replacement of motors, gear boxes, brakes and wire ropes

Q27. OPG needs to decide whether to refurbish all of the cranes or only the 14 most critical ones. Which of the following options do you prefer?

	Options	Pros	Cons
☐	**Refurbish all 20 major cranes**	Ensure reliable operation to end of Darlington Station's commercial service; eliminate risk of mechanical failure that could result in dropped loads and damage to surrounding equipment; ensure improved availability of replacement parts and manufacturer service support	Refurbishment costs of approximately $75 million, resulting in 14 cents more on a typical customer's monthly bill
☐	**Refurbish the 14 critical cranes now and the other 6 later**	Same as Option 1 for the 14 refurbished cranes; reduced immediate refurbishment costs of approximately $65 million ($10 million lower than Option 1), resulting in 12 cents more on a typical customer's monthly bill	Reliability of the 6 non-refurbished cranes is likely to decrease with time; spare parts necessary to maintain the 6 non-refurbished cranes may not be available in the future; potential risk of damage to the facility if failure results in a load being dropped
☐	**Don't know**		

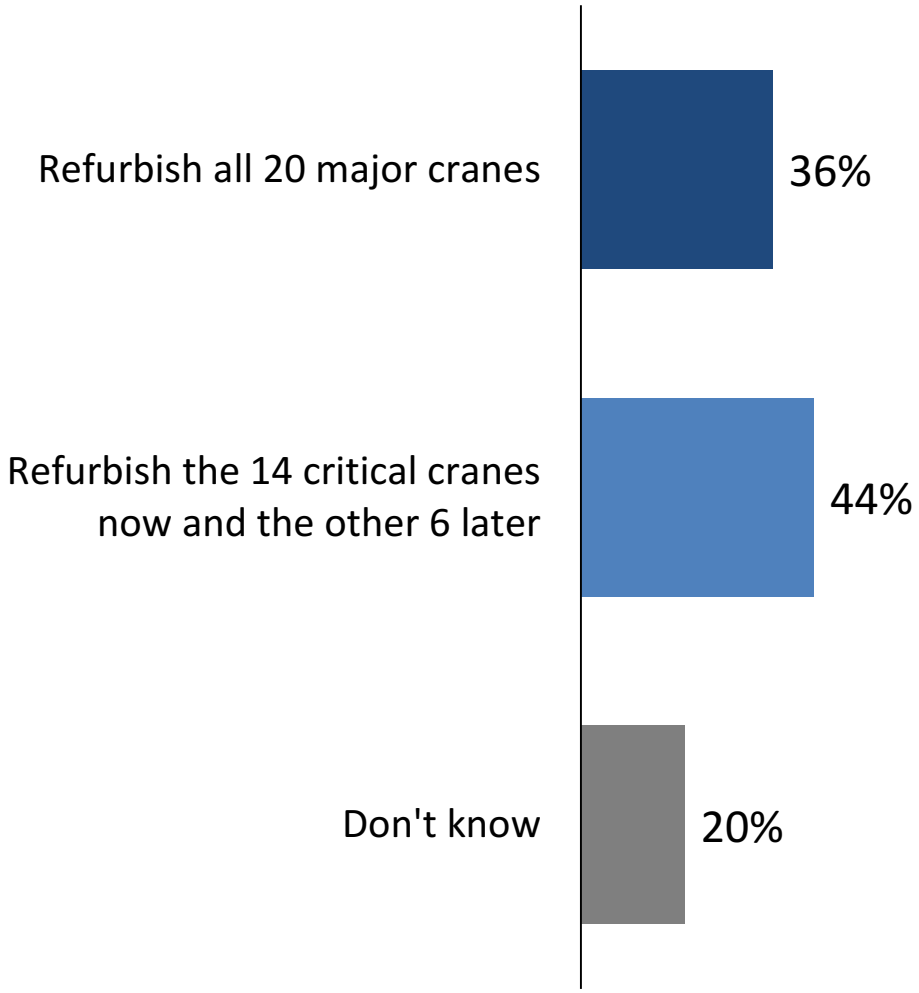
WORKBOOK PAGE

Darlington Crane Group Project

Business

Q

OPG needs to decide whether to refurbish all of the cranes or only the 14 most critical ones. Which of the following options do you prefer?
[asked of all respondents, n=102]

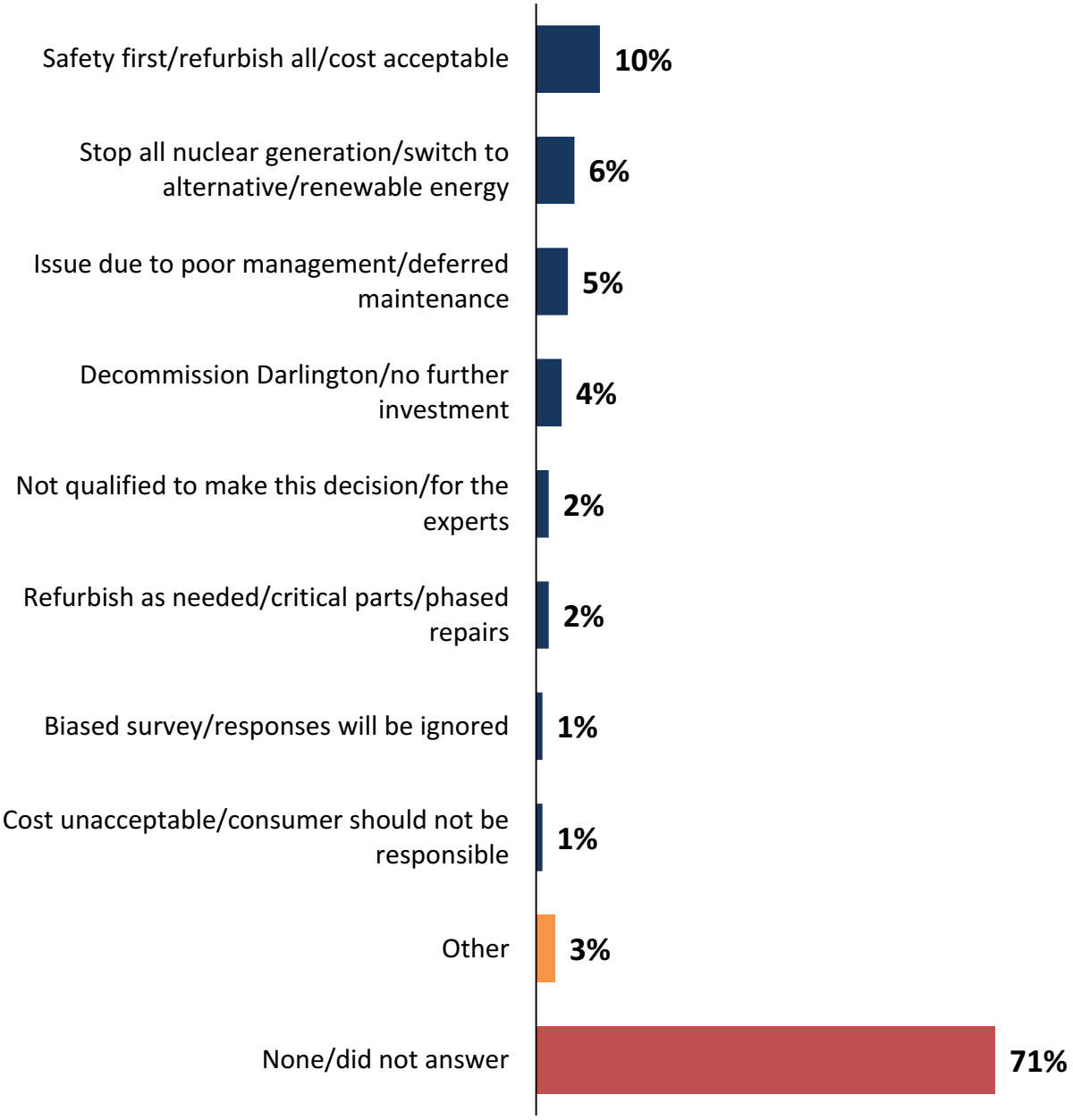


INNOVATIVE RESEARCH GROUP

Darlington Crane Group Project

Business

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=102]



INNOVATIVE RESEARCH GROUP

Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Investing in Technology to Create Efficiencies

Efficiency Initiatives

OPG is also developing initiatives that will reduce costs and create efficiencies throughout the company. OPG expects that these investments will **increase the reliability of its stations**, **improve safety**, and allow it to plan its **work more efficiently**.

Over the 2020 to 2026 period**, OPG is considering investing between $30 million and $60 million on these initiatives. OPG expects that these investments will save or avoid $50 million to $100 million in costs.**

Increased use of data and innovative technology

- OPG is actively looking for areas where better data and innovative technological solutions can deliver value for money. For example, OPG is in the process of creating a **Monitoring & Diagnostic Centre**, which will use advanced sensors and data analysis to improve the performance and reliability of OPG's nuclear generating equipment.
- OPG is also planning to use new technologies to improve safety and efficiency at its nuclear stations. As an example, OPG is testing a program to use drones to monitor the radiation levels around its nuclear plants.
- In order to operate and maintain its hydroelectric stations in the most cost-effective manner, OPG is looking to invest in technologies that would allow these stations to be monitored for safety and maintenance requirements remotely and proactively identify maintenance needs.

OPG will only invest in technologies that would deliver value for money. OPG would only proceed with new technologies that are expected to more than pay for themselves.

Q29. Which of the following statements best reflects your own point of view?

- ☐ Option 1: OPG should make do with what it has and only replace technology as it breaks down
- ☐ Option 2: OPG should only invest in new and innovative technologies if there is proof that these technologies will lead to guaranteed savings
- ☐ Option 3: OPG should pursue Option 2 and also invest money in pilot projects in cases where no previous evidence of guaranteed savings exists, but where the company sees a good chance that it would lead to savings
- ☐ Don't know

Q30. Do you have any comments you wish to add?

WORKBOOK PAGE

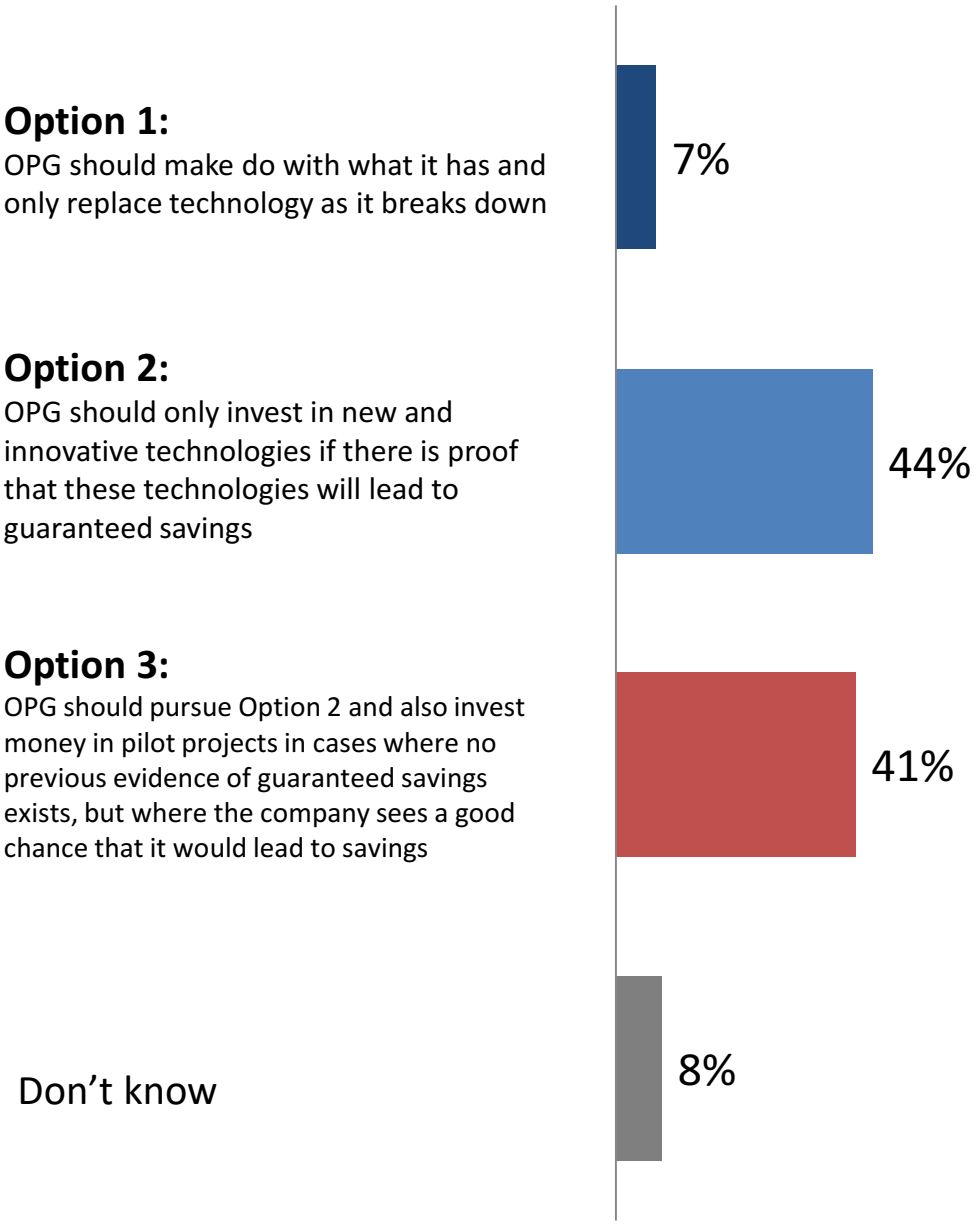
Investing in Technology to Create Efficiencies

Business

Q

Which of the following statements best reflects your own point of view?

[asked of all respondents, n=102]



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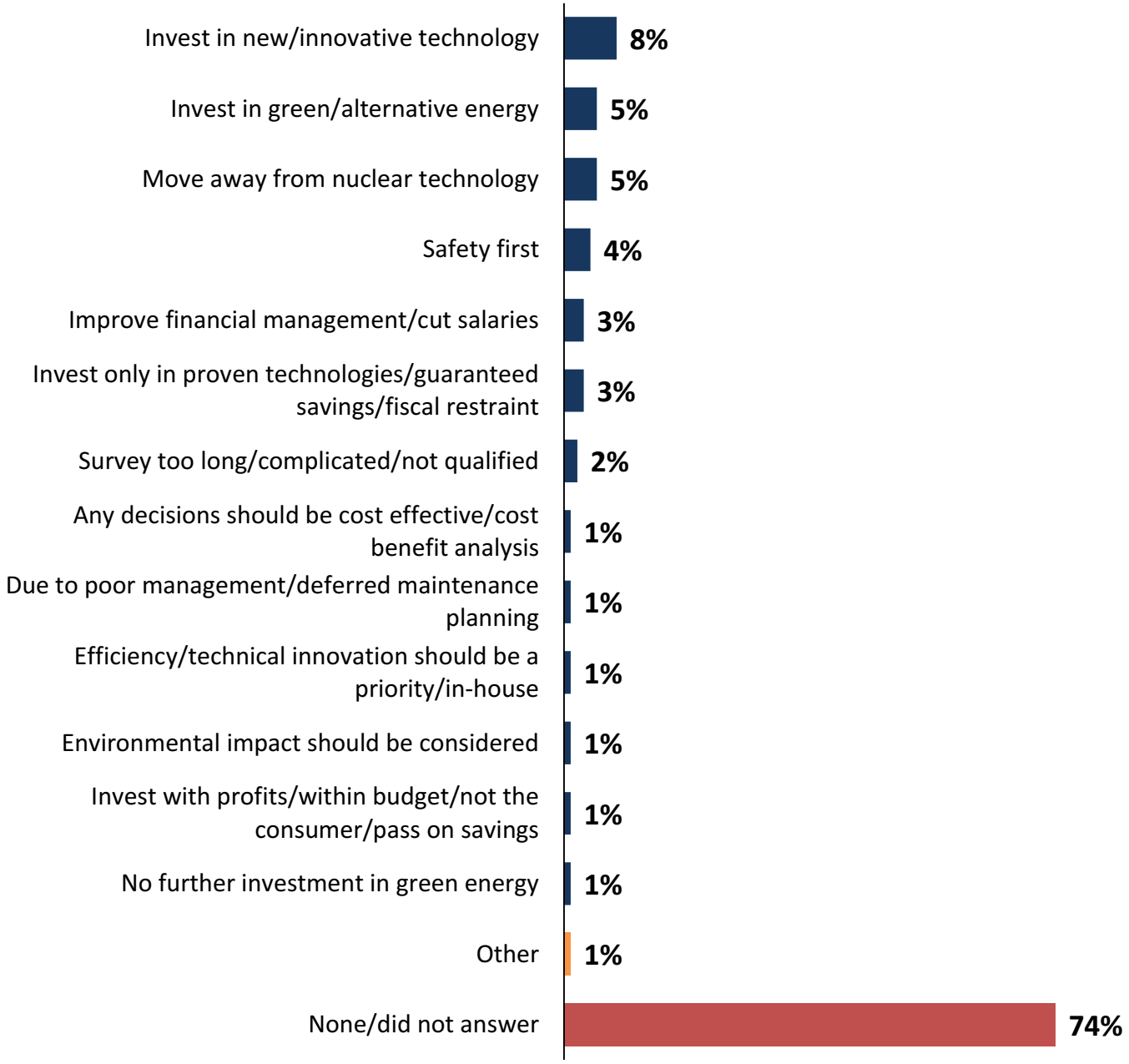
Investing in Technology to Create Efficiencies

Business

Q Do you have any comments you wish to add?
[asked of all respondents, up to 3 responses coded, n=102]



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Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

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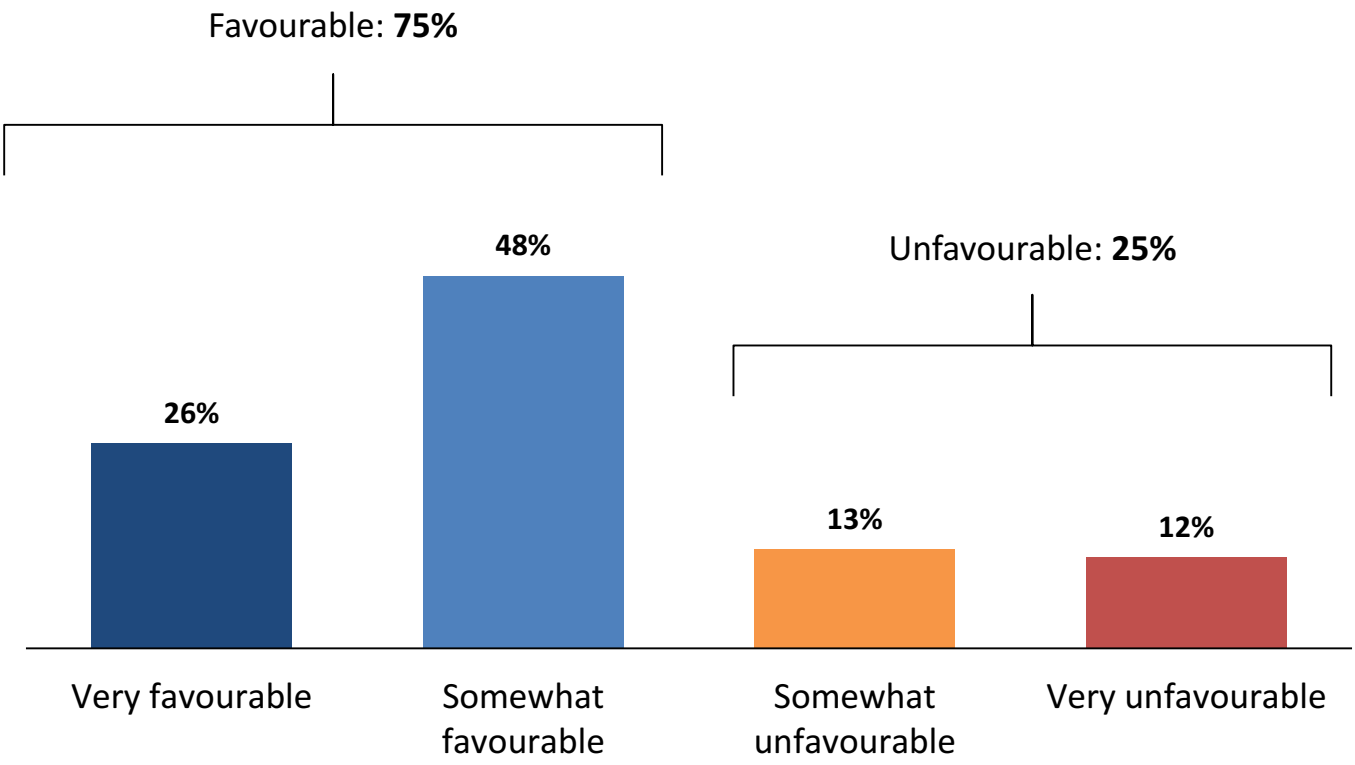
Workbook Diagnostics

Overall Impression of the Workbook

Business

Q Do you have a favourable or unfavourable impression of the workbook?
[asked of all respondents, n=102]



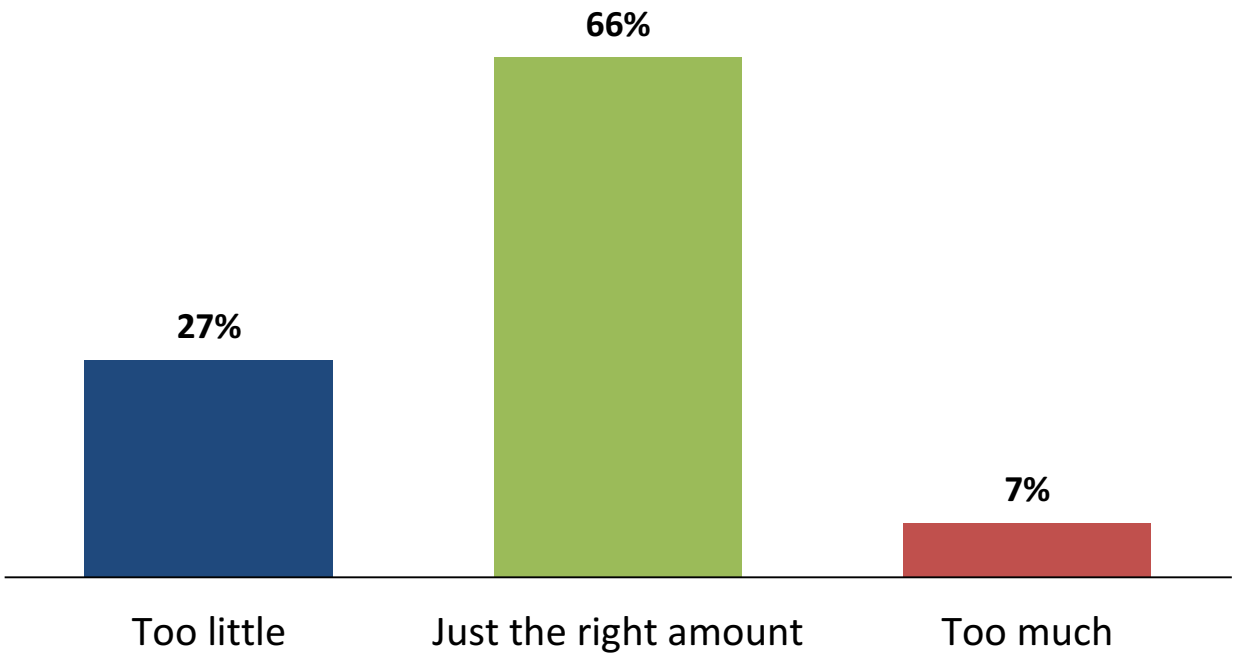
Note: 'Don't know' (1%) not shown.

INNOVATIVE RESEARCH GROUP

Volume of Information

Business

Q Did OPG provide too much information, not enough, or just the right amount?
[asked of all respondents, n=102]



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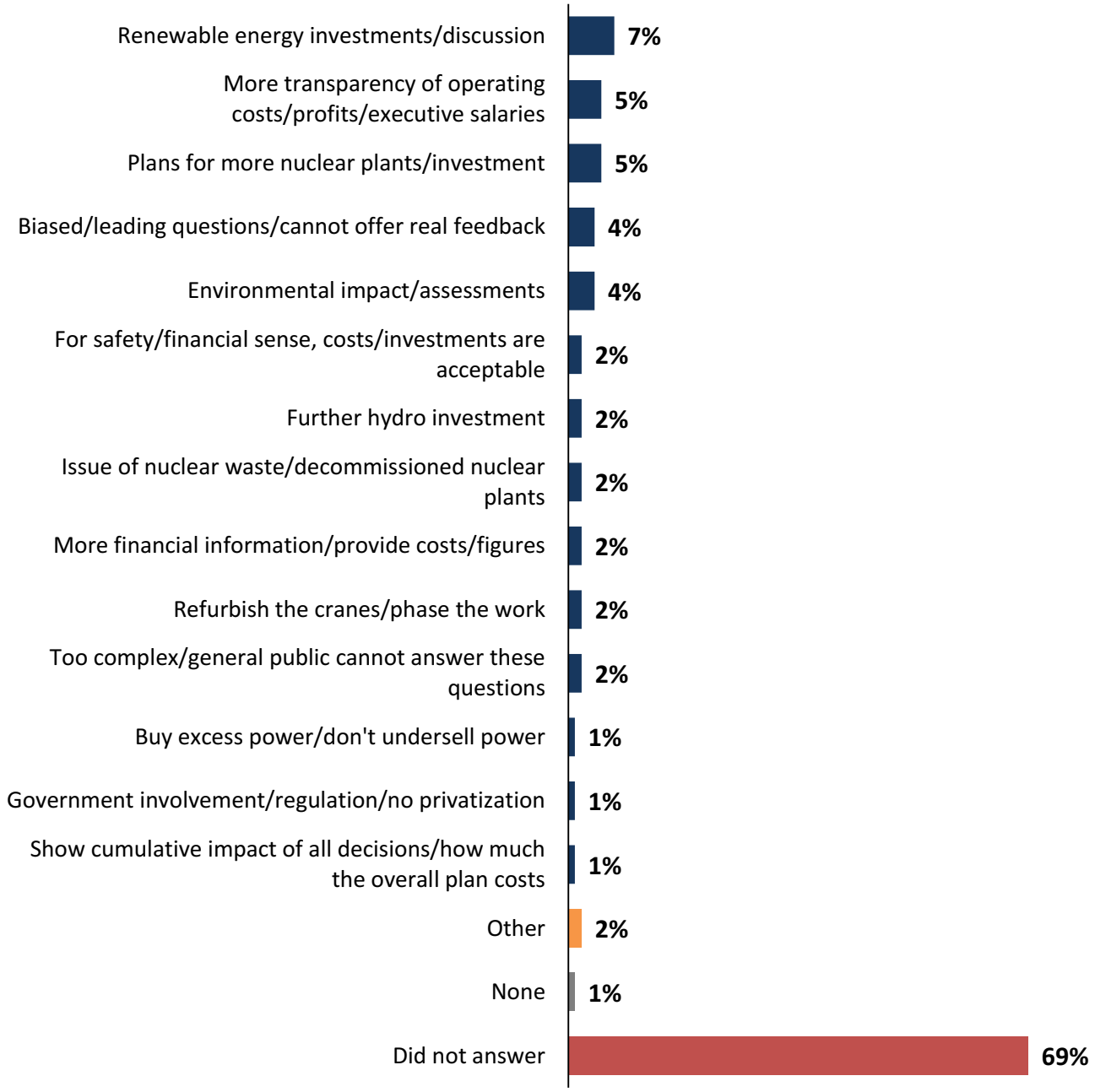
Outstanding Questions

Business

Q Do you have any questions about OPG you would still like answered?
[asked of all respondents, up to 3 responses coded, n=102]



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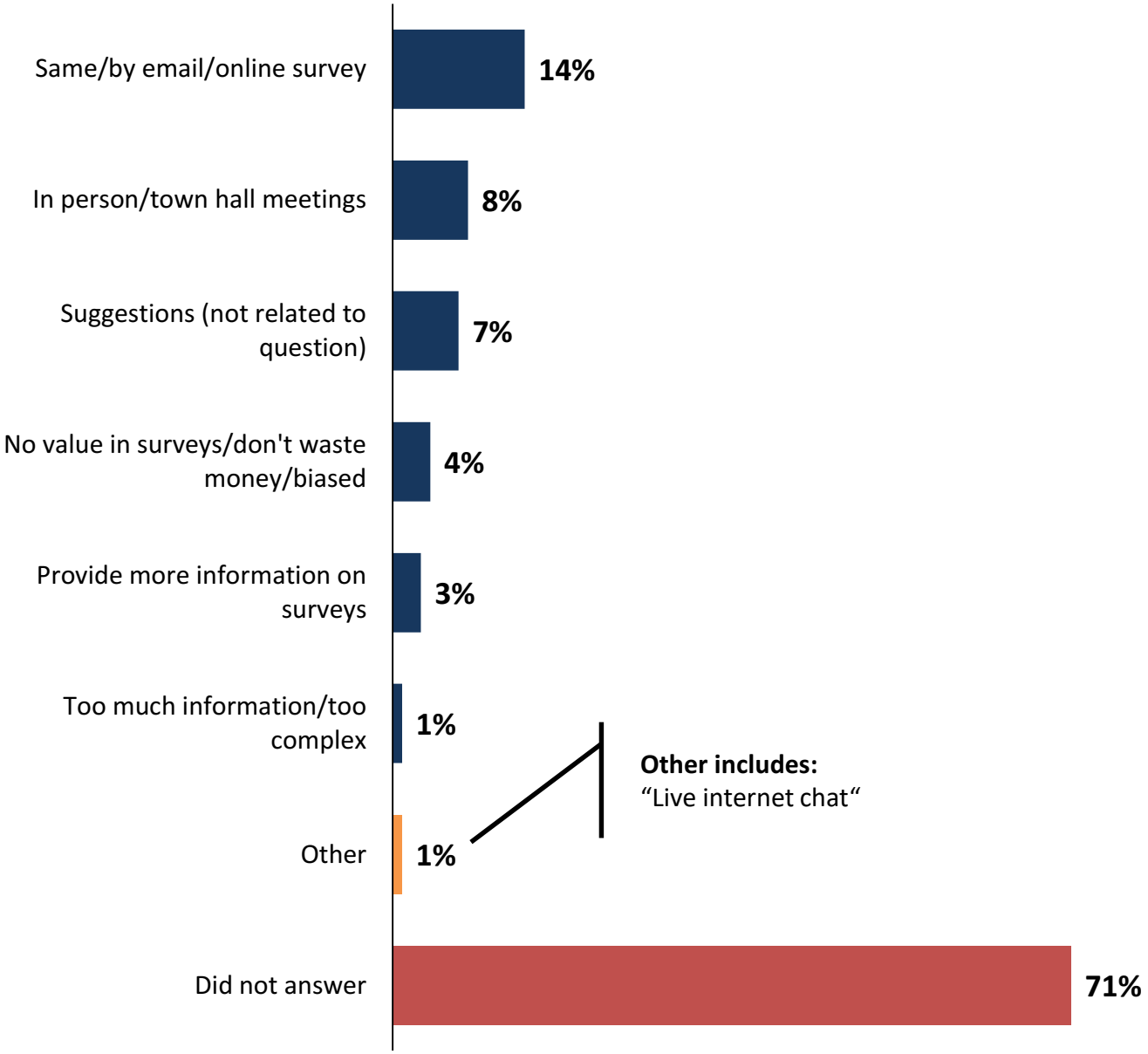
Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

Suggestions for Future Consultations

Business

Q How would you prefer to participate in future consultations?
[asked of all respondents, up to 3 responses coded, n=102]



INNOVATIVE RESEARCH GROUP

Note: Multiple responses are reported per respondent. Percentages may add up to over 100%.

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Exhibit A2-2-1
Attachment 4
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OPG
Customer Engagement

Engagement Focus Groups – Report

April 2019

London, Mississauga, Bowmanville, Thunder Bay

Prepared for:

Torys LLP

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Customer Engagement Report

June, 2019

Confidentiality

This Report and all of the information and data contained within may not be released, shared or otherwise disclosed to any other party, without the prior, written consent of Torys LLP (Torys).

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Torys on behalf of its client Ontario Power Generation Inc. (Ontario Power Generation or OPG). The conclusions drawn, and opinions expressed are those of the authors.

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Methodology

A series of focus groups was held in April 2019 in different locations across Ontario (see table below for details). The primary goal of the groups was to explore specific decisions OPG has to make, and to understand the range of opinions on those decisions. In addition, customers were asked to provide feedback on the process and how they would like to be consulted in the future.

Two evening groups were held in each of the four locations below. One group of residential customers and one group of small business customers was held in each location. Participants were recruited randomly over the phone and screened to ensure that they were OPG customers (residing in Ontario and responsible for paying their electricity bill). In addition, residential customers were also screened based on age, gender and employment status to ensure a good mix of participants.

Date	Location	Focus Group Times	Number of Participants	Customer Type
April 1st, 2019	London	5:30pm-7:30pm	10 participants	Small business
		8:00pm-10:00pm	8 participants	Residential
April 2nd, 2019	Mississauga	5:30pm-7:30pm	7 participants	Small business
		8:00pm-10:00pm	9 participants	Residential
April 3rd, 2019	Bowmanville	5:30pm-7:30pm	4 participants	Small business
		8:00pm-10:00pm	7 participants	Residential
April 4th, 2019	Thunder Bay	5:30pm-7:30pm	7 participants	Small business
		8:00pm-10:00pm	11 participants	Residential

The main tool used in these focus groups was a workbook consisting of two parts:

- The first section was designed to provide enough background information about Ontario's electricity system and OPG to allow participants to provide informed responses to the questions in the second section.
- The second section—the core of the workbook—presented more specific information related to specific business planning decisions. Participants were asked to provide feedback by either choosing one of the proposed options and/or providing alternative answers and other feedback about the workbook

Each group started with a period of individual work where participants completed the workbook on their own, ensuring that their responses were not influenced by other participants in the room. Participants were given as much time as needed to complete the workbook at their own pace.

Once participants were done, a group discussion started with a conversation about their overall impression of the workbook and the amount of information it contained. The groups then went through the workbook page by page, paying specific attention to the pages involving choices. On each page they discussed both if they were able to answer the associated question with the information provided and also why they chose the option they did. Where time permitted it, groups ended with a discussion about how they would like to be consulted in the future and what other formats would work.

Executive Summary

The workbook worked. The majority of participants had a positive impression of the workbook and felt it struck the right balance of how much information was included. Most participants who did want more information agreed that they had enough information to answer the questions, even though they were still curious about questions outside the scope of OPG's engagement.

Once participants learned about OPG, **they tended to be satisfied with OPG**. Participants didn't start with a deep understanding of who OPG is, but after reading through the background section, most participants said they were satisfied with the service they received. Most of the remaining participants were neutral, with only a few participants who said they were dissatisfied.

Participants chose the middle ground on rate smoothing. The appeal of the middle ground scenario, the most common choice in all groups, was that it moderated both the rate impact and the total amount paid, while the other scenarios meant either a high initial cost or paying more over the long run.

Participants were willing to accept rate increases for investments in generating facilities. On nearly all the decisions put in front of participants, the majority chose an option with a higher rate increase than the cheapest option. When multiple more expensive options were presented, participants were more split between the moderate option and the more expensive option. In most cases, participants agreed that it was worth a small increase on their electricity bill to get projects completed faster.

Safety and reliability were key priorities. When participants were given the option to improve safety, most chose to do so even if it resulted in a larger bill increase. Similarly, participants were willing to pay more to improve the reliability of generating assets in the future.

Participants were most likely to choose to spend more on specific projects when there were clear safety or reliability benefits. When the benefits of a rate increase were less clear, such as the future usage of Pickering, participants were more likely to say they would not support an increase without additional information. However, even in the case of the Pickering Station site, the majority of residential customers and many small business customers were willing to pay at least some additional amount for the accelerated pace.

Hydroelectric generation is popular among both residential and business customers. On questions regarding OPG's hydroelectric stations, customers were willing to pay more on their monthly bill to increase capacity and reliability, even if additional capacity is not immediately needed. Nuclear generation, on the other hand, is a more contentious form of electricity generation. Customers opposed to nuclear generation were more skeptical towards OPG and this customer engagement. That said, because safety and environmental impact were key concerns of theirs, they tended to support investing in nuclear projects, giving priority to incremental safety improvements over price.

Workbook Performance

The workbook included multiple "diagnostics" questions designed to assess how well the workbook performs as a tool for providing background information and collecting customer feedback. The most direct evaluation questions were placed at the end of the workbook. However, throughout the Background Information section, participants were also asked various knowledge and comprehension questions that shed light on how well the workbook explained the basics.

Final Diagnostics Section

The results of the diagnostics questions show that, overall, the workbook performed well. Nearly all participants said they had a favourable impression of the workbook (either "very favourable" or "somewhat favourable"; see appendix for details). Only a few participants said they had a moderately unfavorable impression, indicating they were "somewhat unfavourable", while no participants indicated their impression was "very unfavourable".

Overall Impression: Do you have a favourable or unfavourable impression of the workbook?			
	Small Business	**Residential**	**Total**
Favourable	24	33	57
Unfavourable	3	2	5
Don't know/Missing	1	0	1

The workbook struck the right balance in terms of the volume of information. When asked, most participants felt the workbook contained the right amount of information, and very few indicated there was too little or too much information. When participants wanted more information, they mostly agreed that what they felt to be missing was not actually needed to answer the questions, even if they would still have wanted it included.

Volume of Information: Did OPG provide too much information, not enough, or just the right amount?			
	Small Business	**Residential**	**Total**
Too little	3	5	8
Just the right amount	21	23	44
Too much	0	4	4
Don't know/Missing	4	3	7

Background Information

Most participants came to the groups with very little knowledge about Ontario's electricity system or OPG, despite being responsible for electricity used in their home or business. Some participants had never even heard of OPG, while others had a fairly detailed understanding of both the electricity system and OPG. When asked about OPG's share of the bill, most participants were unaware of how much of their electricity bill goes to pay for the power OPG generates.

Before this workbook, how familiar were you with the percentage of your electricity bill that goes to OPG?			
	Small Business	Residential	Total
Familiar	8	7	15
Unfamiliar	19	28	47
Don't know/Missing	1	0	1

The background information provided in the first section of the workbook is intended to level the playing field among participants and to provide enough information to answer the questions on investment choices, thus allowing everyone to participate in the consultation in a meaningful way.

The results of the comprehension and knowledge questions that were asked after each new topic show that this approach was successful. Most participants said the background worked well to set up the rest of the workbook. On questions of how well they understood topics after reading the background on them, nearly all participants felt they now had at least a general understanding.

To what extent do you agree or disagree with the following statements? I generally understand how the various parts of the electricity system work together.			
	Small Business	Residential	Total
Agree	25	29	54
Disagree	2	4	6
Don't know/Missing	1	2	3

To what extent do you agree or disagree with the following statement? I have a general understanding of who OPG is.			
	Small Business	Residential	Total
Agree	27	34	61
Disagree	1	0	1
Don't know/Missing	0	1	1

To what extent do you agree or disagree with the following statement? I have a general understanding of how OPG spends the rates you pay.			
	Small Business	Residential	Total
Agree	27	34	61
Disagree	1	0	1
Don't know/Missing	0	1	1

Views on OPG and Engagement Process

Satisfaction with OPG

After reading through the background section, participants were asked about their overall impression of Ontario Power Generation. The results show that most participants were either satisfied with OPG's performance or did not have a strong opinion; few had a negative view.

The relatively large share of "neutrals", especially among residential participants, reflects the low level of familiarity with OPG. In the ensuing discussion, these participants explained that they were simply too far removed from any direct contact with OPG to judge the generator's performance.

Now that you've read a bit more about OPG and how it fits into Ontario's electricity system, how satisfied are you with OPG's performance?			
	Small Business	**Residential**	**Total**
Satisfied	17	17	34
Neutral	8	16	24
Dissatisfied	2	1	3
Don't know/Missing	1	1	2

This point was also evident in regional differences. In Bowmanville, most participants knew someone who worked for OPG and, therefore, had a more personal connection to the company beforehand. Most participants outside of the Bowmanville groups did not know who OPG was before the consultation. Consequently, they did not have strong opinions going into the engagement.

When asked how OPG could do a better job for them, the two most common answers were to focus more on hydroelectric generation over nuclear, and to produce cheaper power. Several participants said that they were already content with the performance of OPG.

"More investment in hydroelectric generation."

"More hydro, less nuclear."

"Cheaper electricity."

"Return profits to those who pay for the energy."

"No, I believe that OPG is a great asset to our homes/businesses based on the facts."

"Looks like they're on the right track."

Views about the Engagement Process

Participants were presented with information about how OPG builds its plan and how it incorporates customer feedback into the planning process. When asked whether this seems like the right or the wrong approach, nearly all participants agreed that it seems like the right approach; not a single participant felt it was the wrong approach, though some were unsure.

Does this seem like the right approach or the wrong approach to building OPG's plan?			
	Small Business	**Residential**	**Total**
Right approach	26	33	59
Wrong approach	0	0	0
Not sure/Don't know/Missing	2	2	4

In the discussion, some participants had suggestions for improving the existing approach. Several participants wanted an additional step that would revisit customers and get more feedback from them before finalizing the plan.

When asked how they wanted to be engaged in the future, most participants said that they preferred the same format—in-person discussion groups—or an online survey. None of the participants wanted to complete this survey over the phone, where they would not be able to see the visuals presented in the workbook.

Making Choices

In the second part of the workbook, participants were asked for their views on specific decisions that OPG must make. Each example provided the background information necessary to make an informed decision before posing a question. During the discussion, participants were asked which option they chose, whether they had enough information to answer the question, and if they thought there were missing response options.

Rate Smoothing

When asked about their rate smoothing preferences, most participants chose scenario B, the option that offered a middle ground. Both scenario A and scenario C were chosen by a few participants but far fewer than chose the middle option.

Which of the rate smoothing options presented above would you prefer?			
	Small Business	Residential	Total
Scenario A - Produce lower bills in the 20s, but higher bills in the 2030s	3	5	8
Scenario B - Moderate bill impact throughout	20	24	44
Scenario C - Produces higher bills in the 2020s, but lower bills in the 2030s	4	5	9
Don't know/Missing	1	1	2

The participants who selected Scenario A did so to keep prices down in the short term, but they had different reasons for making that decision. Some participants did not trust that prices would go down in the future and so preferred to keep them down in the short run.

> *"Once the cost goes up it often never goes down."*

Additionally, one participant expected to be bringing in more income later, so it would be more manageable to pay higher bills later than higher bills in the short term. Another participant noted that a fixed cost is easier to work with in a business. If the cost changes less frequently, it can be part of a long-term budgeting process.

The appeal of Scenario B, the most common choice in all groups, is that it moderated both the rate impact and the total amount paid, while the other scenarios meant either a high initial cost or paying more over the long run.

> *"Option B seems to be a sensible middle ground."*

The most common reason why participants chose scenario C was to keep the overall amount they paid as low as possible in total. Paying more upfront to reduce interest costs in the future was seen as the key benefit.

> *"I would prefer no interest costs."*

A few participants specifically mentioned that they did not want to pass costs down to others in the future.

> *"Don't leave payments and problems for the future generations."*

One participant mentioned that, as she enters retirement, she would like the bill to go down and so she was willing to pay the extra amount in the present to save money later.

> *"Personally, as someone in their mid-fifties, I would be worried about high electricity bills when I'm retired."*

With regard to missing response options, one participant noted that it should theoretically be possible to completely smooth out the rates, which he would have preferred. However, most participants were able to select one of the three options provided that best fit their personal needs.

Investing in OPG's Hydroelectric Stations

Overhauling Hydroelectric Stations

With respect to OPG's plan to overhaul its hydroelectric stations, participants were asked a pacing question. Participants were split between the moderate and faster paces, with the majority of small business customers opting for the moderate pace and the majority of residential customers choosing the faster pace. No participants selected the slower pace.

In the 2020 to 2026 period, OPG plans to increase the number of overhauls it does each year. OPG must also decide on the right pace for that overhaul program. Which approach would you prefer?			
	Small Business	**Residential**	**Total**
Faster pace	9	21	30
Moderate pace	17	13	30
Slower pace	0	0	0
Don't know/Missing	2	1	3

Those who favoured the moderate approach did so for different reasons. Several participants gravitated towards the middle approach because they wanted a moderate option. Specifically, some of them wanted to balance out increasing costs with getting the project done and felt the slow pace would delay it too much.

A few participants wanted to make use of the full life expectancy of the stations; by moderating the pace the stations would still be overhauled, but not before they had run their course.

Others favoured the moderate pace approach, so that if there were a massive jump in technology, OPG would be able to make use of it. There was concern that if they did the overhauls too quickly, they would have no opportunity to take advantages of new technology.

> *"We cannot foresee natural disasters, economics, etc. – a moderate pace makes most sense."*

One participant wanted to go slowly to keep rates down in the hopes that would help Ontario be competitive.

Some participants preferred the faster pace approach because they felt it was the best option to be prepared for increases in demand in the future, and that since there is a current surplus, now was the best time to make those preparations.

A few participants felt that being prepared for higher demand in the future is important in order to maintain reliability of supply. They felt that it is better to strain the system now when we have a surplus, rather than in the future when we will not.

> *"Paying now for our future is better than waiting to pay something later so that we can enjoy dependable energy since we pay less in the long run."*
>
> *"For such a nominal increase in monthly bills it seems prudent to opt for the more reliable generation."*
>
> *"If the faster pace is 33 cents per month to get the most reliable hydroelectric generation that is the better option for only a little more."*

A couple of participants wanted the faster pace in the hopes that it would reduce the reliance on nuclear power because they preferred hydroelectric as a power source.

One participant mentioned concern that while the cost is low now, it won't be so low in the future, so a faster pace is better.

Two participants mentioned they wanted more options for this question. One participant wanted the option to repair the stations instead of overhauling them, while the other wanted a middle ground between moderate and fast.

Niagara Frequency Conversion Project

Most participants preferred to convert both units now, rather than delay them, but a small number in both residential and small business groups said they wanted to delay conversion.

OPG is planning to convert the two 25 Hz units to the modern 60 Hz standard, and it needs to decide when to do the work. Which of the following options do you prefer?			
	Small Business	**Residential**	**Total**
Convert both	20	24	44
Delay conversion	6	7	13
Don't know/Missing	2	4	6

A few participants just wanted to get it done for the sake of having it done, particularly because the cost of doing it now was so low. Some were also concerned that costs would increase in the future so doing it now was better.

> *"$1.20 more a year – of course it's worth it."*
>
> *"It's a minimal cost – best to be prepared, especially if our nuclear plants need work."*

Several participants wanted to get the conversion done now so that it is in place for when demand increases in the future. In particular, a couple of participants mentioned the closing of Pickering Station as something that would require more generating capacity and felt that this could be used to fill that need.

One participant did not want to convert them now because we are already selling power to the states at cost so there is no value in getting extra generating assets online now. Likewise, some participants felt that since we have a surplus now there is no need to convert and it is better to wait until it is needed.

"We currently have a surplus. Plan now for quick execution later".

One participant felt this was an area where the cheaper option could be taken to keep bills down for now when customers could really use it, and to allocate the money to more urgent areas.

"I believe a delay will allow us to save and use free money for more urgently need projects."

Several participants would have liked a middle option to convert only one unit now and the second one later so they could spread out the cost of conversion over a longer period.

"There should be an option of converting one unit at a time."

"Why do both have to be done at once? Why not spread out the cost?"

Several participants felt this page was one of the more technical and difficult to follow. Details about the number of hertz and the history of the turbines made it more challenging for some participants.

Investing in OPG's Nuclear Stations

Making the Pickering Station site available for other uses

A split between small business and residential customers emerged on how to deal with the Pickering Station site after the station shuts down in 2024. Both types of customers had a range of opinions – from being unwilling to spend any more to being willing to spend as much as it took. However more small business participants weren't willing to accept any increase, while more residential participants were.

Would you be willing to pay more on your monthly bill until the end of Pickering Station's operations, to reduce the shut-down period to approximately 25 years and have the land available for other purposes sooner?			
	Small Business	**Residential**	**Total**
Not willing to pay more	16	7	23
Up to $3/$1	6	13	19
Up to $6/$2	3	3	6
Up to $9/$3	1	5	6
Don't know/Missing	2	7	9
Note: The bill impact for small business customers would be $3/$6/$9, respectively for the three options. For residential customers, it would be $1/$2/$3.			

Several of the more nuclear-skeptic participants were suspicious that using an accelerated approach (taking 25 years) would be less safe than the standard approach, which takes 45 years.

"The reason is the 25-year plan will not work as a predicted, money wasted."

"You want to make sure that the land and water is safe - that would be my biggest concern - not fast forward still makes me a little uncomfortable."

Various participants liked the idea of making the land available for use sooner, but without knowing specifics of what the land would be used for, they were not willing to pay more than the bottom end of the scale. Similarly, many participants wanted more details on how the land would be used once it was reclaimed. For some uses they might be willing to pay more but for others, such as development into condos, they would not. A few participants particularly noted that they would be willing to pay for the accelerated approach if it meant they would be able to sell the land faster.

"Unclear as to why I as a consumer would want the land re-purposed. Will I get a break on my bill when land sells?"

"I would need more info first considering what the site would be used for instead before committing to paying additional on my hydro bill."

"If the Pickering Station can be used for something needed I would not mind paying more."

A couple of participants noted that they would no longer be around by the time either approach finished so the question was hard for them to answer. Some participants also felt that they were just too far away from the site for it to ever matter to them.

"This doesn't affect my business or is too far from my business to make any difference to me. I would say no."

A few participants felt that those who are getting the benefit should pay for it – specifically the city of Pickering.

"Pickering should pay since they'll get tax and economic revenue sooner."

Participants who were willing to pay the most money for the recovery of Pickering felt that even three or nine dollars a month is not a huge added cost for them and saving that much is not worth it to leave land that could be used for something unavailable for 50 years.

As noted above, many participants wanted more information on what the site would be used for, but this did not prevent them from answering the question. Some participants mentioned that they specifically chose a lower option because they were not clear on this question.

Additionally, a few participants were not clear why Pickering was shutting down, despite the information provided in the workbook.

"Why is Pickering being closed?"

Darlington Vapour Recovery System Improvement

The majority of participants preferred the second option—replace the old VRS with a higher capacity system. This preference was more pronounced among residential than business customers, with the latter being more evenly split between improving the old system and replacing it.

OPG needs to decide whether to improve the existing system or replace the system with a higher capacity system. In either case, OPG expects to be within the top 25% of nuclear generators with the same reactor technology for airborne tritium emissions. Which of the following options do you prefer?			
	Small Business	**Residential**	**Total**
Improve existing	11	12	23
Replace with new	14	20	34
Don't know/Missing	3	3	6

This was another page that was viewed as more technical and difficult to understand. Most participants were still able to answer the question, but a couple felt it went over their heads. The topic of the question was more abstract to many participants, as they did not know what a vapour recovery system is, but most used the information on the page to make an informed decision.

"I don't understand any of the info about the nuclear station. I can offer no opinion."

Many participants were concerned about workers at the station and felt that the associated cost was a small price to pay for their safety. Participants were clear that tritium emissions from the station were already less than 1% of the legal maximum but felt that as long as there was any risk, it was worth reducing. A couple of participants pointed towards the fact that OPG is only projecting to be in the top 25% and they could still do better.

"Cleaner air and people's health is worth paying more."

"The less emissions the better."

"Safety always first."

"Even at double the price, 12 cents is not going to be noticed by average customer - makes sense to do it right".

"It makes financial sense to go with a higher capacity system. There will be a bit more on our bills but lower emissions and radiation is better for the environment in the long run."

Some participants were satisfied with the below 1% of emission maximums and so did not want to spend extra money on the VRS.

"The lifespan of the station matters. If it's already in top 25% then, why spend more than double?"

"Since we are currently at a surplus and currently in top 25% for airborne tritium it makes more sense to improve the current Darlington Station."

A small set of participants was concerned about new technology generally across several questions. They were skeptical that the new system would work better than the existing one. Additionally, one participant wanted to improve the old system rather than replace it because they felt that maintenance on old systems is generally cheaper than maintenance on new systems.

Darlington Air Compressor Replacement

OPG needs to decide whether to proactively replace all of the air compressors or purchase some spares and replace as the existing compressors fail. Which of the following options do you prefer?			
	Small Business	**Residential**	**Total**
Proactively replace all 19	14	22	36
Acquire 4 spares	12	11	23
Don't know/Missing	2	2	4

A few participants felt that the cost was very low, particularly compared to the costs for other projects like Pickering repurposing, and so it is a small price to pay.

Several participants were worried about the danger of not proactively replacing the compressors. One felt that even asking questions of this nature about nuclear energy was concerning.

> *"Common sense dictates that replacing all the air compressors makes the most sense. Forced outages can be dangerous."*
>
> *"I am frightened that you are asking me these questions. We are talking about nuclear technology. We need 100% reliability."*
>
> *"I'm a firm believer in doing any task proactively."*

One participant thought it would be better not to have spares just sitting around. Replace them all now so that everything is in use.

There was general concern from a few participants about the uncertainty of the future. One participant noted that there are no assurances that new compressors will be better, so spares are a better option. Another participant was unsure what the future would hold and so felt it was better to wait for now.

Several participants wanted to use the whole life cycle of the existing units so felt that replacing them as they failed was the better way to handle the situation.

> *"The current condition is fair. There's no need to replace immediately. The cost is reasonable."*
>
> *"I would prefer to pay only as required."*

A few participants felt that there should be another option that was a mix of the two, where some compressors are replaced proactively but not all of them.

> *"A mix is probably best. Proactively replace 2-4 per year for example."*
>
> *"Why is it all or nothing?"*

Darlington Crane Group Project

This question was another pacing question. When asked whether OPG should refurbish all 20 cranes at Darlington station or refurbish only a subset now and the rest later, most participants opted for refurbishing all 20 now. Like the previous question, residential customers were more open to spending more on refurbishment than business customers.

OPG needs to decide whether to refurbish all of the cranes or only the 14 most critical ones. Which of the following options do you prefer?			
	Small Business	**Residential**	**Total**
Refurbish all 20 now	14	24	38
Refurbish 14 now and 6 later	12	9	21
Don't know/Missing value	2	2	4

Many participants felt that if they are at the end of their lifecycle, it is important to replace them all now. For some, this was because proactive work is generally better than reactive work. Others were more specifically concerned about safety of not refurbishing the other cranes. A few participants felt the cost was sufficiently low that if it was safer at all, it was worth replacing.

> *"Best to be proactive."*
>
> *"Safety is more important than one cent."*
>
> *"The risk of dropping a load is too high."*

Some participants were concerned that all the costs from the various choices were adding up to a more significant amount, and so they felt this was an opportunity to keep costs for consumers down.

> *"There's too much addition to consumer costs. Repairs and maintenance must be done, but not to affect the customer too much."*

Participants who were generally wary of new technology felt that the new ones might not work as well as the old ones, therefore it is best to keep the old ones for as long as possible.

In the discussion, participants were more open to refurbishing only the most critical when they got additional assurances that the failure of the remaining 6 cranes would not cause plant failure. However, many still felt that safety was the top priority, thus all should be refurbished now.

Investing in Technology to Create Efficiencies

There is a general consensus among both business and residential participants that investing in new technology was the right decision, but they were more split on whether it was better to only invest when savings are guaranteed or if OPG should invest in pilot projects. For many it came down to a question of whether the risk of pilot projects was worth it.

Which of the following statements best reflects your own point of view?			
	Small Business	**Residential**	**Total**
Never invest in new technology	1	0	1
Invest only in new technology that is proven	15	22	37
Invest in pilot projects without proven savings	7	11	18
Don't know/Missing value	5	2	7

Several participants expressed concern that pilot projects won't work out, meaning they will end up spending more money than they save on these initiatives. While they wanted to save money by using new technologies, they did not want to risk spending more than they saved in looking for something new.

> *"Invest only if there is guaranteed savings."*

> *"New tech is always being developed that can be more effective and could be changed up as it's proven."*

> *"It's nice to take risks but they can get very costly."*

Several participants wanted OPG to be proactive and invest in new technologies. They felt that innovation is important, and someone has to pay for it. A few participants had already noted before this discussion that there was no mention of Research & Development throughout the workbook.

> *"Innovation is something government industries should invest more in."*

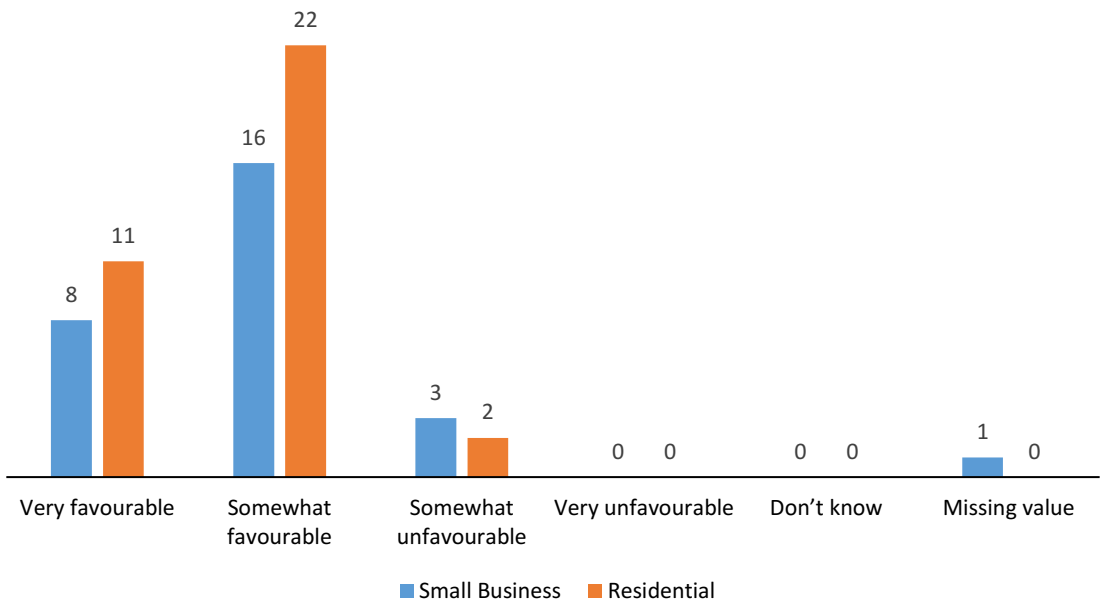
> *"Innovation or stagnation. Using new technologies is smart, and pilot projects to 'test the waters' makes sense."*

A few participants wanted specific blends of only investing in new technology that is proven and investing in pilot projects. They wanted to be able to specify how much money could be spend on each.

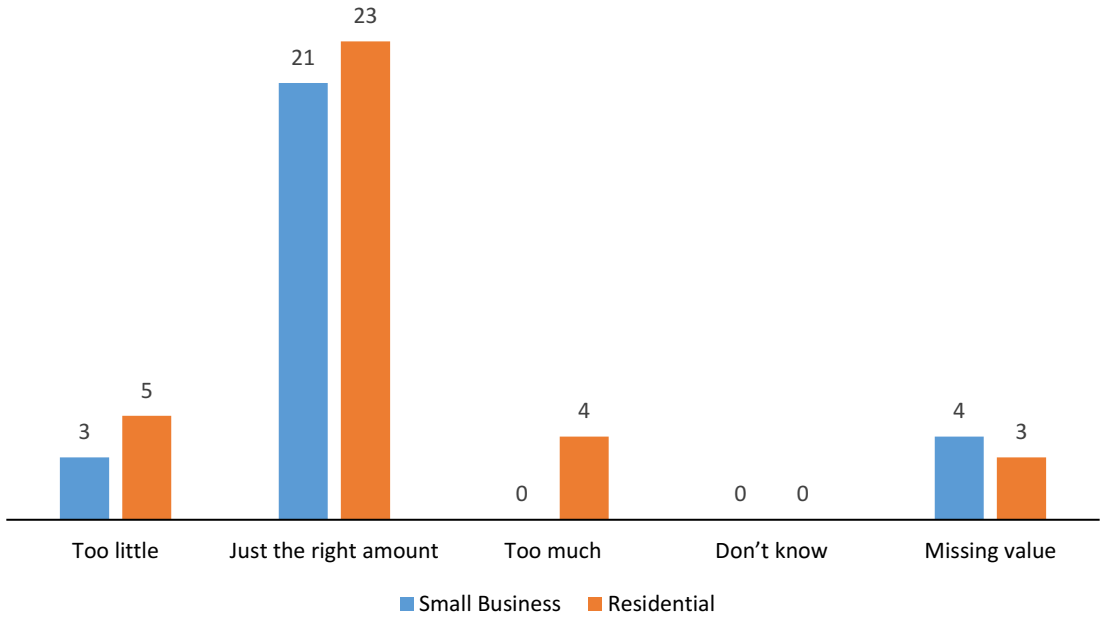
> *"A blended approach of new and pilot."*

Appendix: Detailed Results

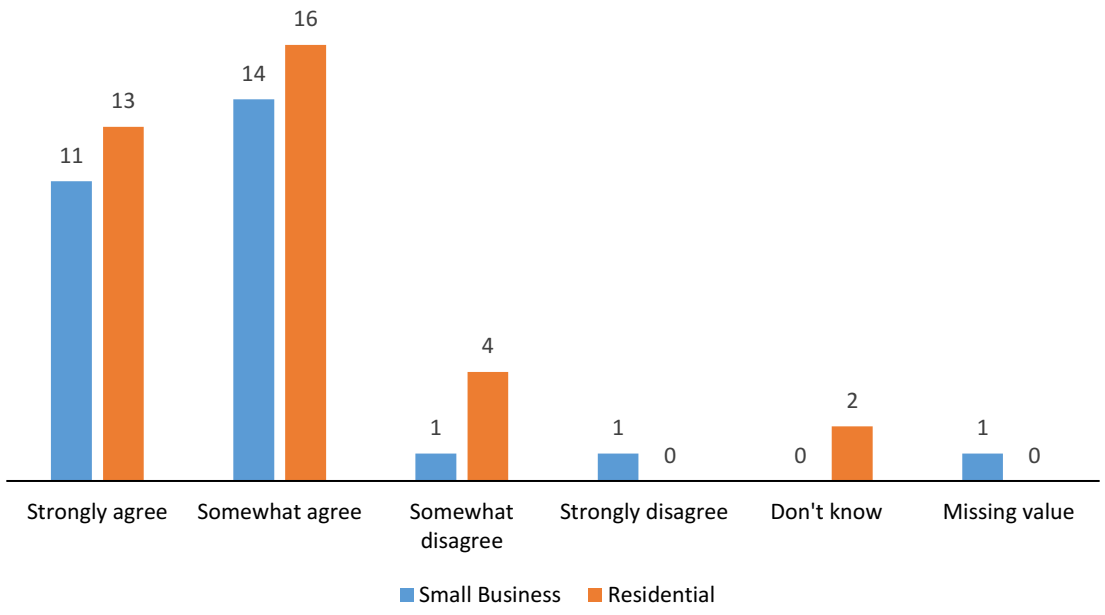
Overall Impression: Do you have a favourable or unfavourable impression of the workbook?



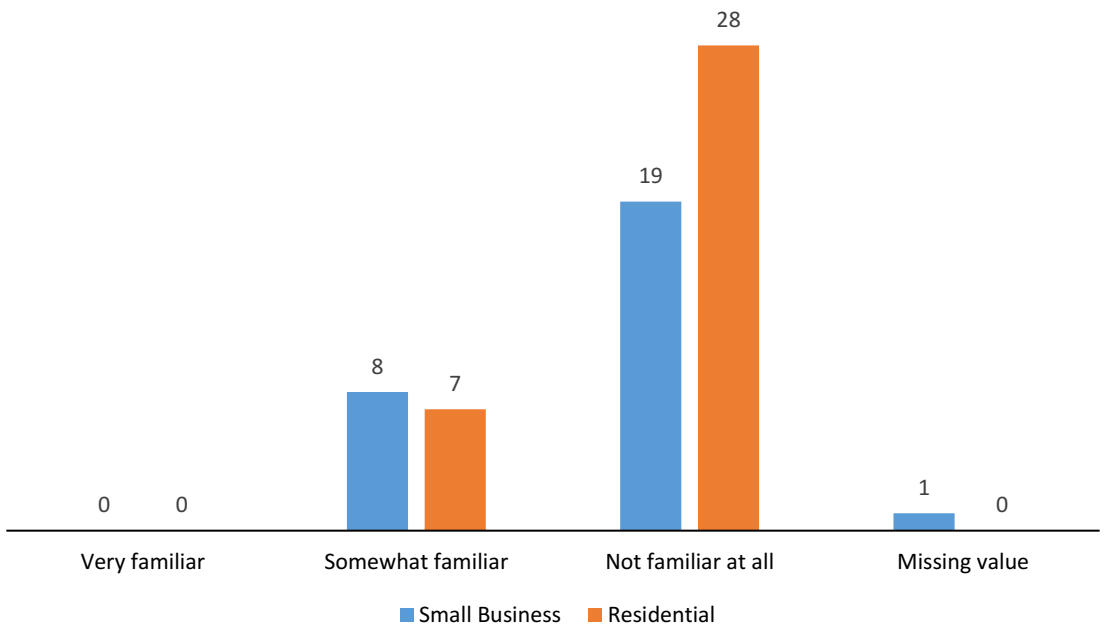
Volume of Information: Did OPG provide too much information, not enough, or just the right amount?



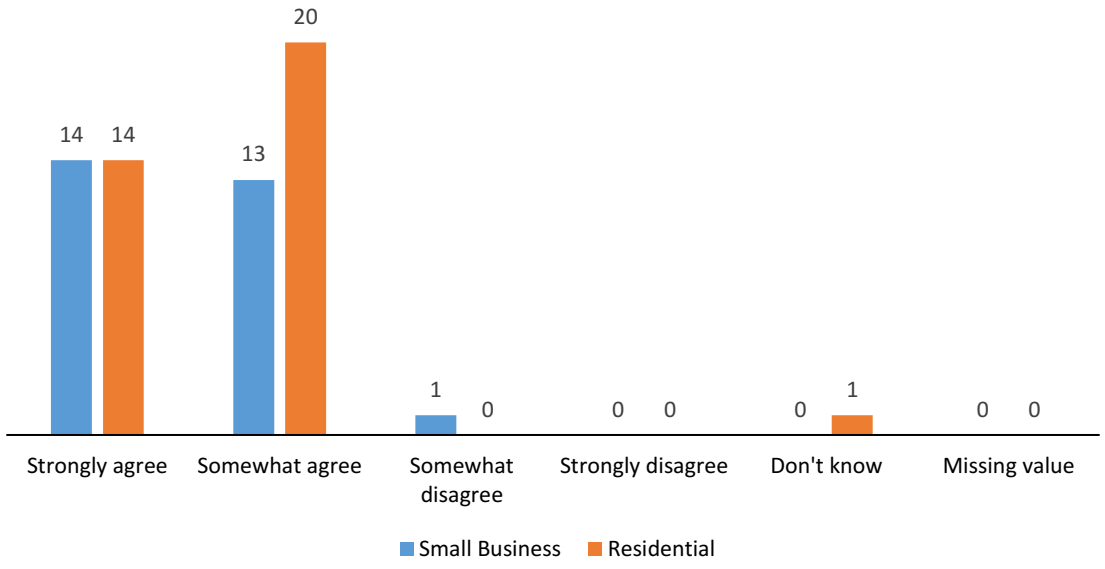
To what extent do you agree or disagree with the following statements? I generally understand how the various parts of the electricity system work together.



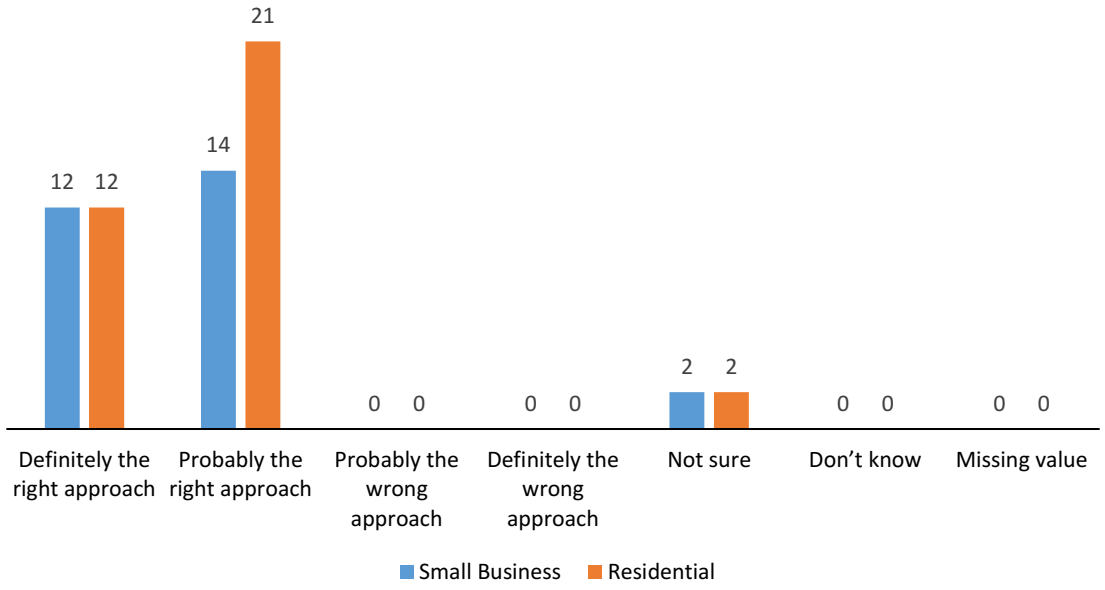
Before this workbook, how familiar were you with the percentage of your electricity bill that goes to OPG?



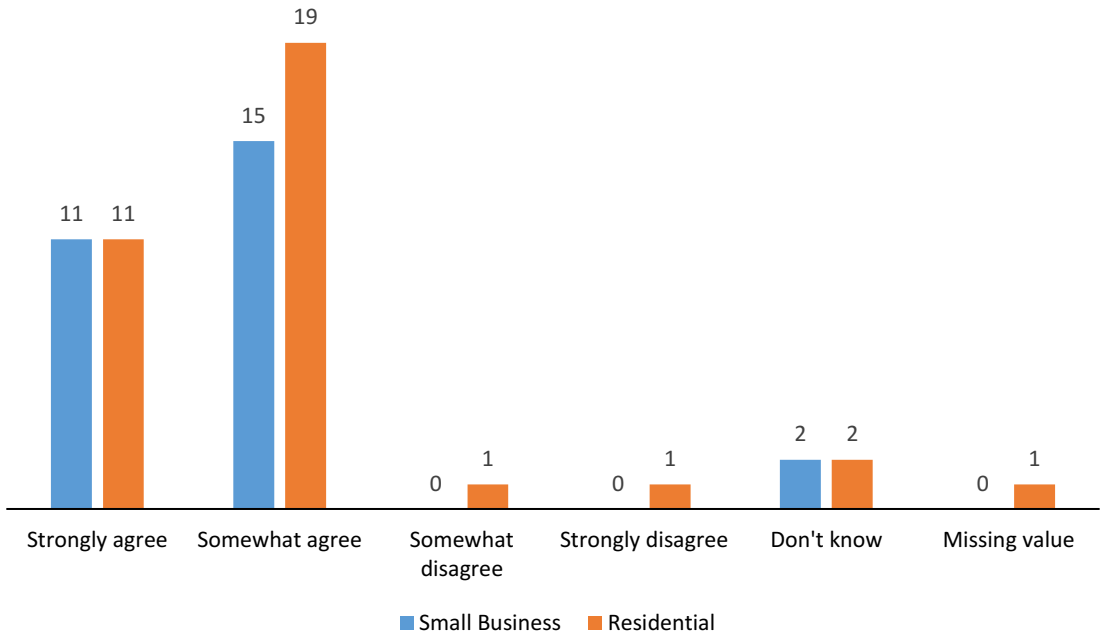
To what extent do you agree or disagree with the following statement? I have a general understanding of who OPG is.



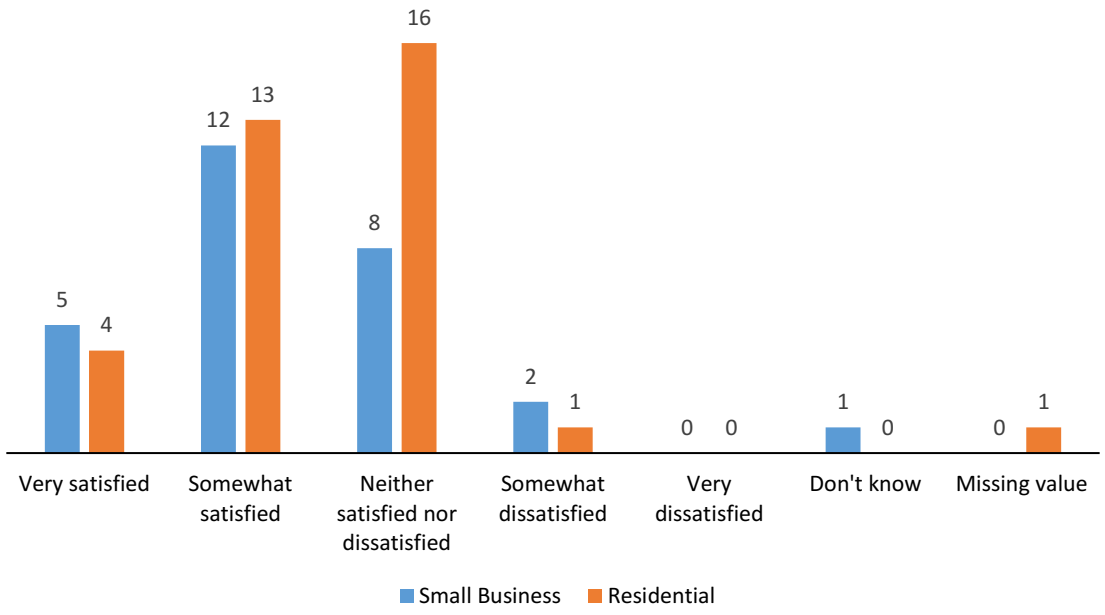
Does this seem like the right approach or the wrong approach to building OPG's plan?



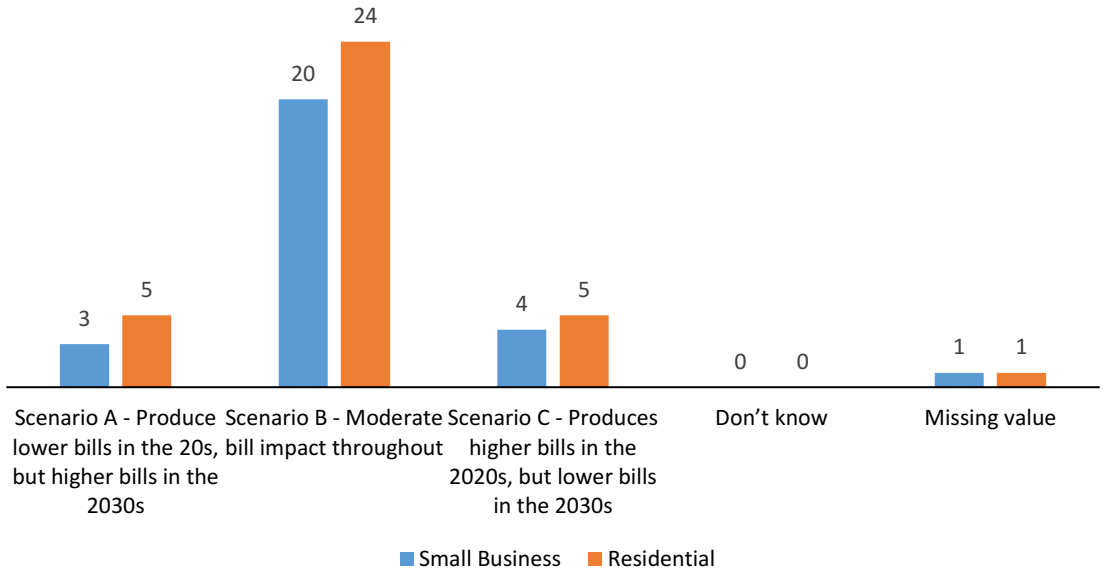
To what extent do you agree or disagree with the following statement? I have a general understanding of how OPG spends the rates you pay.



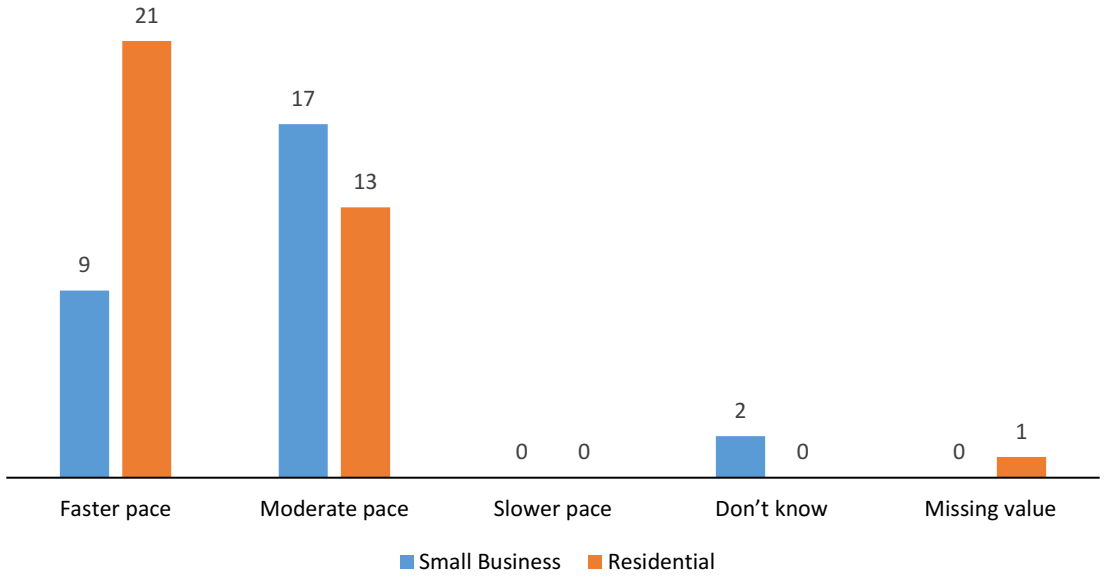
Now that you've read a bit more about OPG and how it fits into Ontario's electricity system, how satisfied are you with OPG's performance?



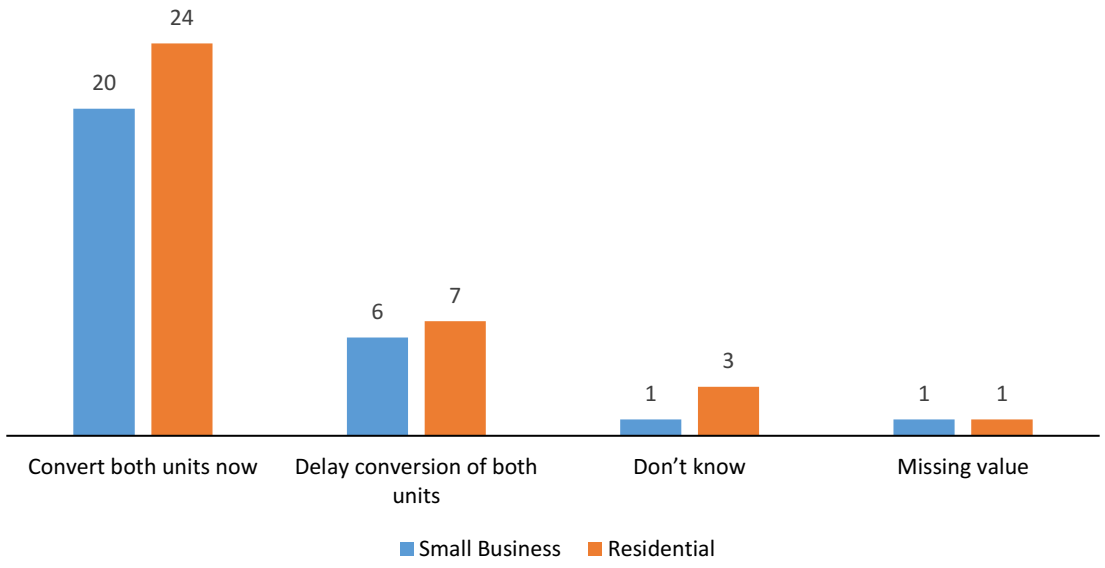
Which of the rate smoothing options presented above would you prefer?



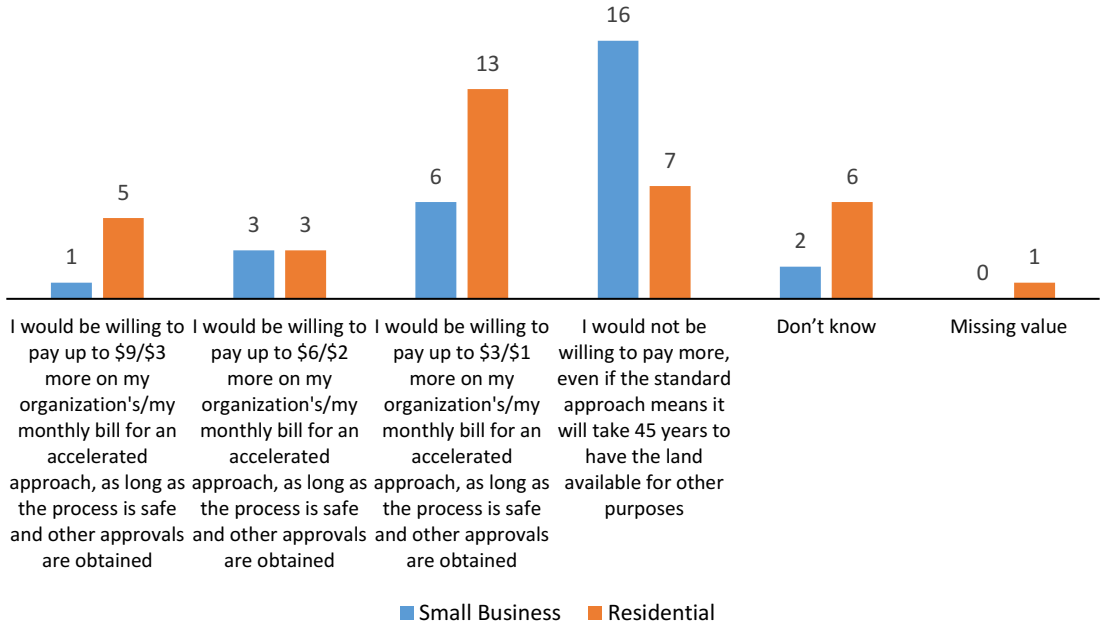
In the 2020 to 2026 period, OPG plans to increase the number of overhauls it does each year. OPG must also decide on the right pace for that overhaul program. Which approach would you prefer?



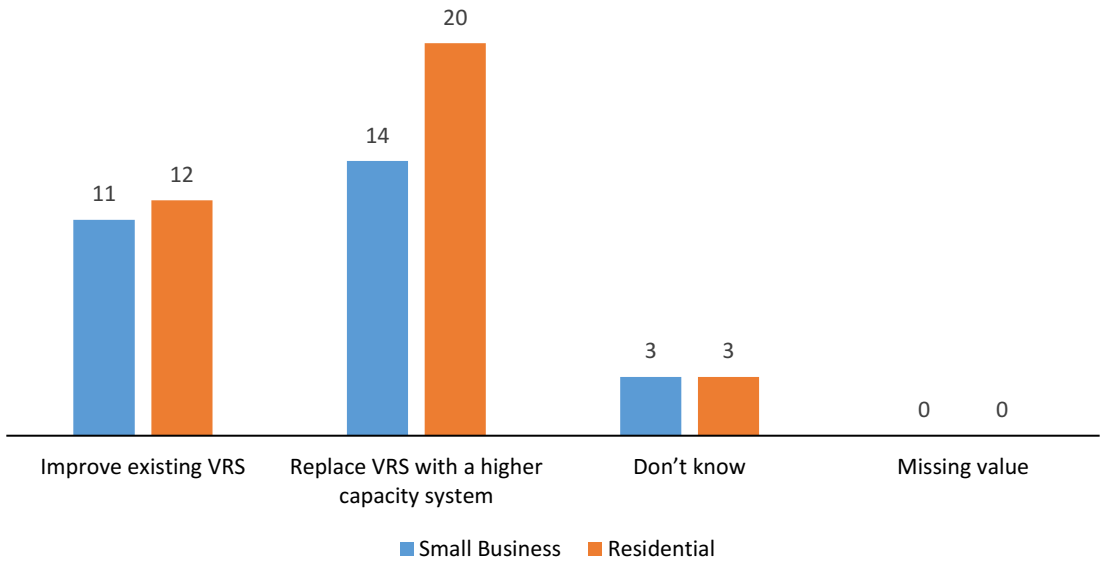
OPG is planning to convert the two 25 Hz units to the modern 60 Hz standard, and it needs to decide when to do the work. Which of the following options do you prefer?



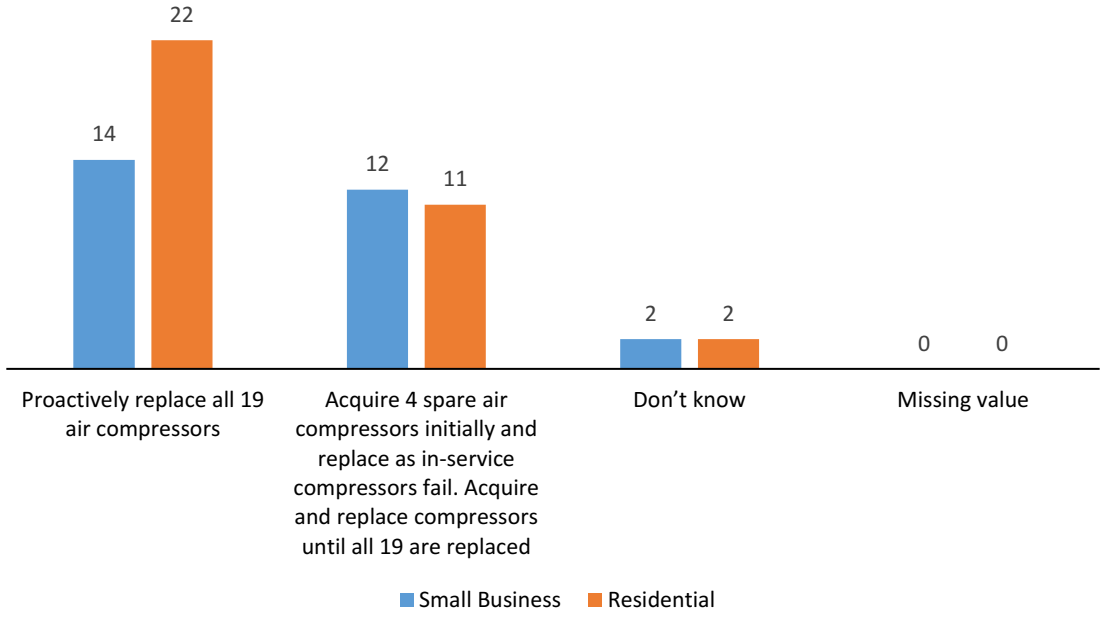
Would you be willing to pay more on your monthly bill until the end of Pickering Station's operations, to reduce the shut-down period to approximately 25 years and have the land available for other purposes sooner?



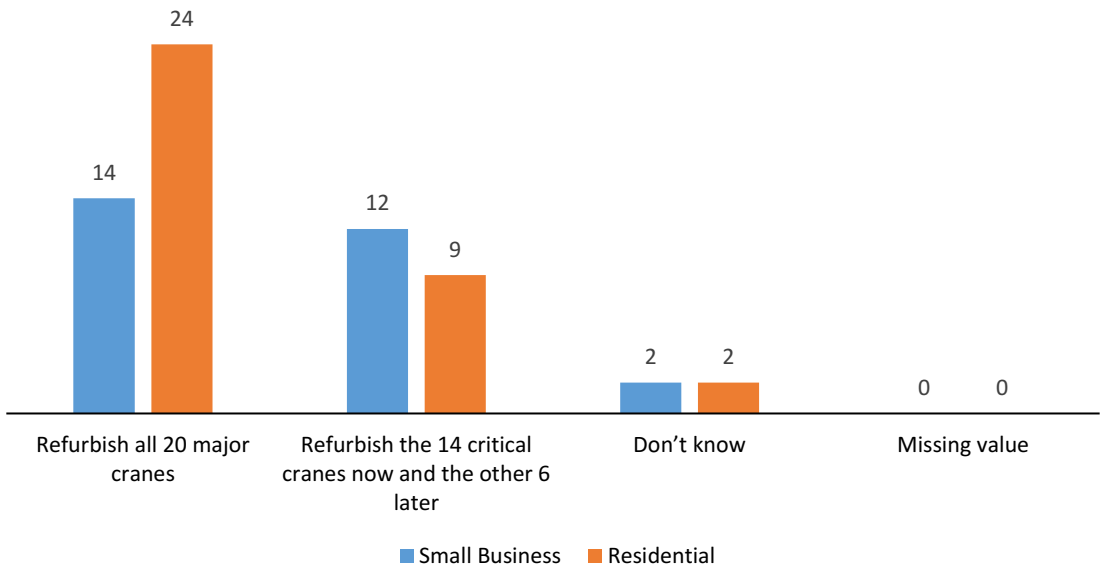
OPG needs to decide whether to improve the existing system or replace the system with a higher capacity system. In either case, OPG expects to be within the top 25% of nuclear generators with the same reactor technology for airborne tritium emissions. Which of the following options do you prefer?



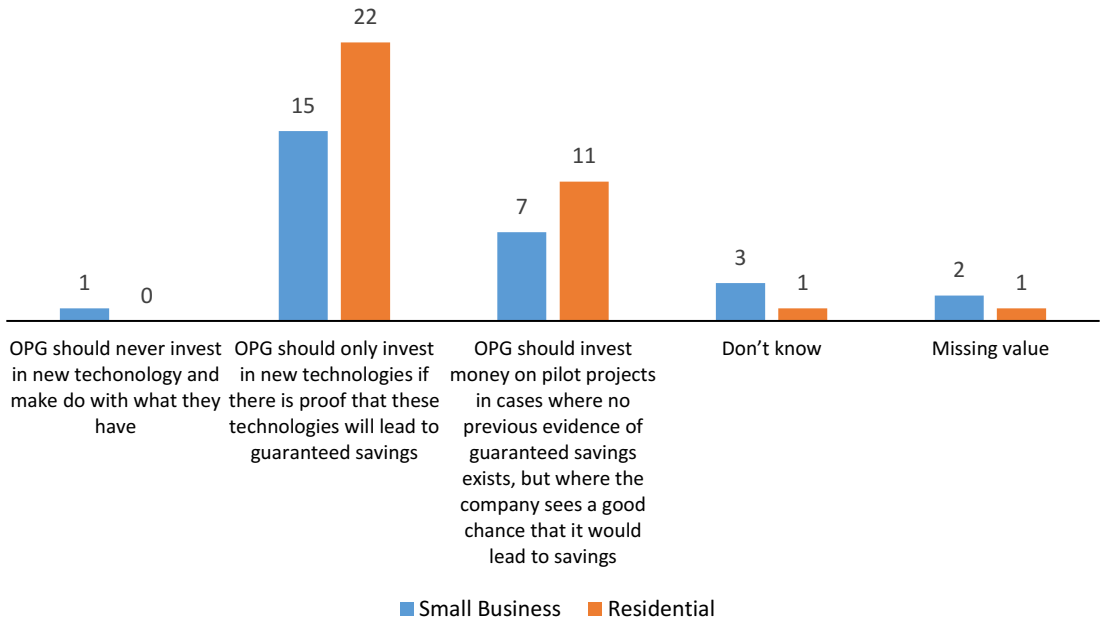
OPG needs to decide whether to proactively replace all of the air compressors or purchase some spares and replace as the existing compressors fail. Which of the following options do you prefer?



OPG needs to decide whether to refurbish all of the cranes or only the 14 most critical ones. Which of the following options do you prefer?



Which of the following statements best reflects your own point of view?



Filed: 2020-12-31
EB-2020-0290
Exhibit A2-2-1
Attachment 4
Page 245 of 421

INNOVATIVE RESEARCH GROUP

Telephone Survey Report
2018 Customer Engagement

ONTARIO POWER GENERATION

February 2019

STRICTLY PRIVILEGED AND CONFIDENTIAL

Telephone Survey Methodology

Field and Design

These are the findings of two Innovative Research Group (INNOVATIVE) telephone surveys conducted amongst Ontario residents and small businesses between **December 5th, 2018 and January 8th, 2019.**

- The **residential** survey fielded from **December 5th to 23rd, 2018** amongst **n=600** (unweighted n=603) randomly selected Ontarians. The final sample includes both landline (63%) and cell phone (37%) respondents, so that individuals who don't have a landline are represented. The margin of error is approximately ±4.0%, 19 times out of 20.

- The **small business** survey fielded from **December 7th, 201 to January 8th, 2019** amongst **n=200** (no weights applied) randomly selected small business customers. The small business sample was provided by ASDE, a sample provider. The margin of error is approximately ±6.9%, 19 times out of 20.

INNOVATIVE conducted all interviews through its computer assisted telephone interviewing (CATI) system, using live callers.

This generalizable telephone survey used a stratified random sampling approach to set targets based on known characteristics of the population.

- The **residential** survey targets were set based on region, age, and gender. The sample is then weighted by these characteristics.

- The **small business** survey targets were set based on region and industry sector. Because the targets were met exactly, no weights were applied to the final sample.

Note: *Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers. Caution interpreting results with small n-sizes.*

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Residential Sample Validation

Targets for the residential sample were set based on region and age/gender. The sample was weighted to ensure it was representative across those known characteristics.

Region	Target	Unweighted N	Weighted N
Toronto	129	102	129
West Metro Belt	70	66	70
North/East Metro Belt	65	61	65
Southwest	70	75	70
South Central	89	95	89
East	76	85	76
Central	60	67	60
North	41	52	41
Total	**600**	**603**	**600**

Age & Gender	Target	Unweighted N	Weighted N
Male 18-34	46	51	46
Male 35-54	112	116	112
Male 55+	131	136	131
Female 18-34	49	40	49
Female 35-54	120	111	120
Female 55+	142	149	142
Total	**600**	**603**	**600**

INNOVATIVE RESEARCH GROUP

Small Business Sample Validation

Targets for the small business sample were set based on region and industry sector. Because these targets were met exactly, no weights were applied to the final sample.

Region	Target	Unweighted N
GTA	98	98
Rest of Ontario	102	102
Total	**200**	**200**

Age & Gender	Target	Unweighted N
Business/Commerce	69	69
Public/Culture	72	72
Resources/Construction/ Manufacturing	59	59
Total	**200**	**200**

INNOVATIVE RESEARCH GROUP

INNOVATIVE RESEARCH GROUP

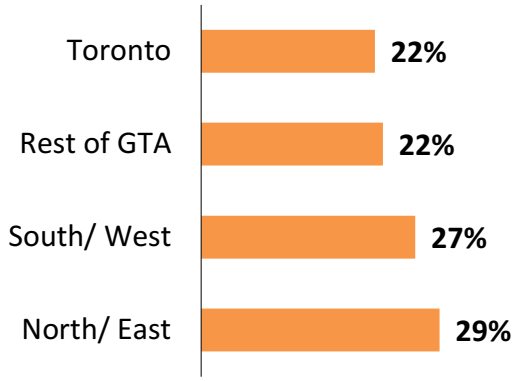
Residential Survey

Residential

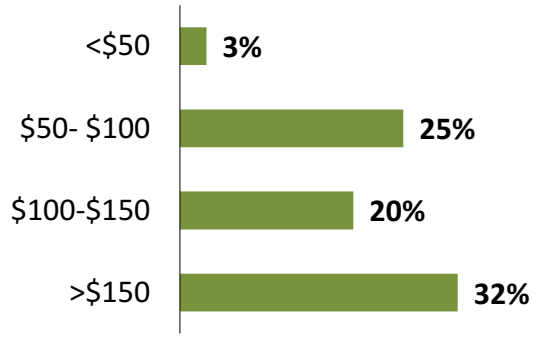
Demographics

Respondent Profile

Region

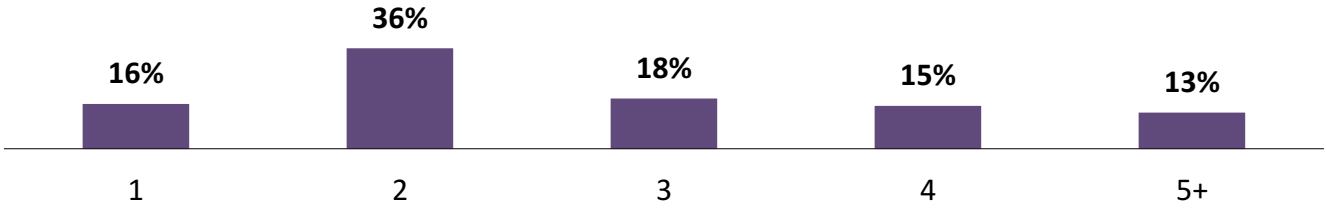


Bill Size



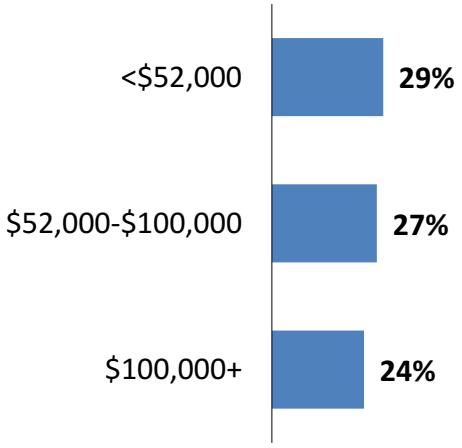
Note: 'Don't know/Not sure' (20%) not shown.

Household Size



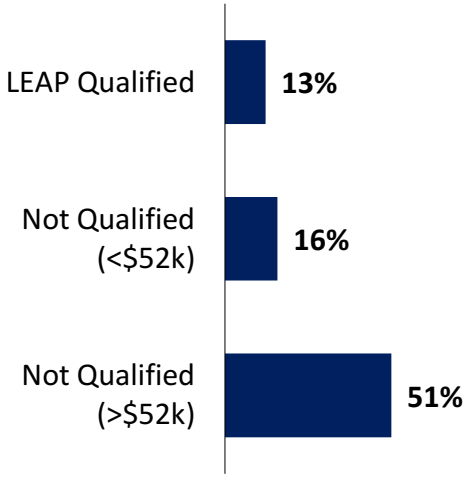
Note: 'Refused' (3%) not shown.

Household Income (After Tax)



Note: 'Refused' (17%), 'Not sure' (3%) not shown.

LEAP Qualification

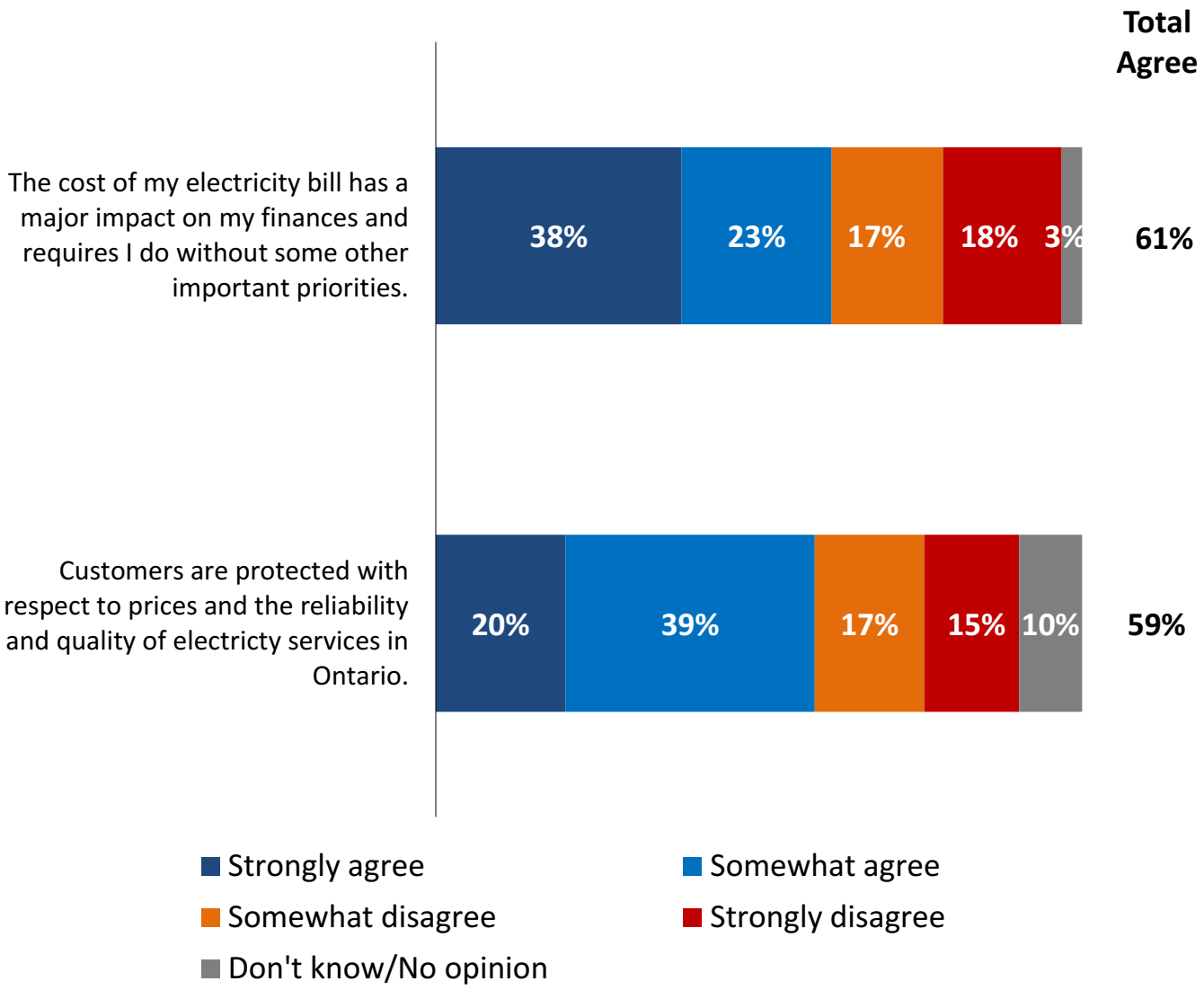


Note: 'Refused' (17%), 'Not sure' (3%) not shown.

Residential

Segmentation

Q Now I'd like to ask you some general questions about the electricity system in Ontario. For each statement please tell me if you would strongly agree, somewhat agree, somewhat disagree or strongly disagree. If you don't know enough to say or don't have an opinion just let me know.
[asked of all respondents, n=600]



INNOVATIVE RESEARCH GROUP

INNOVATIVE RESEARCH GROUP

Background Information

Residential

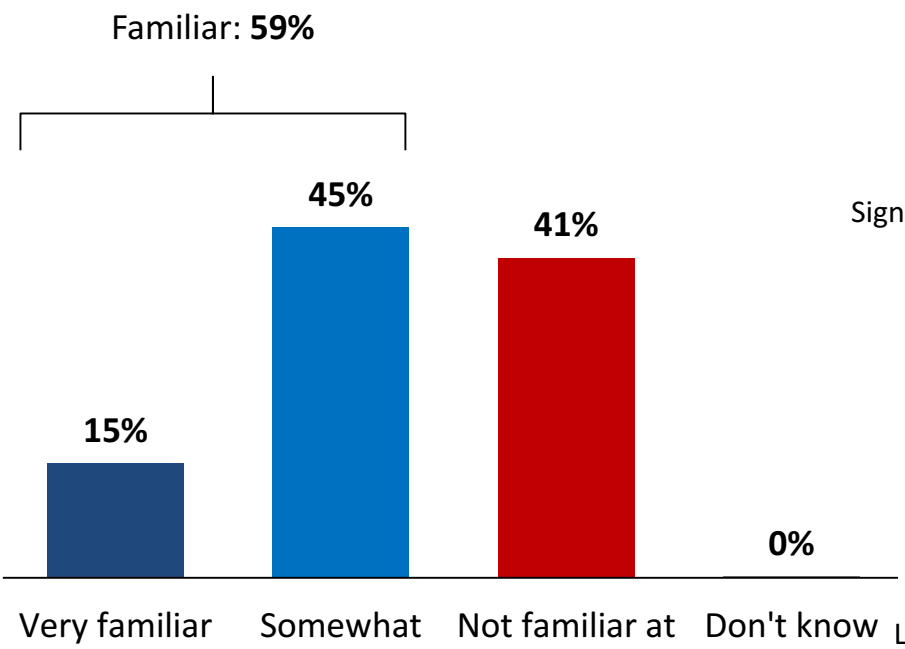
Familiarity with OPG

Q

Today, I'd like to talk to you about Ontario Power Generation.

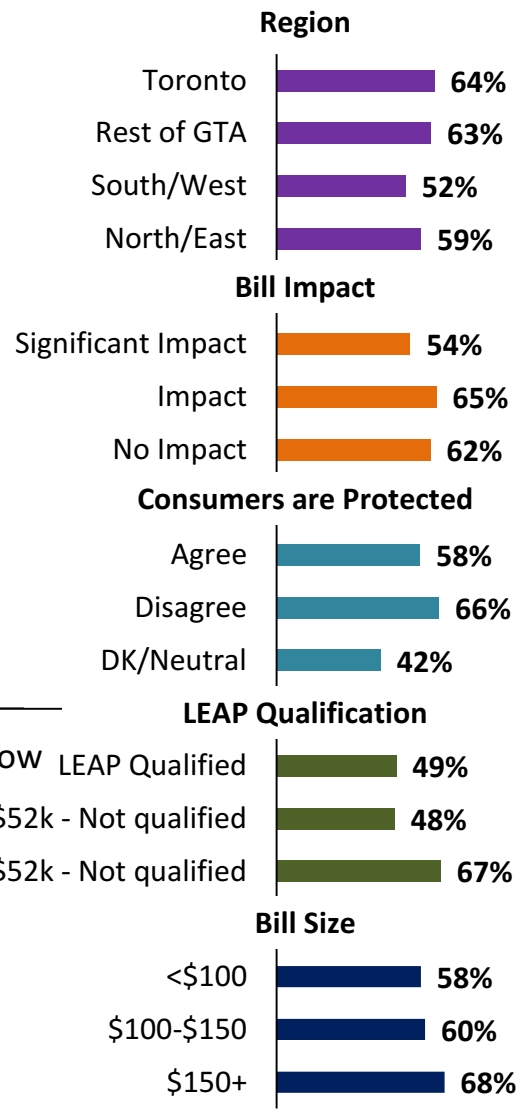
How familiar are you with a company called Ontario Power Generation? Would you say you are very familiar, somewhat familiar, or not familiar at all?

[asked of all respondents, n=600]



Segmentation

*Those who say "**Familiar**":*



INNOVATIVE RESEARCH GROUP

Residential

OPG's Share of the Bill

Preamble

"I'd now like to talk with you about your electricity bill …

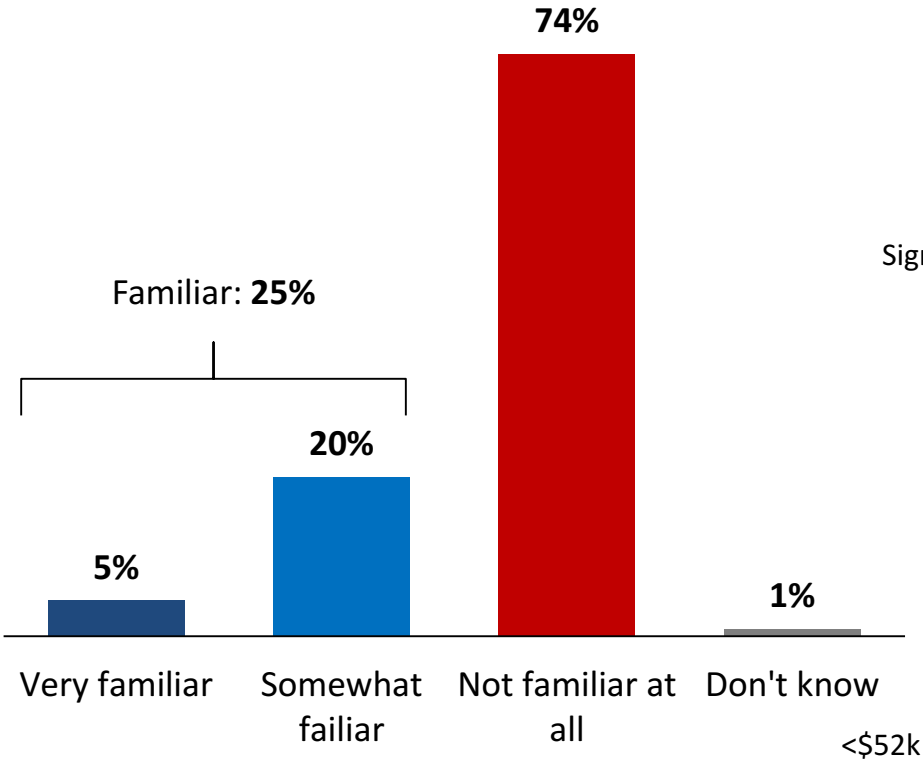
While your local distributor is responsible for collecting payment for the entire electricity bill, OPG receives about 20% of the typical residential customer's bill for its portion of the generation. The rest of the bill goes to other power generation companies, transmission companies, distribution companies, the provincial government and regulatory agencies."

INNOVATIVE RESEARCH GROUP

Residential

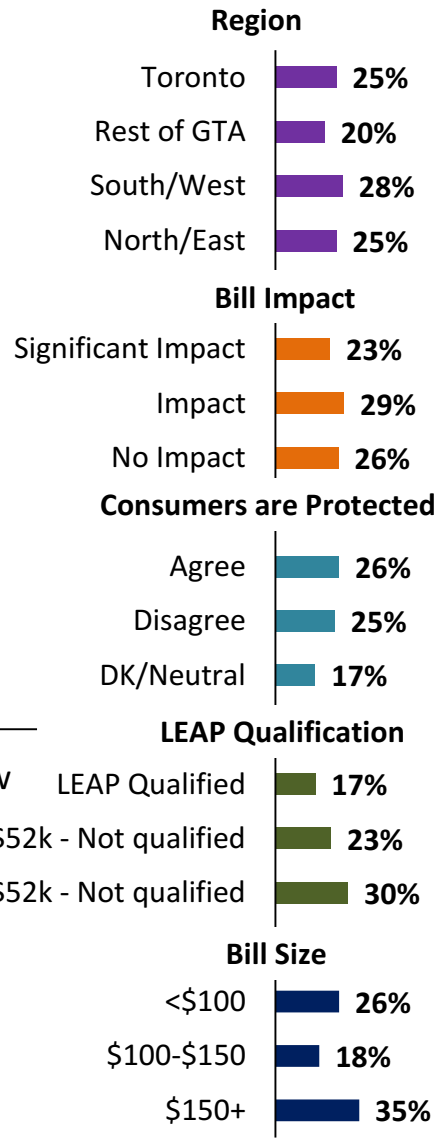
Familiarity with OPG's Share of the Bill

Q Before this survey, how familiar were you with the percentage of your electricity bill that goes to OPG?
[asked of all respondents, n=600]



Segmentation

*Those who say "**Familiar**":*



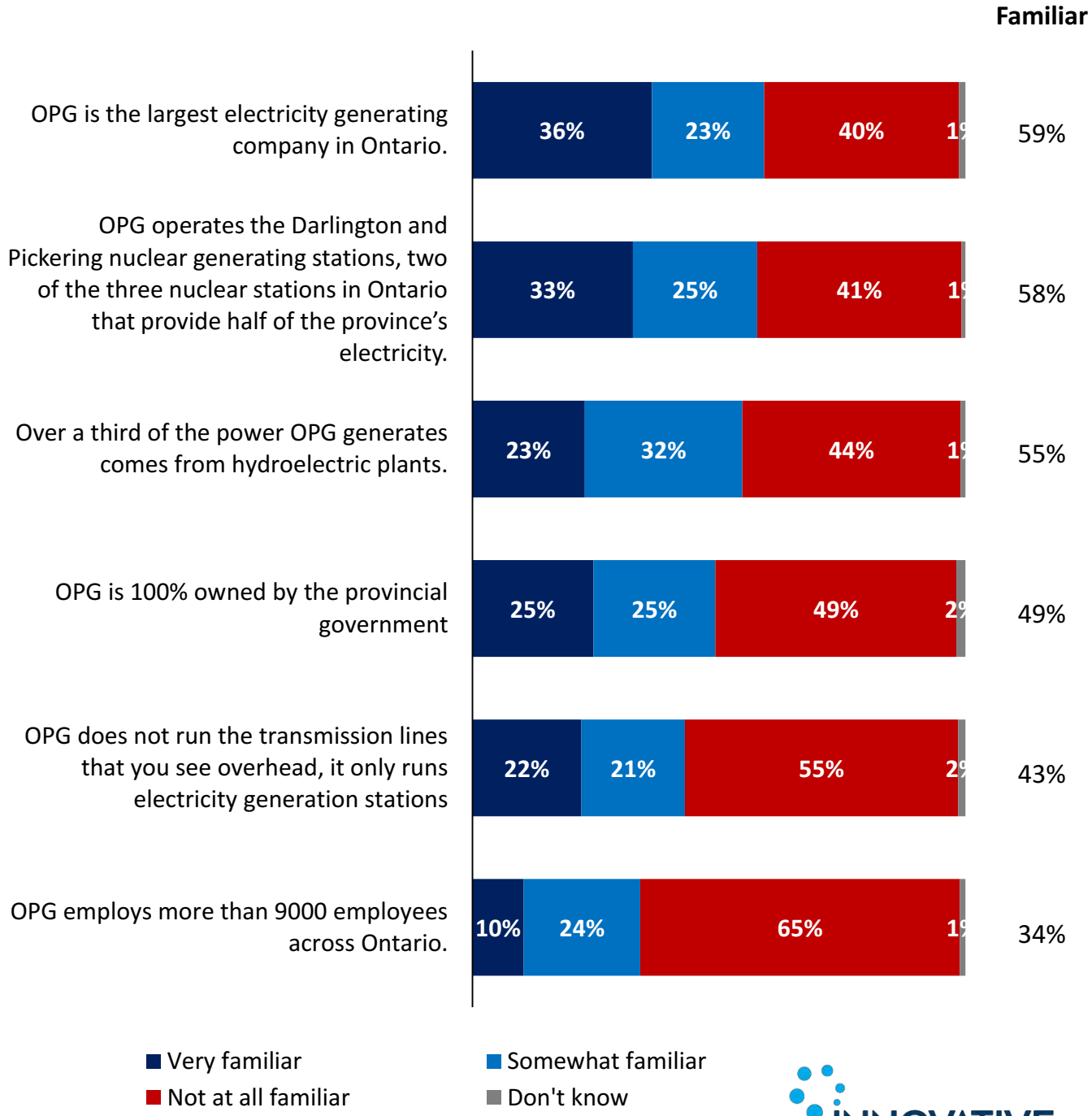
INNOVATIVE RESEARCH GROUP

Residential

Knowledge of OPG

Overview

Q I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.
[asked of all respondents, n=600]



Note: The items are arranged in descending order of total "familiar".

INNOVATIVE RESEARCH GROUP

Knowledge of OPG

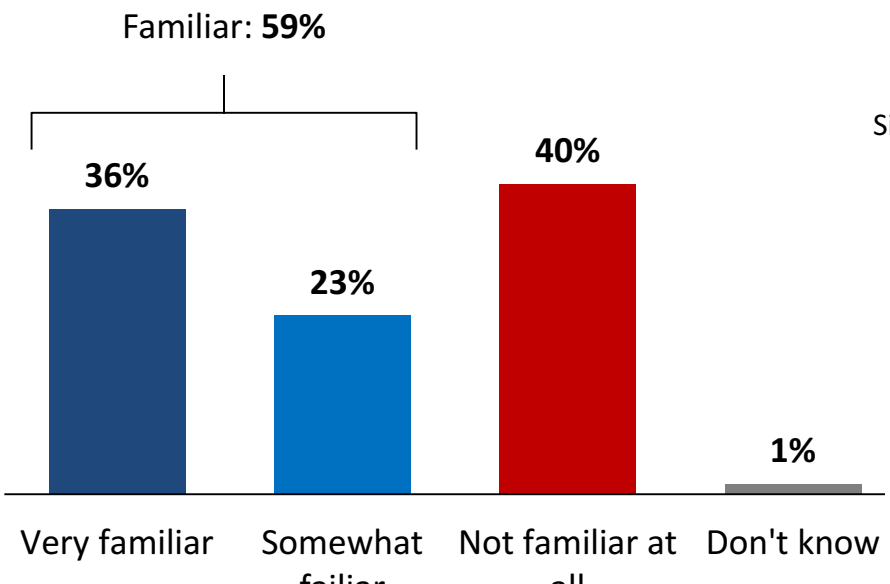
Ontario's Largest Electricity Generator

Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

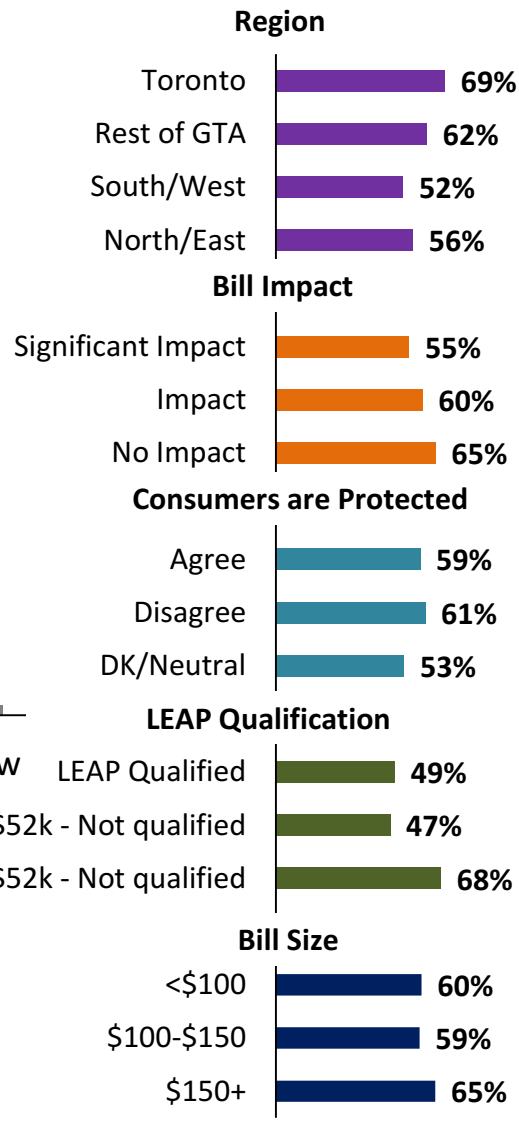
OPG is the largest electricity generating company in Ontario.

[asked of all respondents, n=600]



Segmentation

*Those who say "**Familiar**":*



INNOVATIVE RESEARCH GROUP

Knowledge of OPG

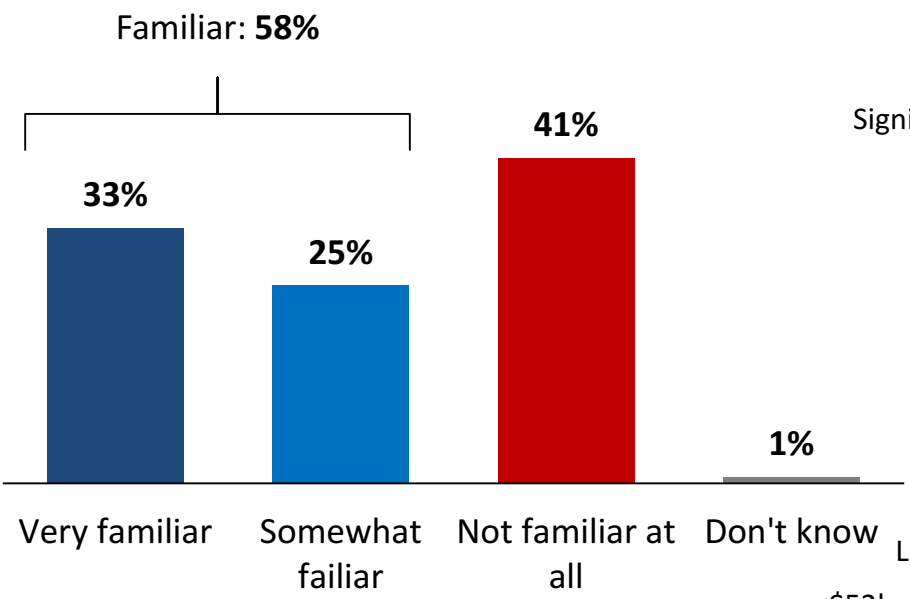
Nuclear Plants

Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

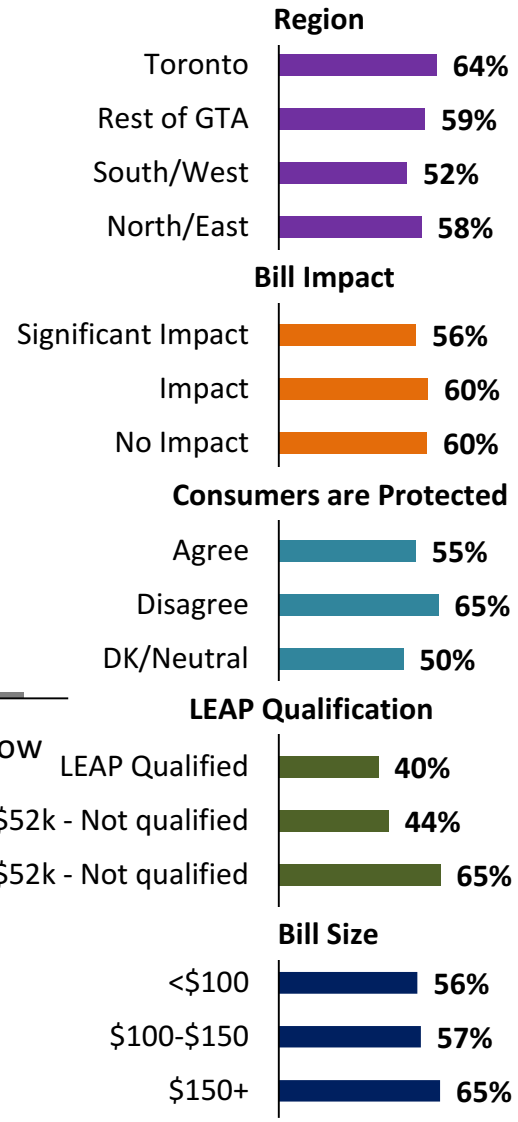
OPG operates the Darlington and Picker nuclear generating stations, two of the three nuclear stations in Ontario that provide half of the province's electricity.

[asked of all respondents, n=600]



Segmentation

*Those who say "**Familiar**":*



INNOVATIVE RESEARCH GROUP

Knowledge of OPG

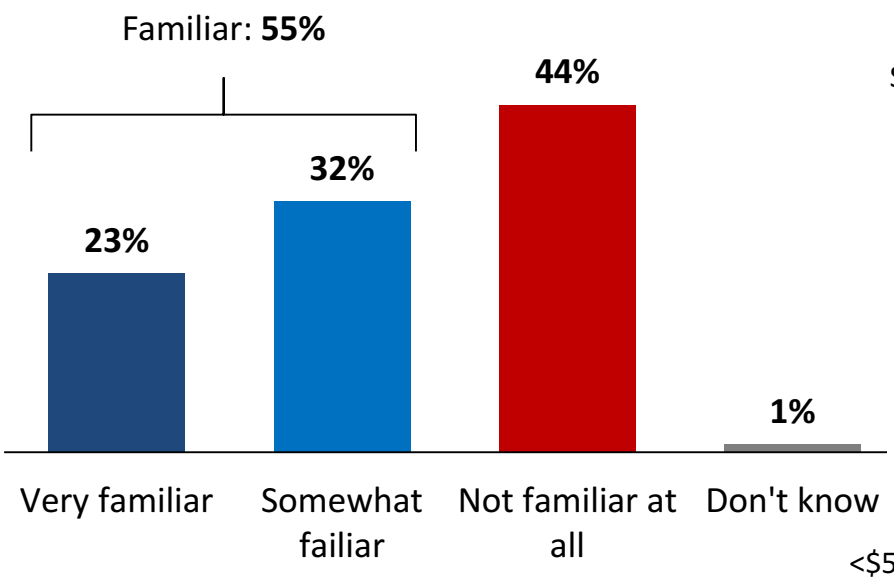
Hydroelectric Plants

Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

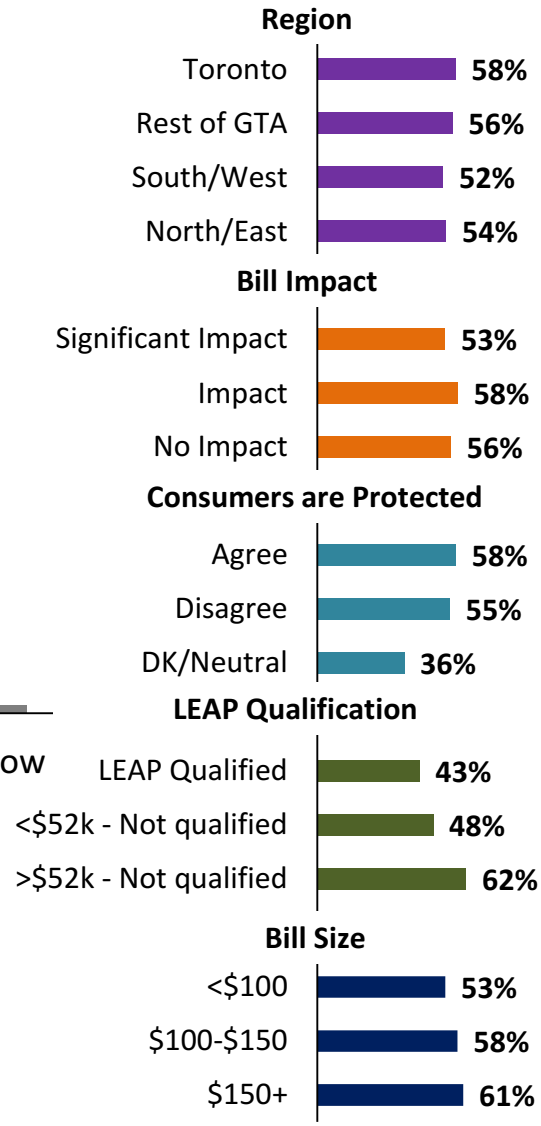
Over a third of the power OPG generates comes from hydroelectric plants.

[asked of all respondents, n=600]



Segmentation

*Those who say "**Familiar**":*



INNOVATIVE RESEARCH GROUP

Residential

Knowledge of OPG

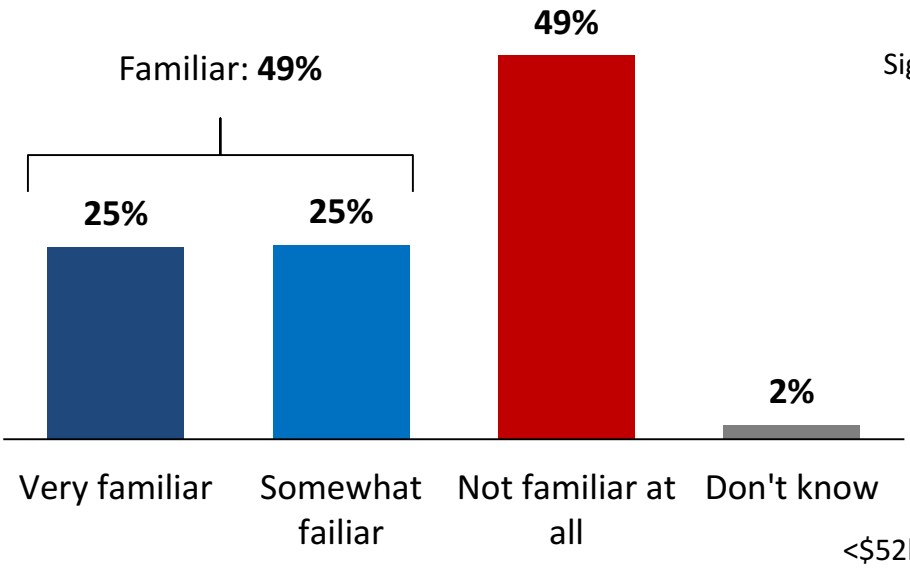
Government Ownership

Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

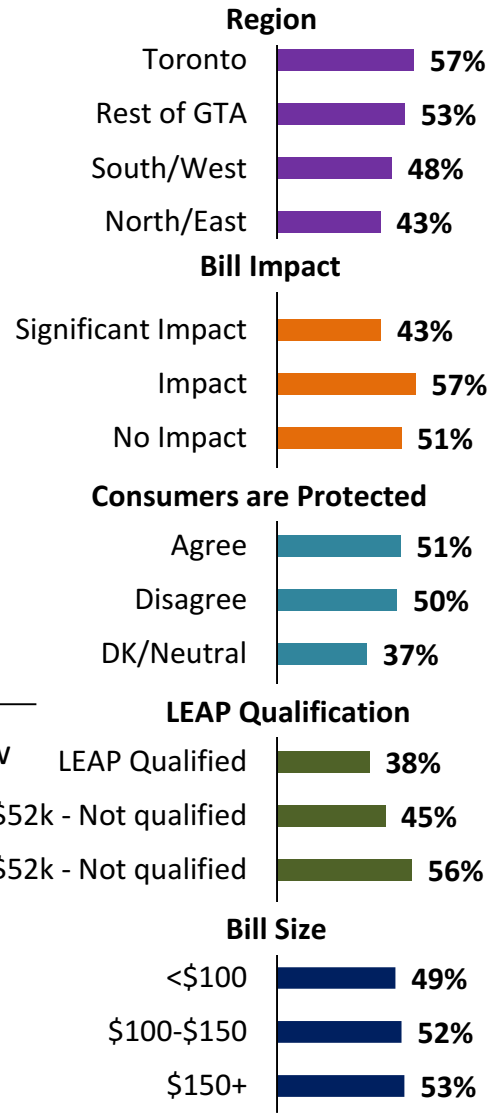
OPG is 100% owned by the provincial government

[asked of all respondents, n=600]



Segmentation

*Those who say "**Familiar**":*



INNOVATIVE RESEARCH GROUP

Residential

Knowledge of OPG

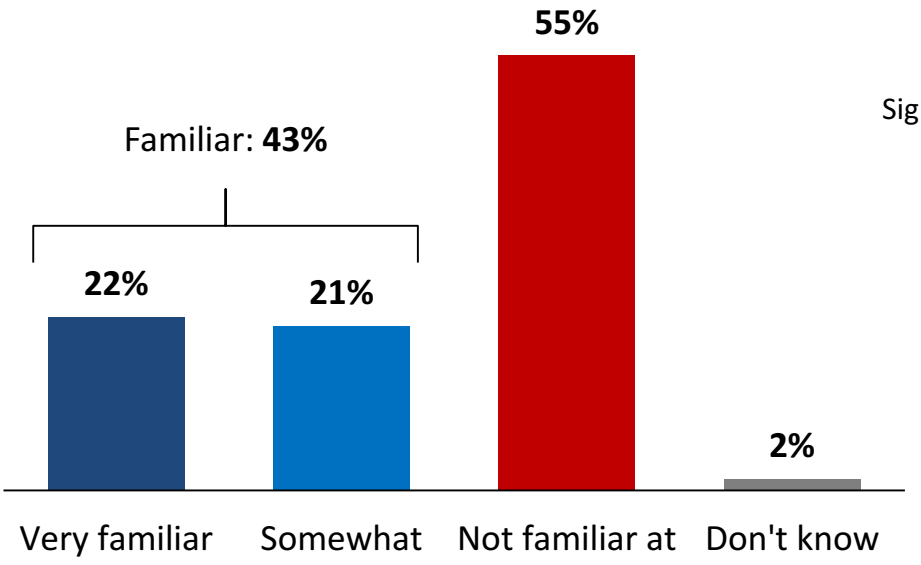
Electricity Generator

Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

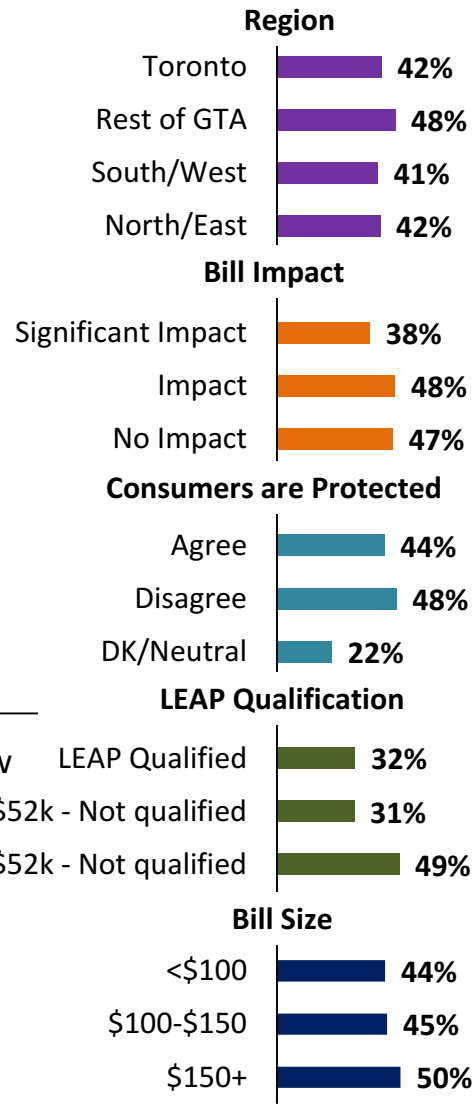
OPG does not run the transmission lines you see overhead, it only runs electricity generation stations

[asked of all respondents, n=600]



Segmentation

*Those who say "**Familiar**":*



INNOVATIVE RESEARCH GROUP

Knowledge of OPG

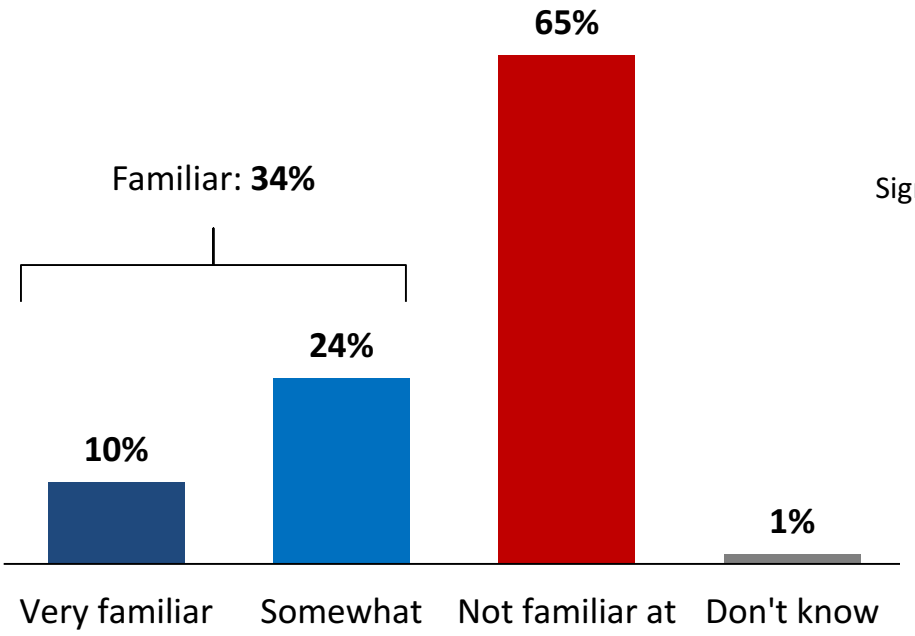
Number of Employees

Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

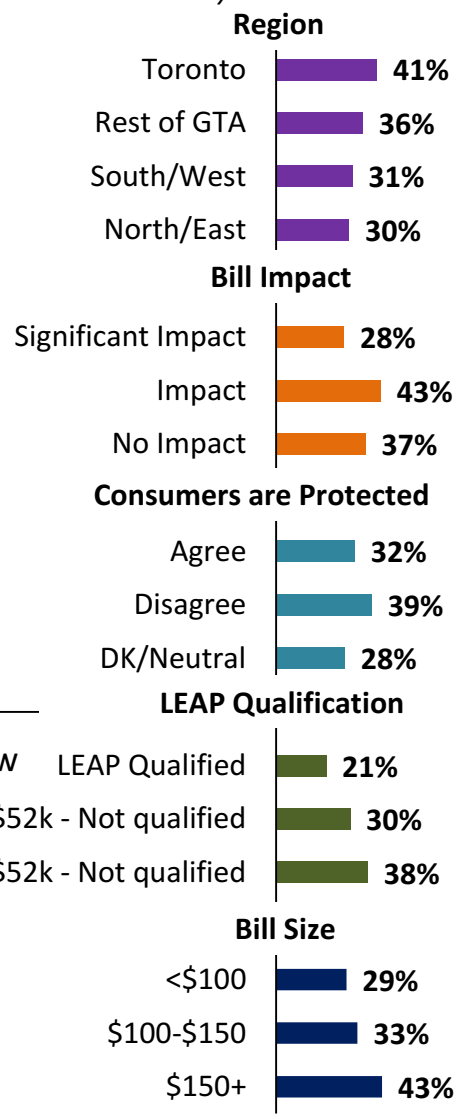
OPG employees more than 9000 employees across Ontario

[asked of all respondents, n=600]



Segmentation

*Those who say "**Familiar**":*



INNOVATIVE RESEARCH GROUP

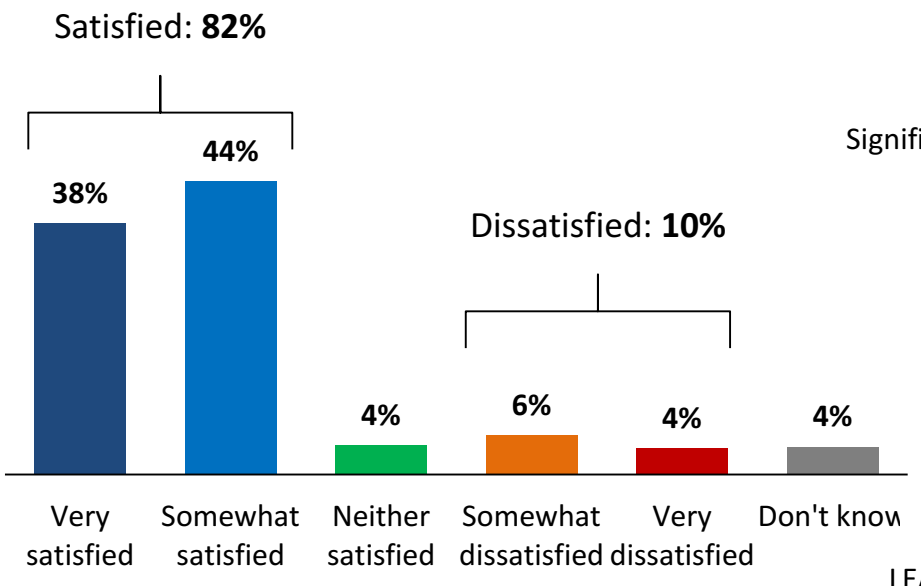
INNOVATIVE RESEARCH GROUP

Customer Needs & Preferences

Satisfaction with OPG

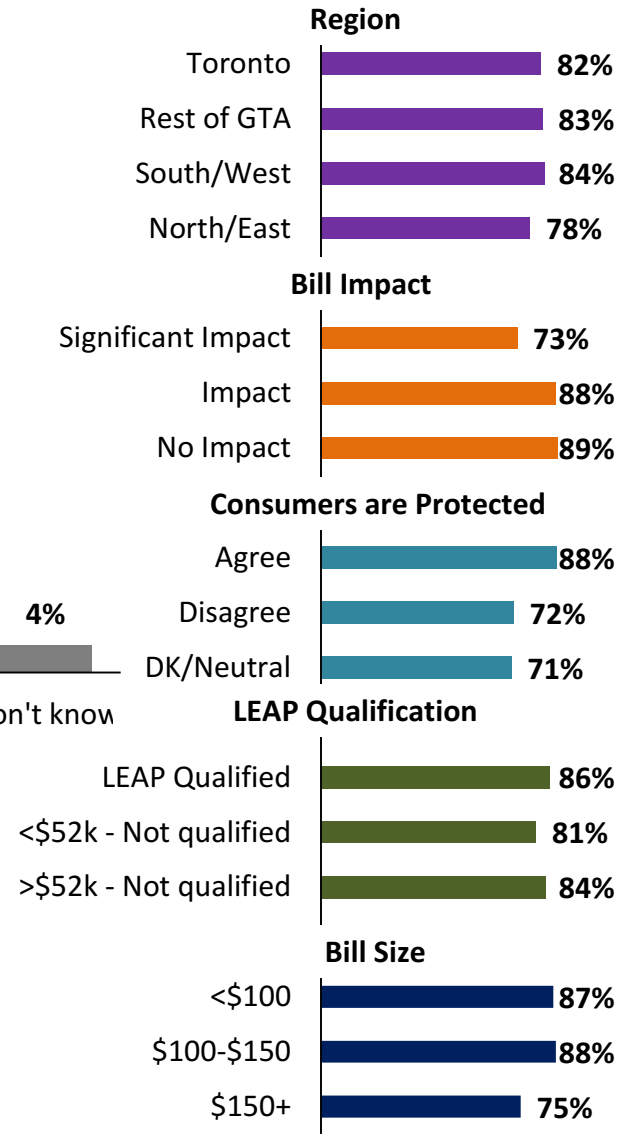
Q In general, how satisfied or dissatisfied are you with the services you receive from Ontario Power Generation? Would you say you are very satisfied, somewhat satisfied, somewhat dissatisfied, or very dissatisfied?

[asked of all respondents, n=600]



Segmentation

*Those who say "**Satisfied**":*



INNOVATIVE RESEARCH GROUP

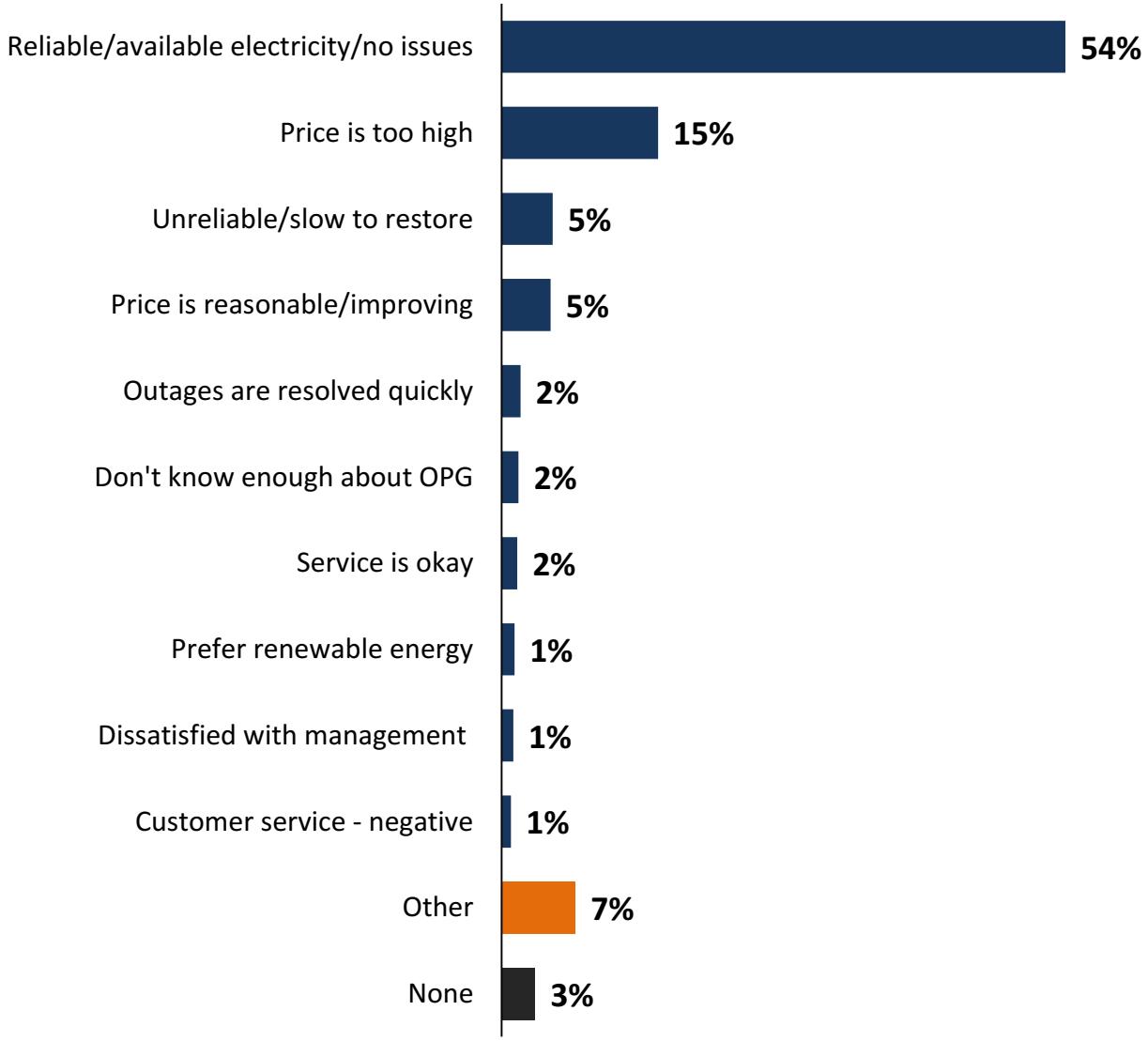
Residential

Satisfaction with OPG

Why Satisfied?

Q Why do you feel this way?
[asked of all respondents]

Amongst those who answered: 'Very satisfied' or 'Somewhat satisfied' (n=490)



Note: 'Refused' (2%) not shown.

INNOVATIVE RESEARCH GROUP

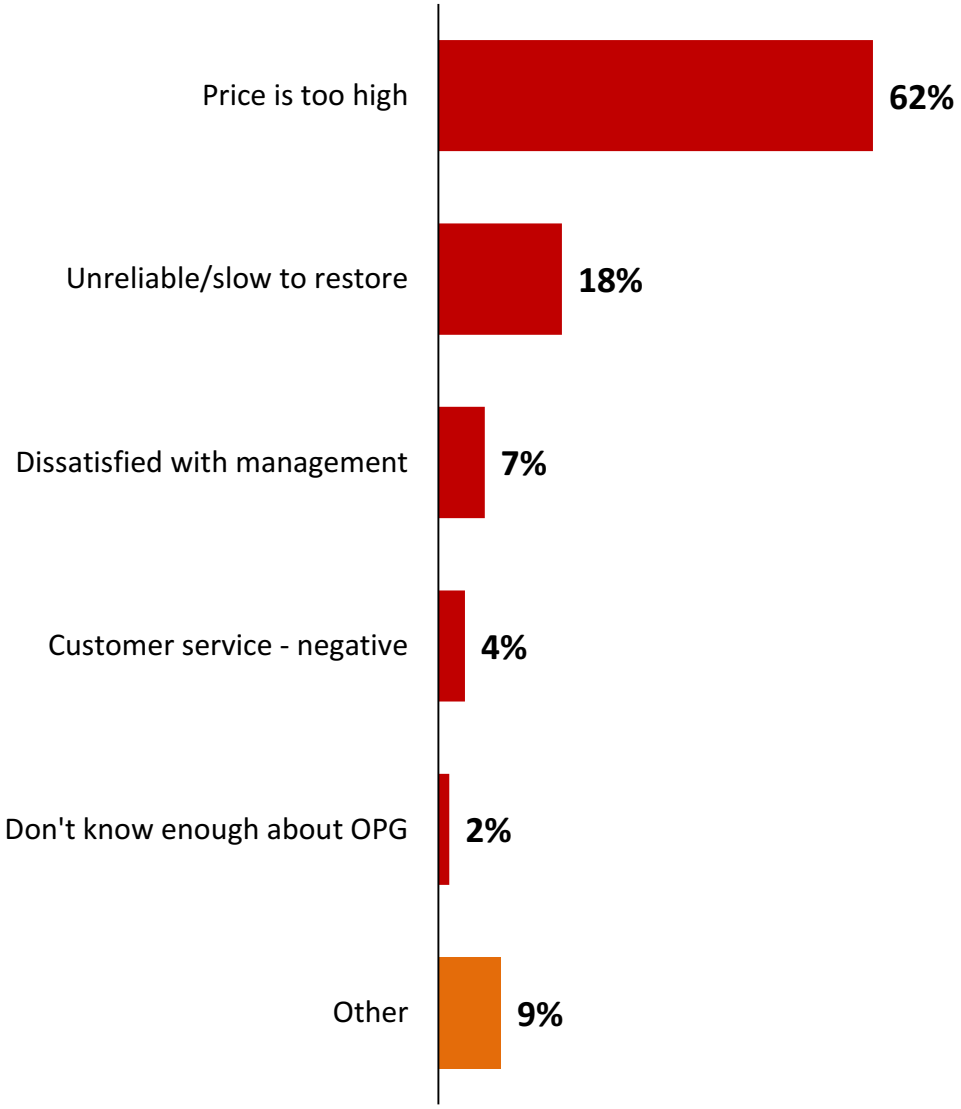
Residential

Satisfaction with OPG

Why Dissatisfied?

Q Why do you feel this way?
[asked of all respondents]

Amongst those who answered: 'Very dissatisfied' or 'Somewhat dissatisfied' (n=59)



INNOVATIVE RESEARCH GROUP

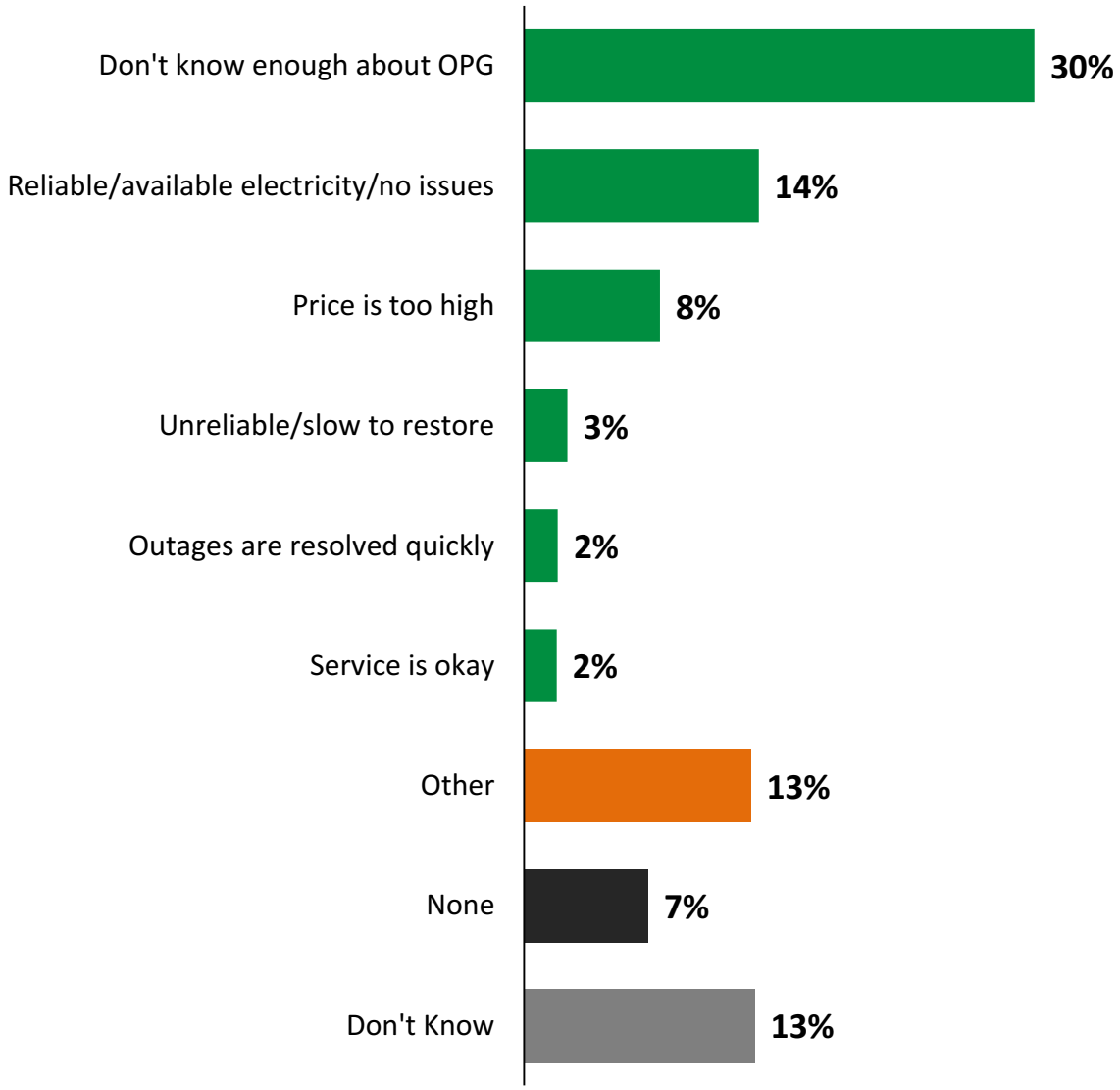
Residential

Satisfaction with OPG

Why Neutral?

Q Why do you feel this way?
[asked of all respondents]

Amongst those who answered: 'Neither satisfied nor dissatisfied' or 'Don't know' (n=51)



Note: 'Refused' (9%) not shown.

INNOVATIVE RESEARCH GROUP

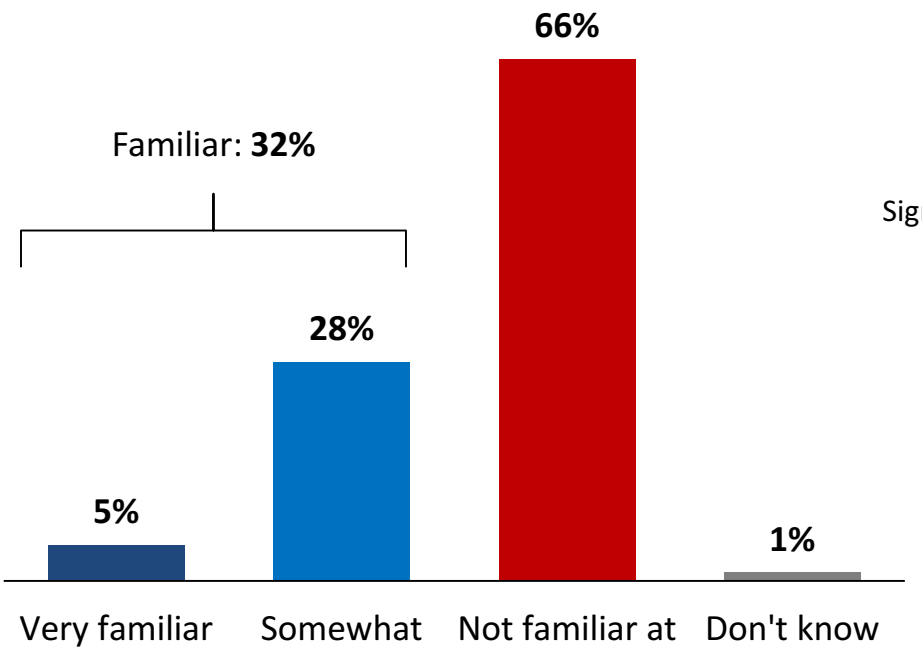
Awareness of the Long-Term Energy Plan

Q

The Ontario government determines the energy mix for the province and forecasts long term demand for energy in the *Long-Term Energy Plan*. OPG is required by law to follow the direction set by the government in the *Long-Term Energy Plan*.

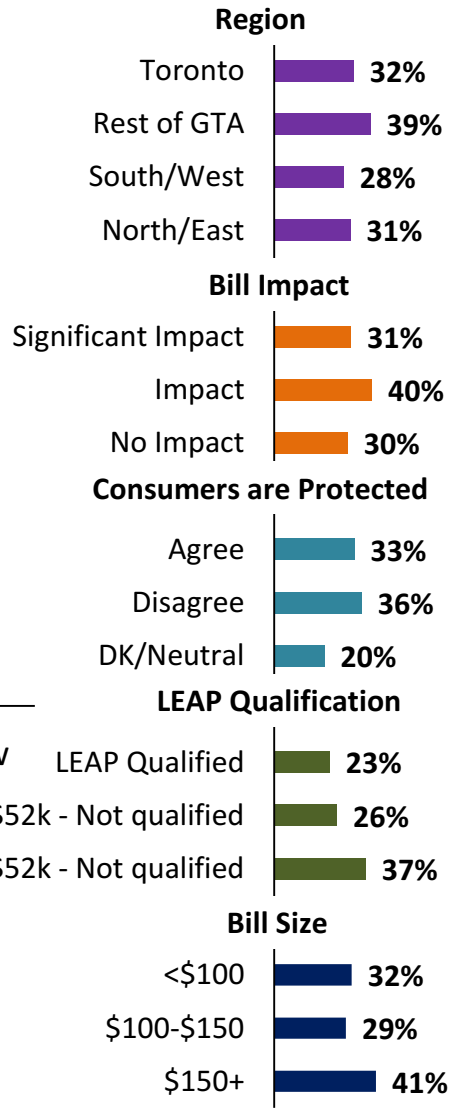
Before this survey how familiar were you with the *Long-Term Energy Plan*?

[asked of all respondents, n=600]



Segmentation

*Those who say "**Familiar**":*



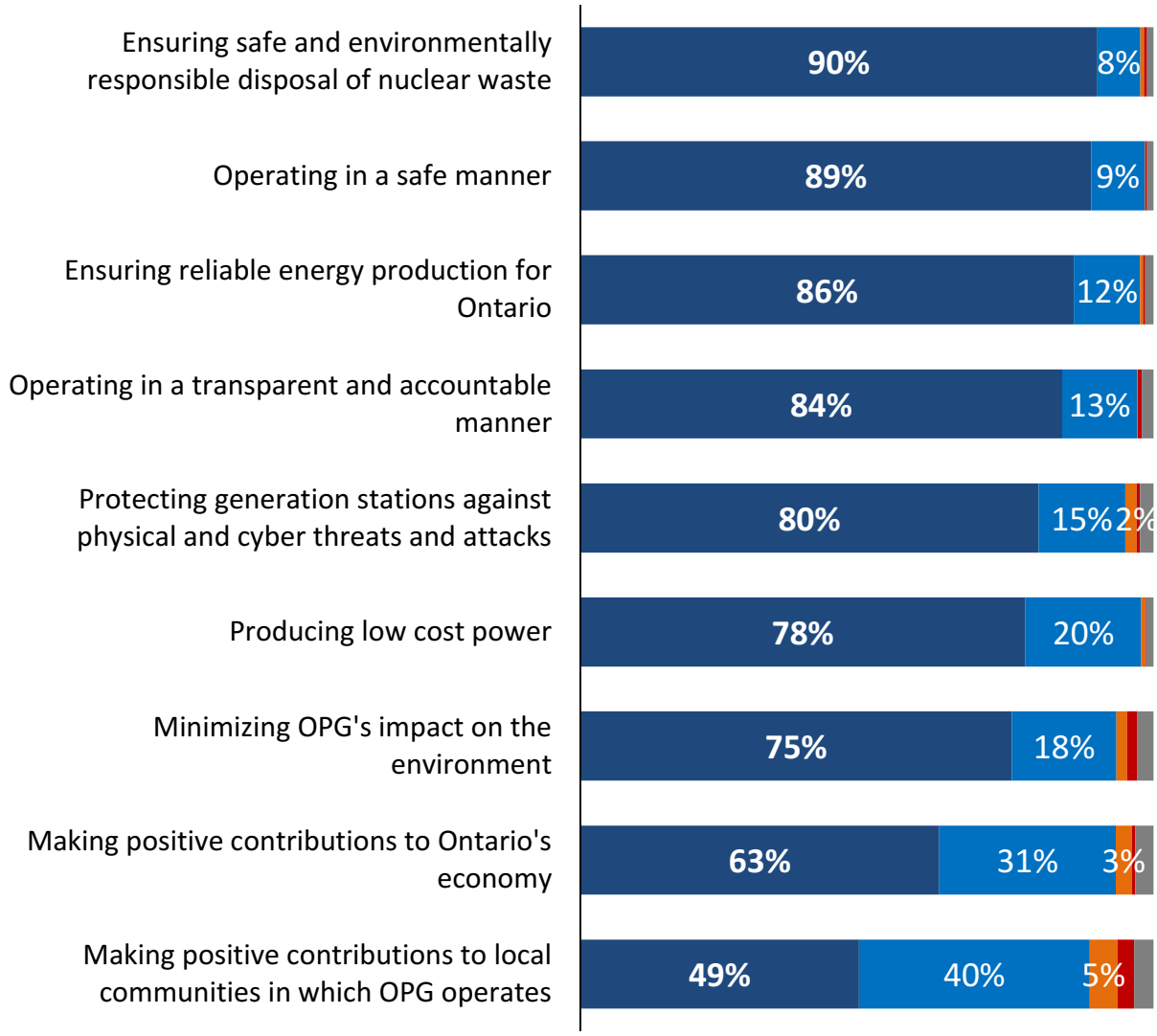
INNOVATIVE RESEARCH GROUP

Residential

Outcome Priorities

Overview of Importance Ratings

Q While the government and regulators tell OPG what it must do, OPG has some choices to make in how it does those things. I am going to read you a list of possible outcomes that were developed based on earlier research conducted with people from all around Ontario.
For each of the following, please tell me how important it is to you.
[asked of all respondents, n=600]



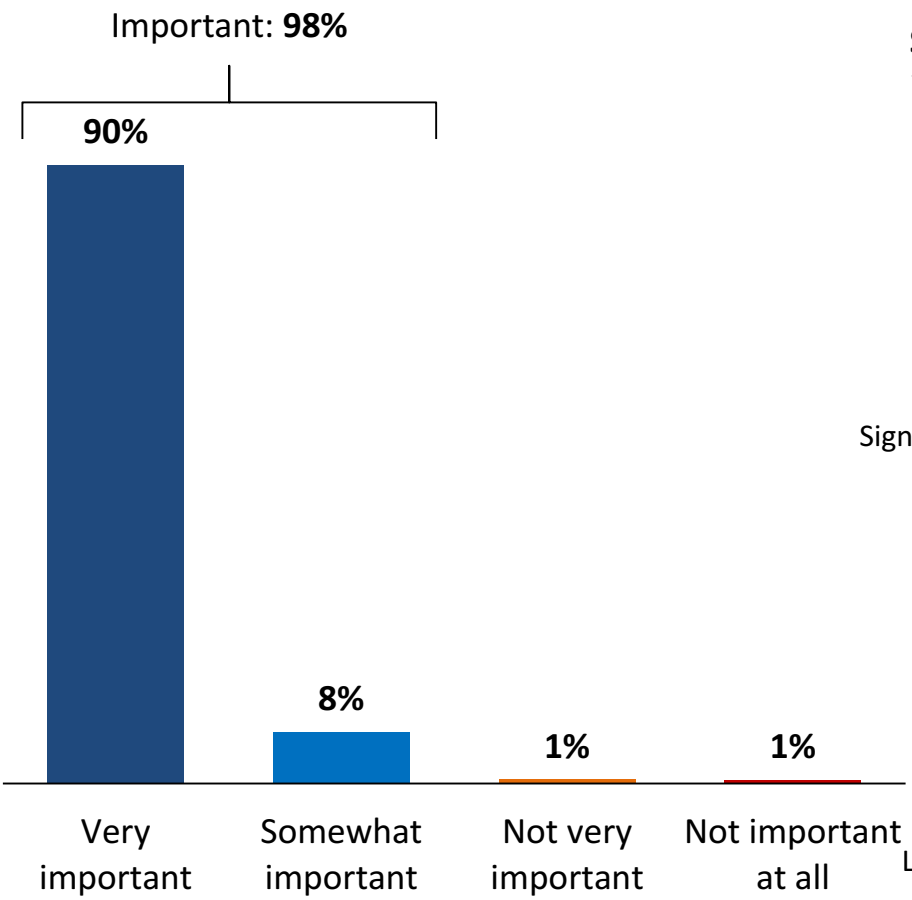
Note: The items are arranged in descending order of "very important".

INNOVATIVE RESEARCH GROUP

Outcome Priorities

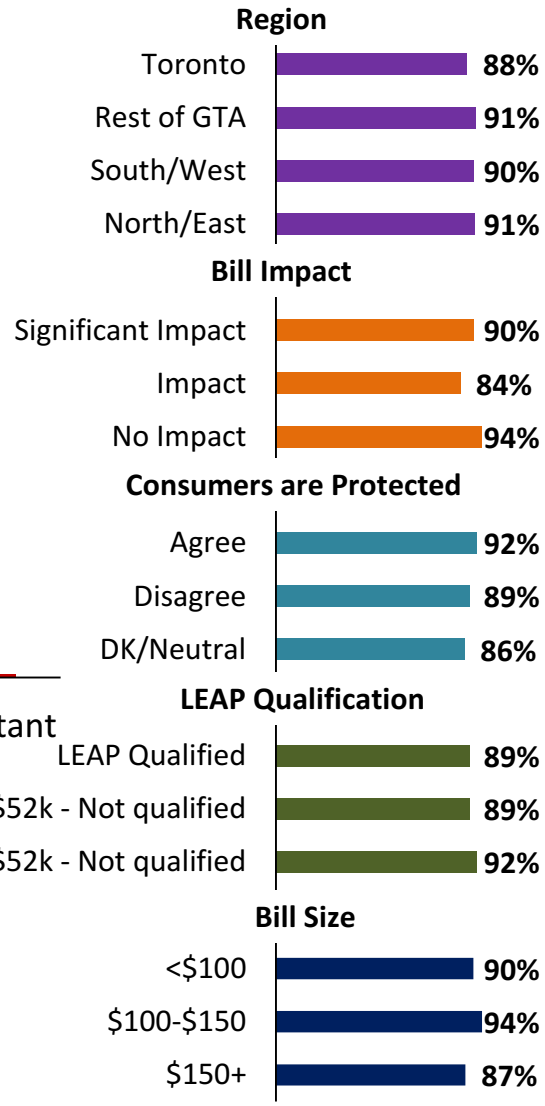
Nuclear Waste Management

Q For each of the following, please tell me how important it is to you.
Ensuring safe and environmentally responsible disposal of nuclear waste
[asked of all respondents, n=600]



Segmentation

*Those who say "**Very important**":*



Note: 'Don't know' (1%) not shown.

INNOVATIVE RESEARCH GROUP

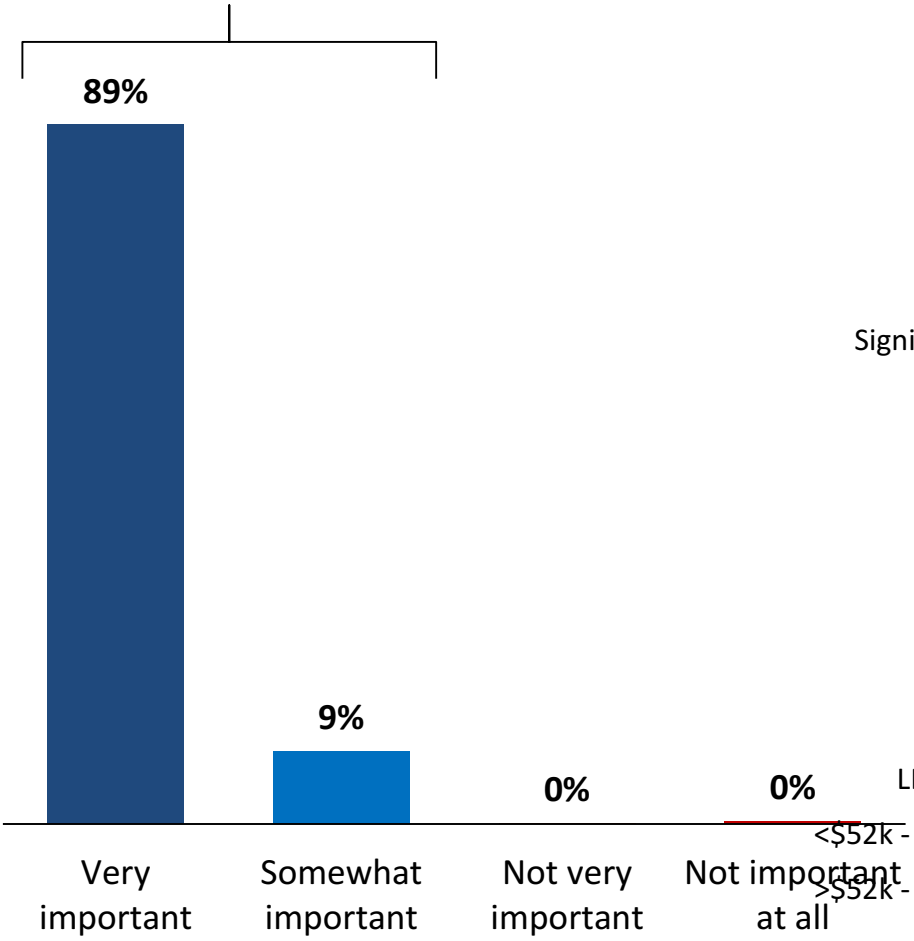
Residential

Outcome Priorities

Operating Safely

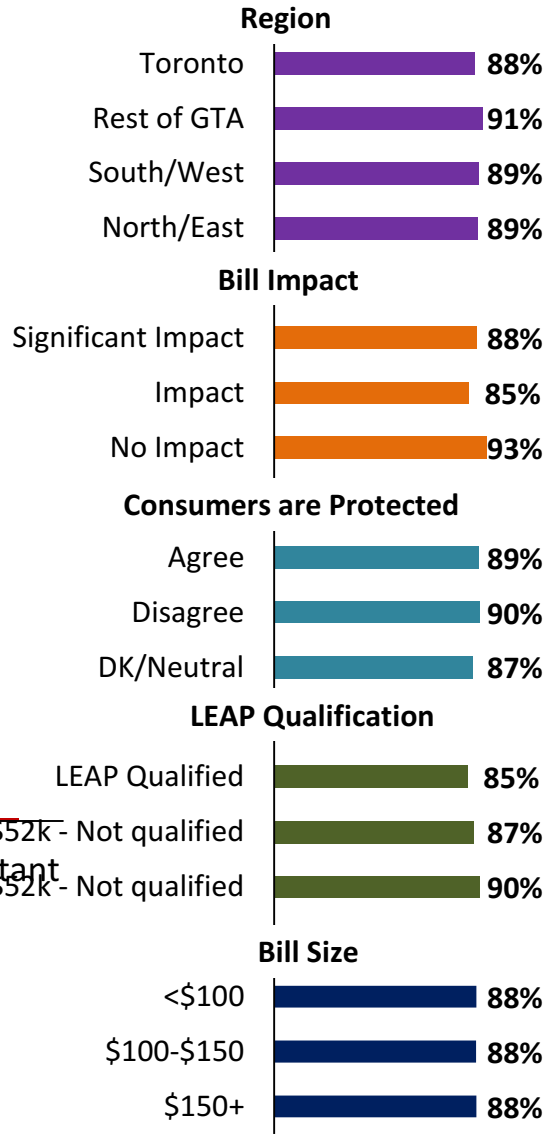
Q For each of the following, please tell me how important it is to you.
Operating in a safe manner
[asked of all respondents, n=600]

Important: **98%**



Segmentation

*Those who say "**Very important**":*



Note: 'Don't know' (1%) not shown.

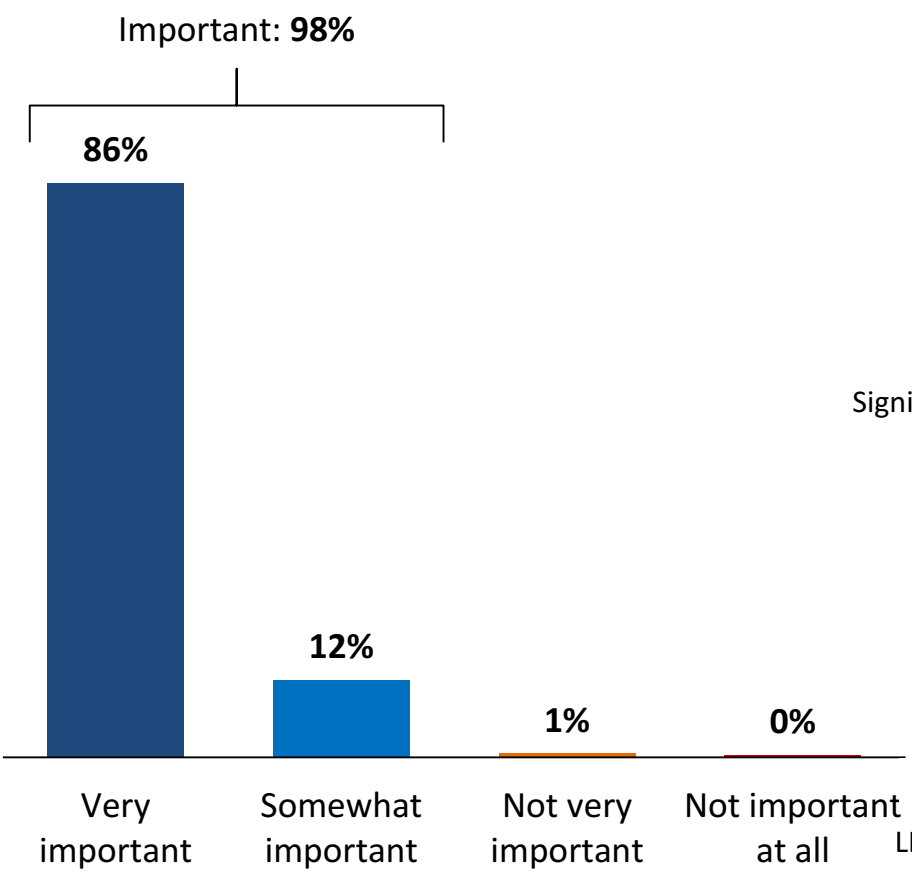
INNOVATIVE RESEARCH GROUP

Residential

Outcome Priorities

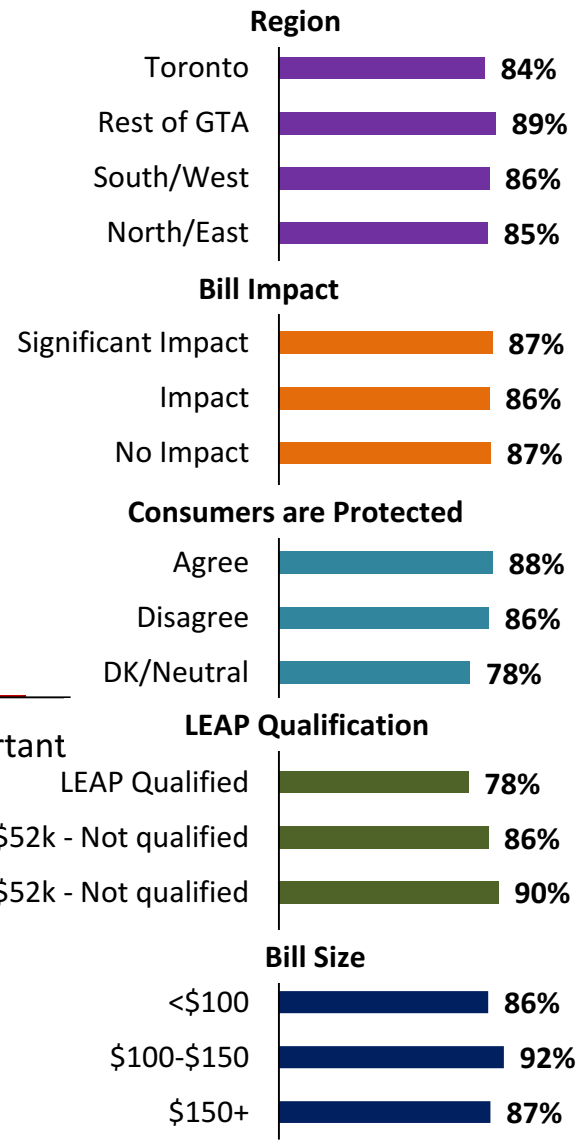
Reliable Production

Q For each of the following, please tell me how important it is to you.
Ensuring reliable energy production for Ontario
[asked of all respondents, n=600]



Segmentation

*Those who say "**Very important**":*



Note: 'Don't know' (1%) not shown.

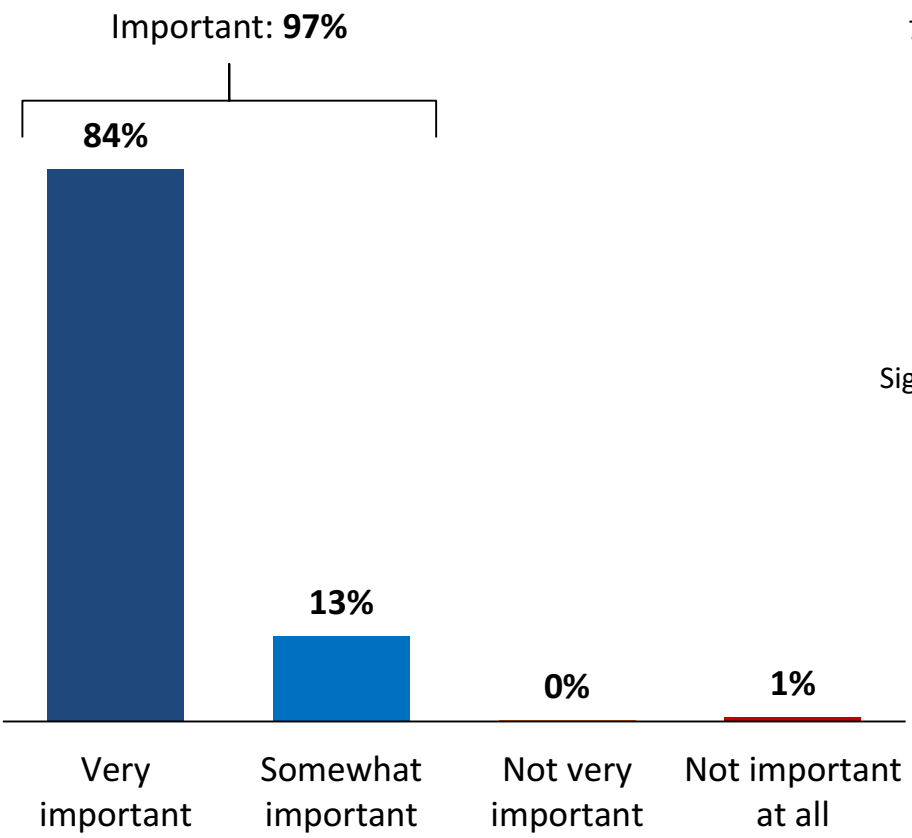
INNOVATIVE RESEARCH GROUP

Residential

Outcome Priorities

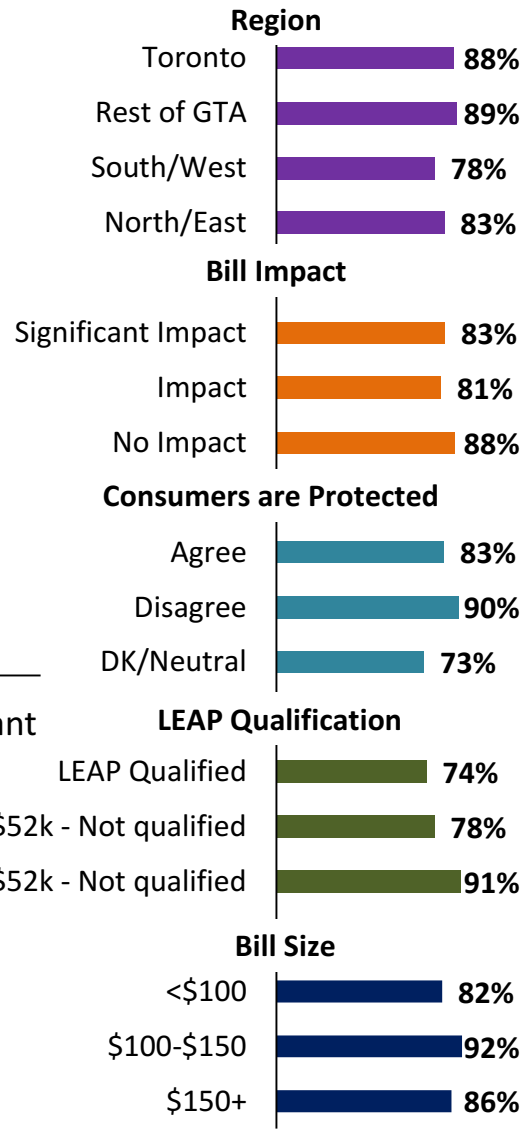
Transparency & Accountability

Q For each of the following, please tell me how important it is to you.
Operating in a transparent and accountable manner
[asked of all respondents, n=600]



Segmentation

*Those who say "**Very important**":*



Note: 'Don't know' (2%) not shown.

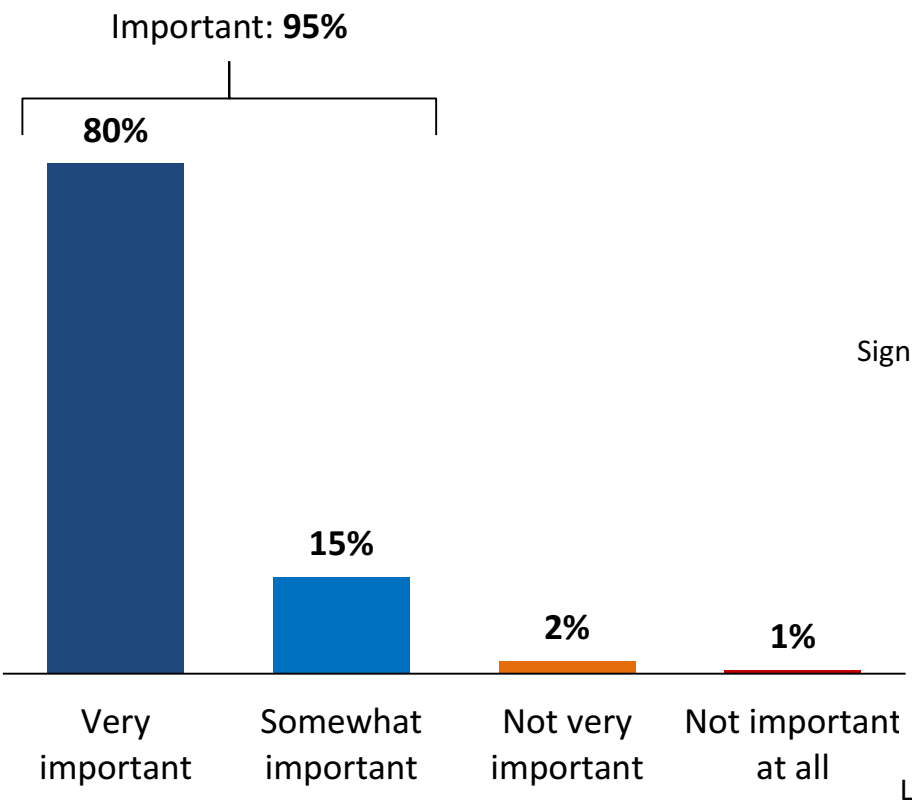
INNOVATIVE RESEARCH GROUP

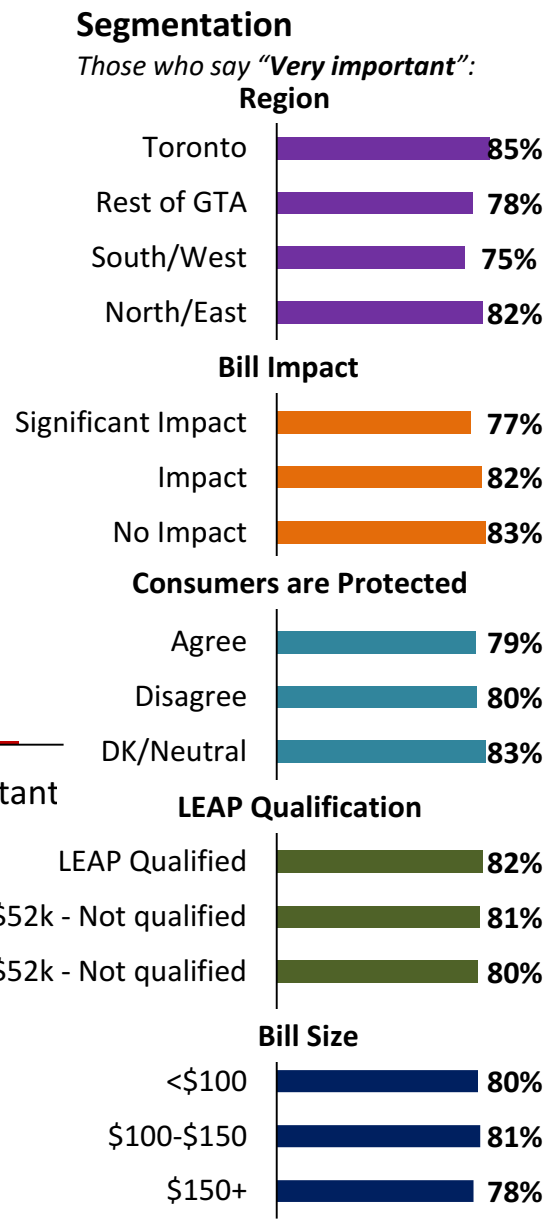
Residential

Outcome Priorities

Protecting Against Threats

Q For each of the following, please tell me how important it is to you.
Protecting generation stations against physical and cyber threats and attacks
[asked of all respondents, n=600]





Note: 'Don't know' (3%) not shown.

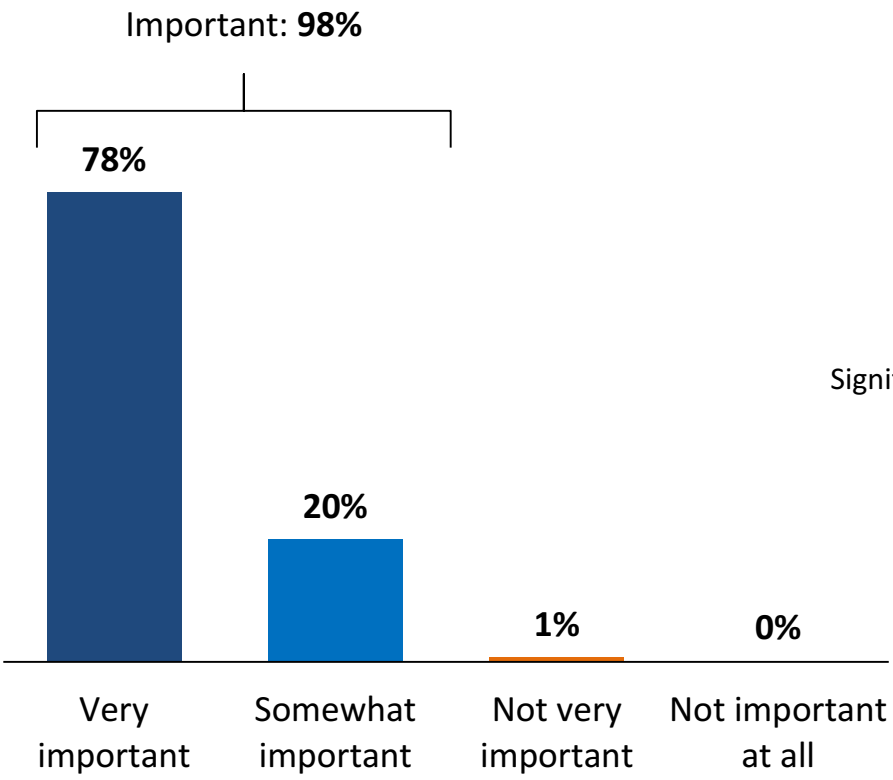
INNOVATIVE RESEARCH GROUP

Residential

Outcome Priorities

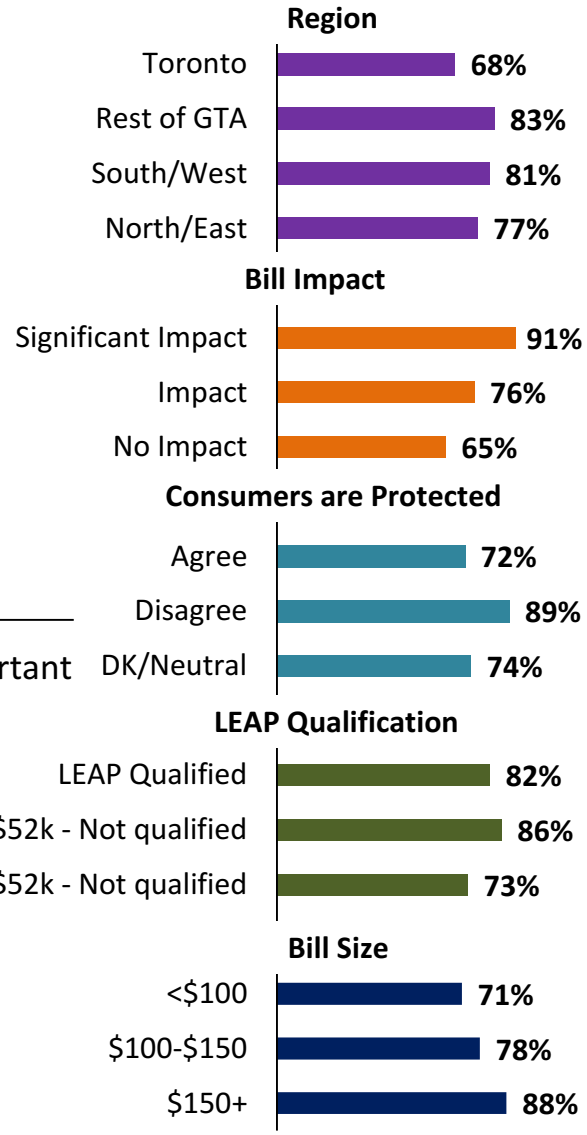
Producing Low Cost Power

Q For each of the following, please tell me how important it is to you.
Producing low cost power
[asked of all respondents, n=600]



Segmentation

*Those who say "**Very important**":*



Note: 'Don't know' (1%) not shown.

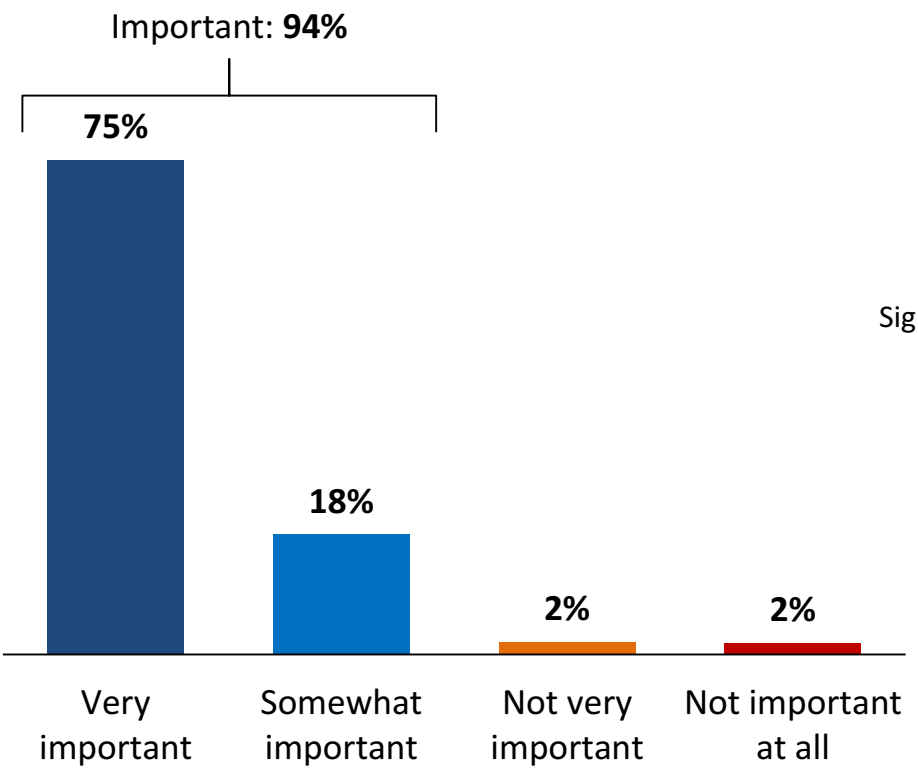
INNOVATIVE RESEARCH GROUP

Outcome Priorities

Minimizing Environmental Impact

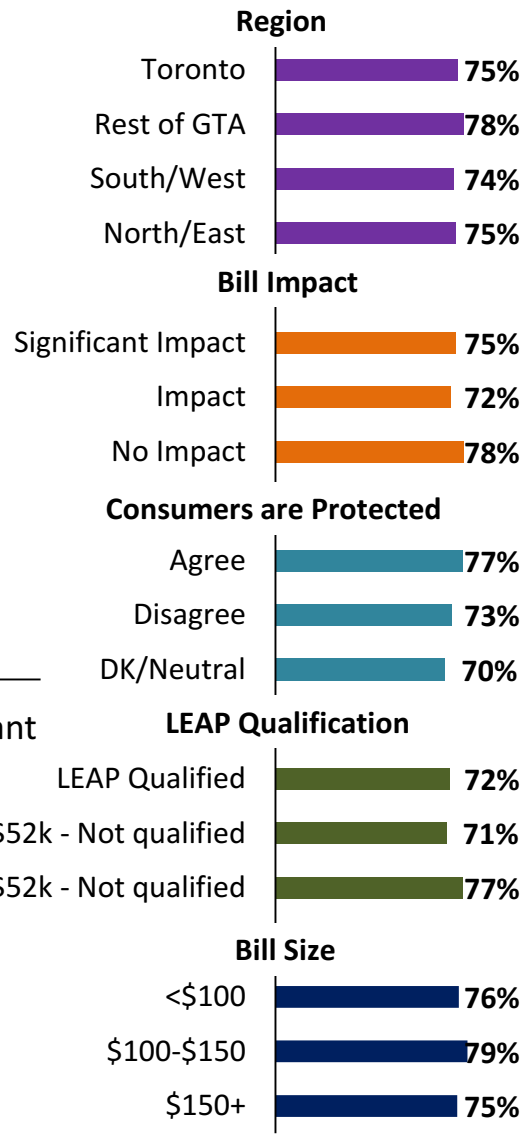
Q

For each of the following, please tell me how important it is to you.
Minimizing OPG's impact on the environment
[asked of all respondents, n=600]



Segmentation

*Those who say "**Very important**":*



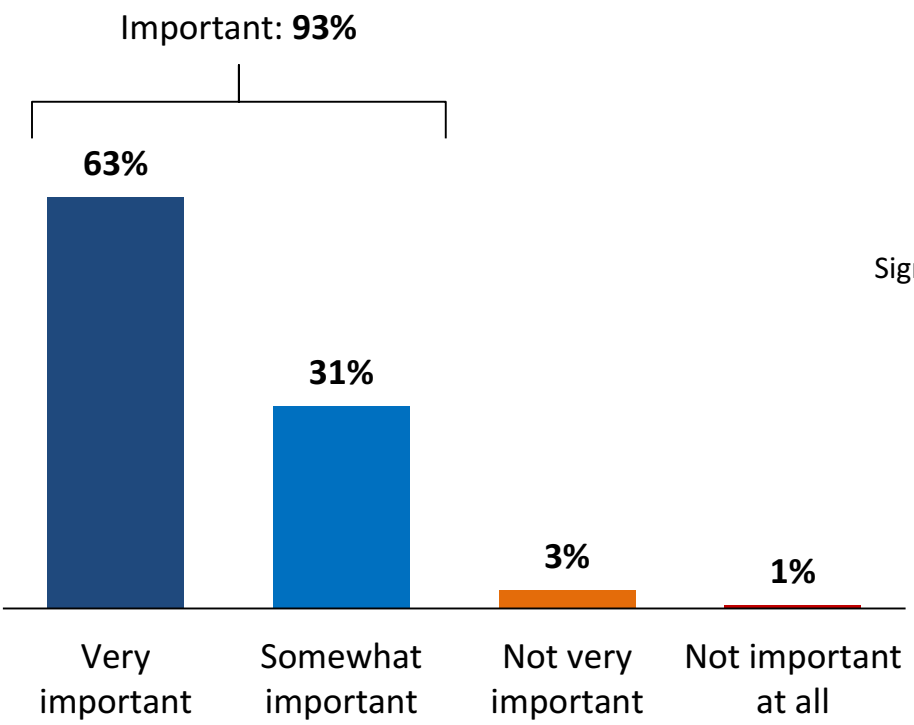
Note: 'Don't know' (3%) not shown.

Residential

Outcome Priorities

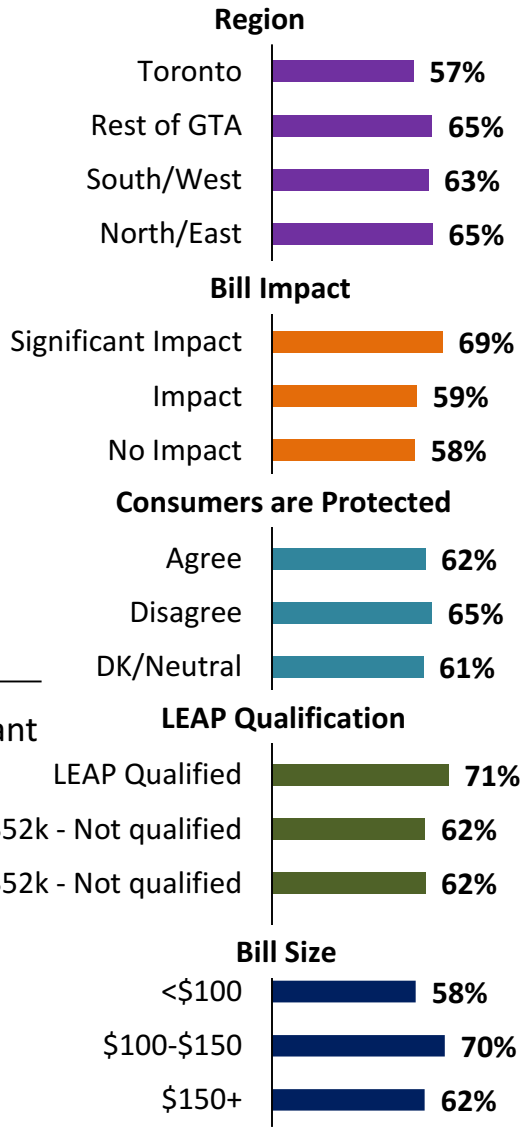
Contributing to Ontario's Economy

Q For each of the following, please tell me how important it is to you.
Making positive contributions to Ontario's economy
[asked of all respondents, n=600]



Segmentation

*Those who say "**Very important**":*



Note: 'Don't know' (3%) not shown.

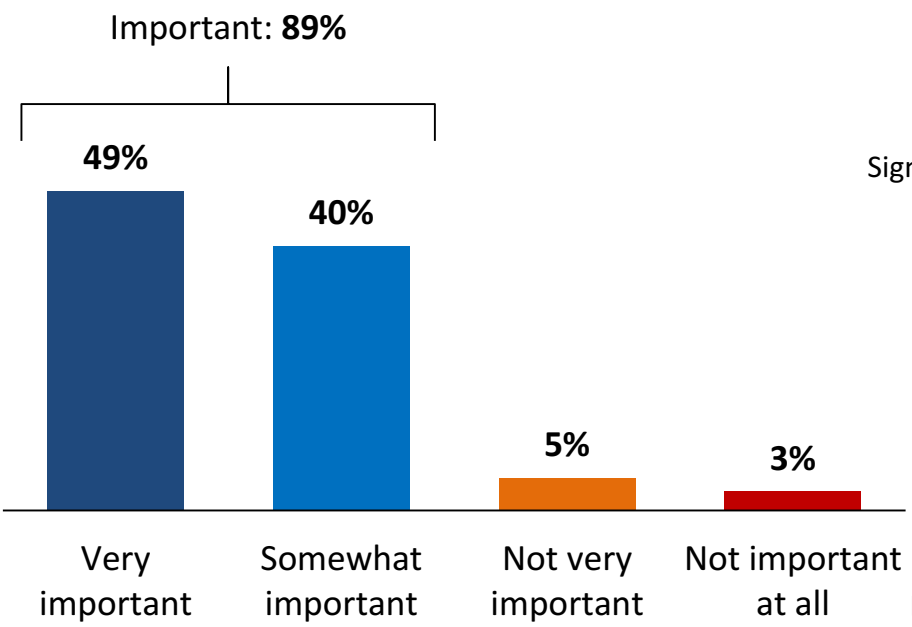
INNOVATIVE RESEARCH GROUP

Residential

Outcome Priorities

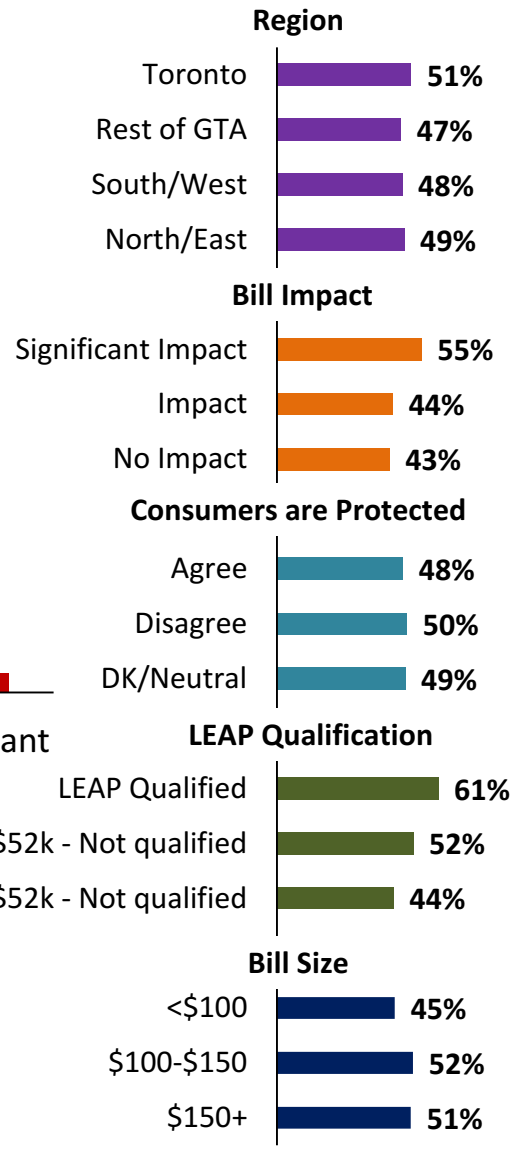
Contributing to Local Communities

Q For each of the following, please tell me how important it is to you.
Making positive contributions to local communities in which OPG operates
[asked of all respondents, n=600]



Segmentation

*Those who say "**Very important**":*



Note: 'Don't know' (3%) not shown.

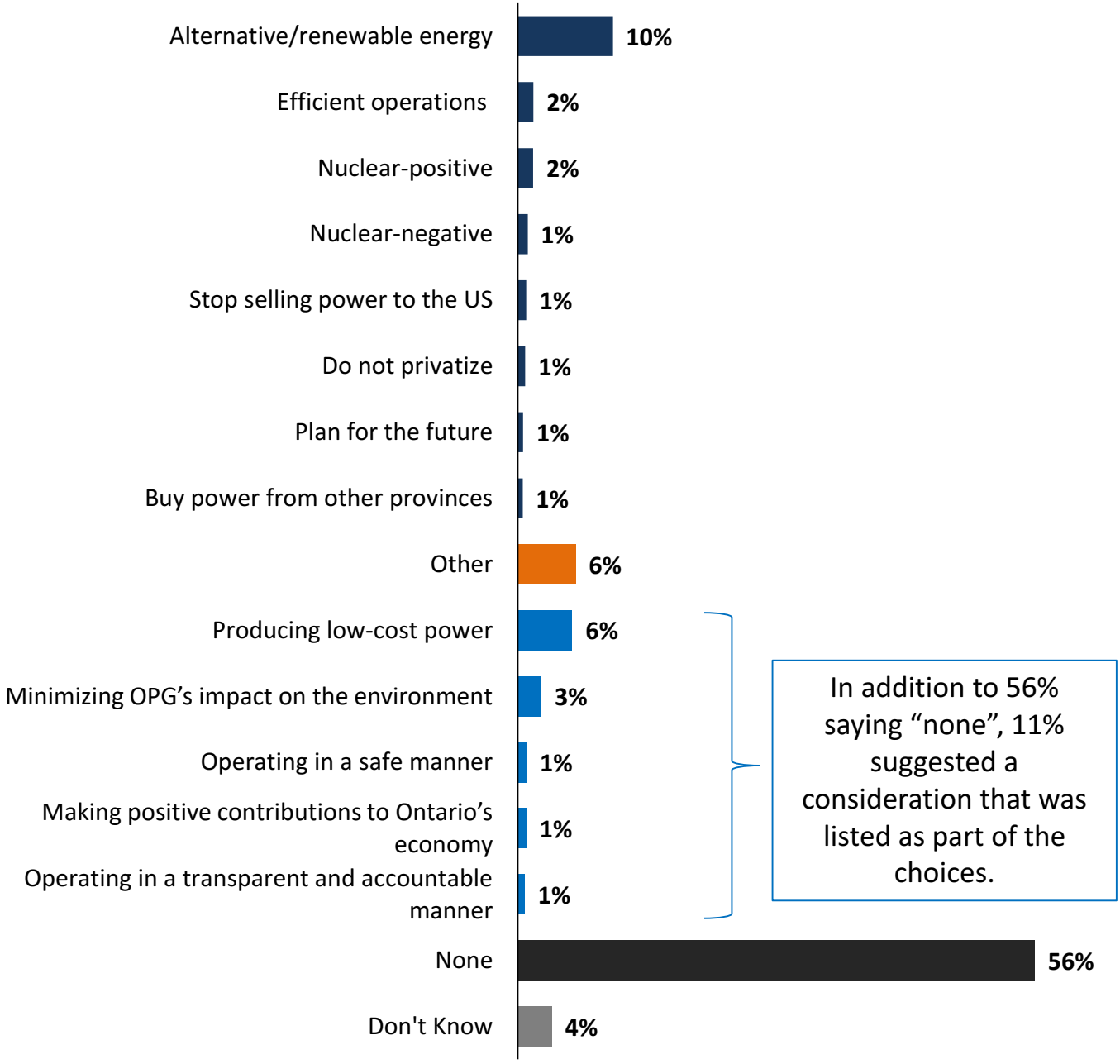
INNOVATIVE RESEARCH GROUP

Residential

Outcome Priorities

Additional Outcomes

Q Are there any other outcomes you feel OPG should be considering in developing its plans?
[asked of all respondents, n=600]



Note: 'Refused' (5%) not shown.

INNOVATIVE RESEARCH GROUP

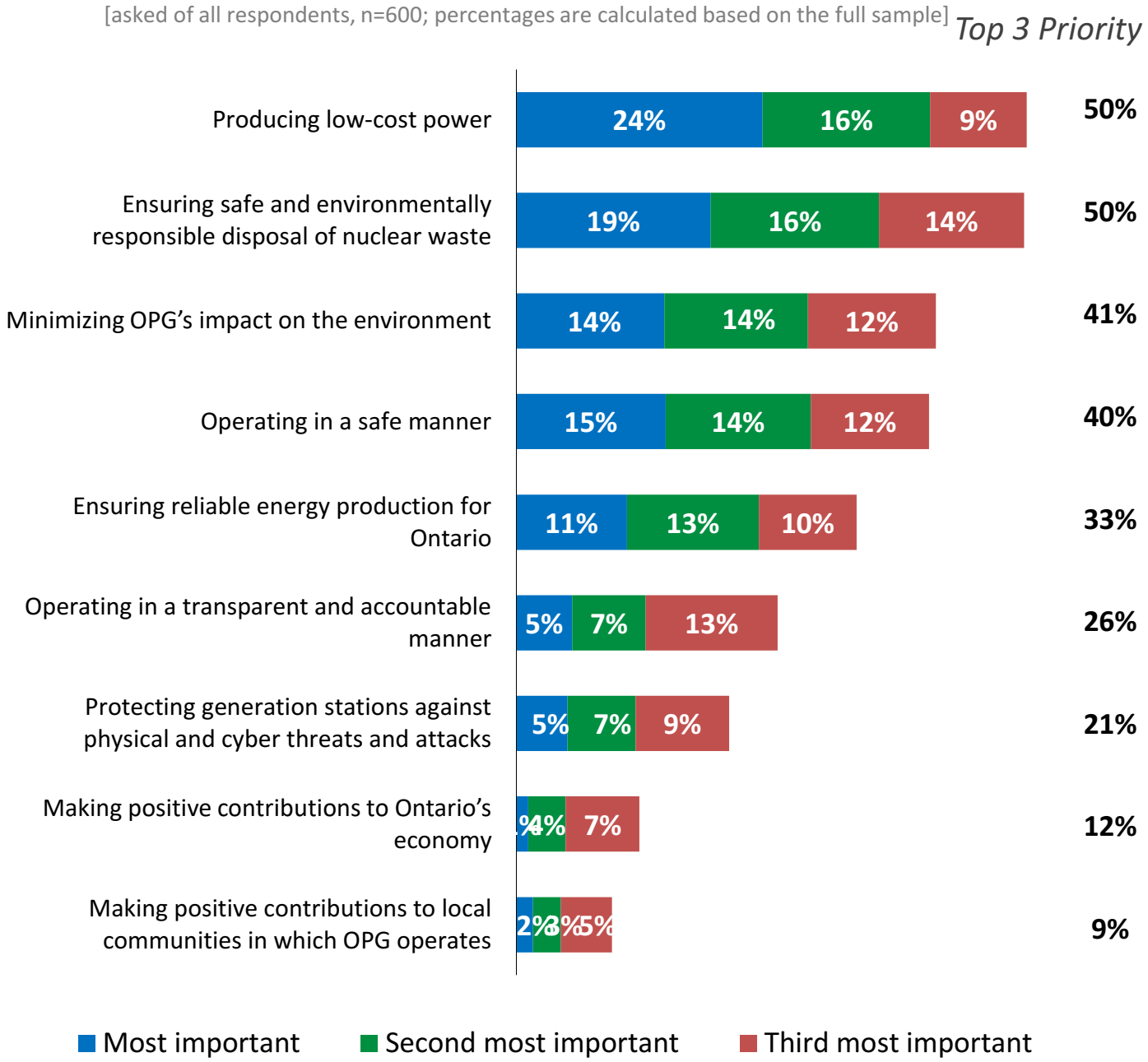
Residential

Outcome Priorities

Ranking the Top Three

Q I am going to read you that list of outcomes again, and I would like you to tell me which one you feel should be OPG's first priority. And which is the second most important? And which is the third most important?

[asked of all respondents, n=600; percentages are calculated based on the full sample]



Note: 'Don't know' not shown.

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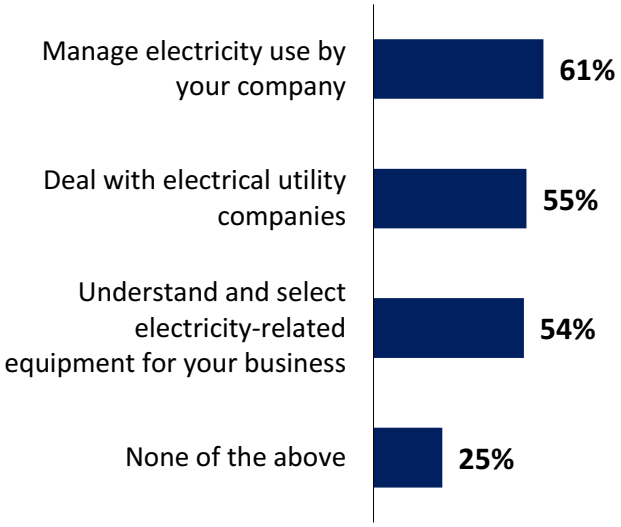
Small Business Survey

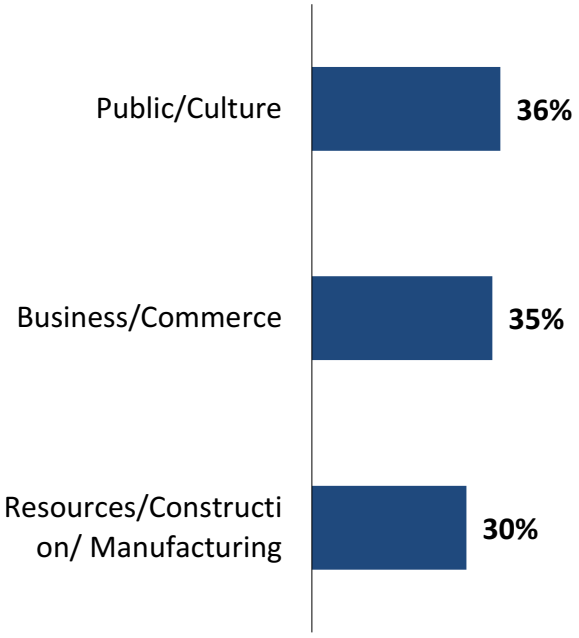
Firmographics
Respondent Profile

Role of Respondent

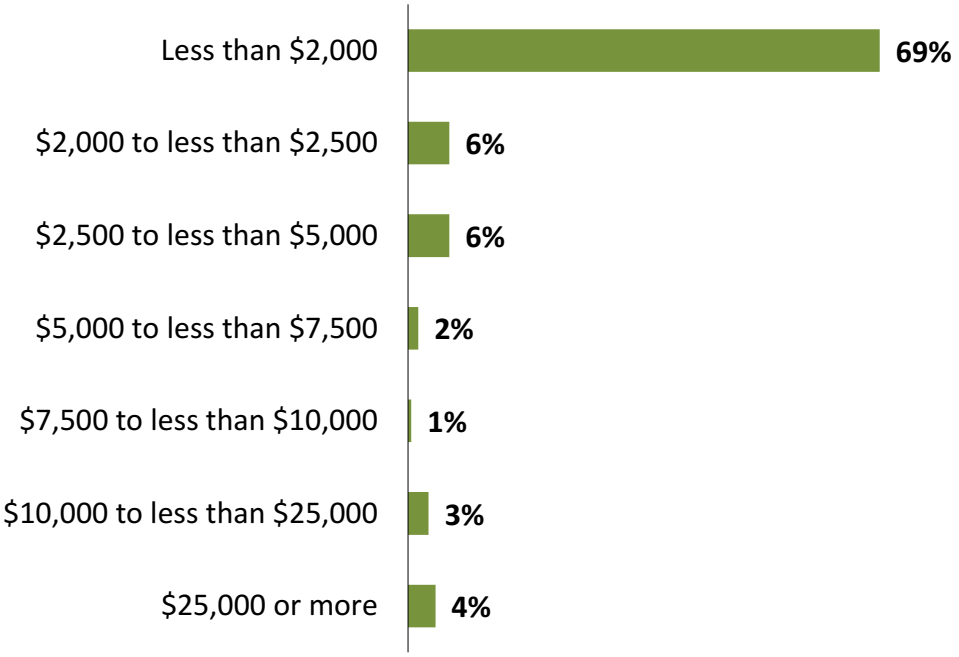
Q Do you personally do any of the following things in your organization?[Multiple mention]



Business Type



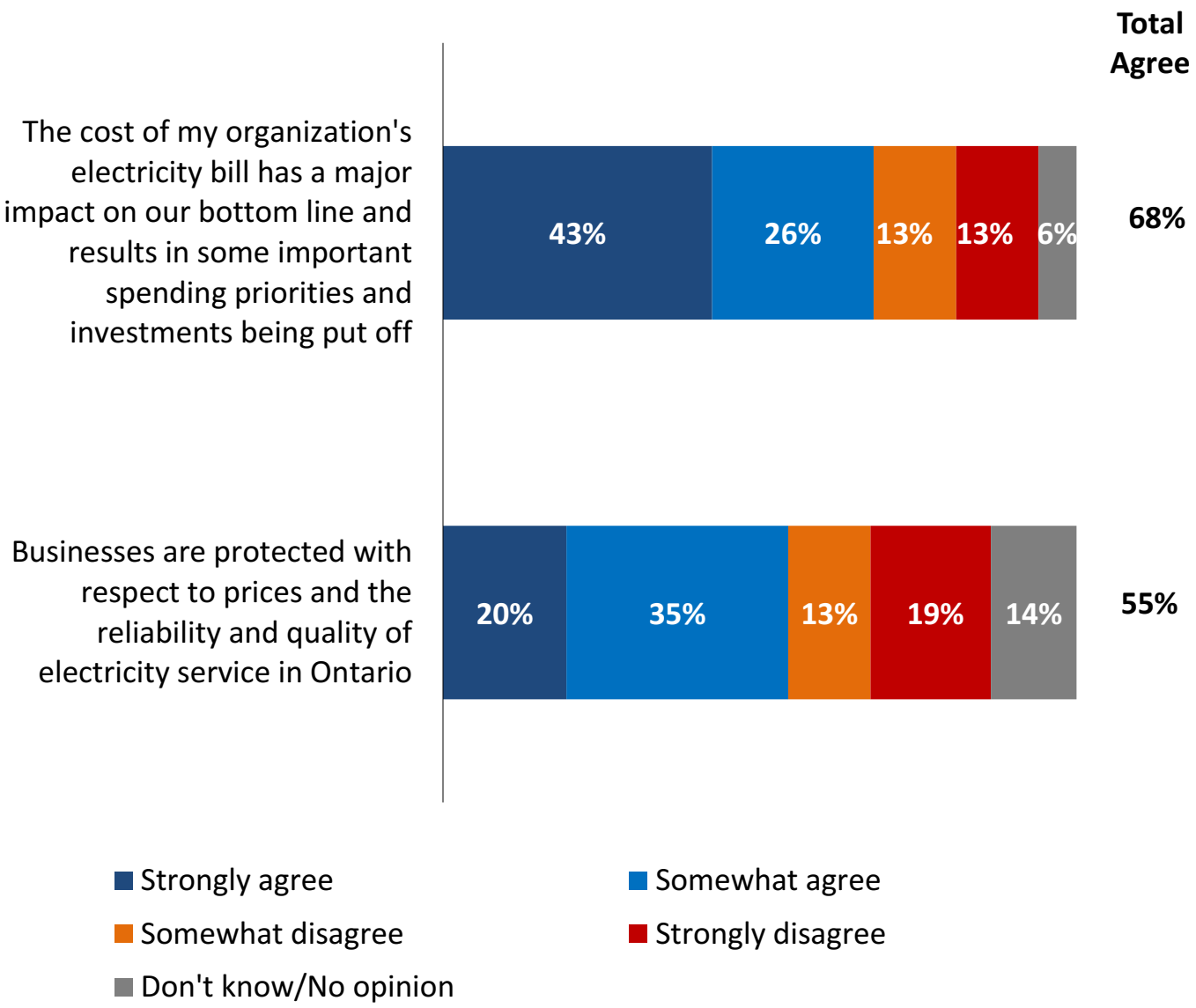
Bill Size



Note: 'Don't know'/'Refused' (11%) not shown.

Segmentation

Q Now I'd like to ask you some general questions about the electricity system in Ontario. For each statement please tell me if you would strongly agree, somewhat agree, somewhat disagree or strongly disagree. If you don't know enough to say or don't have an opinion just let me know.
[asked of all respondents, n=200]



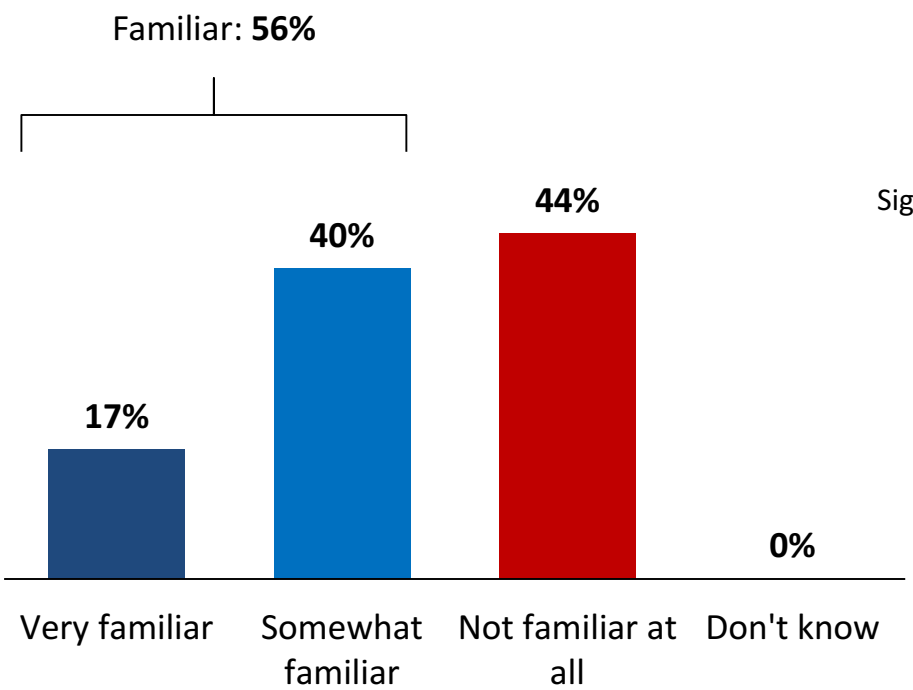
INNOVATIVE RESEARCH GROUP

Familiarity with OPG

Q

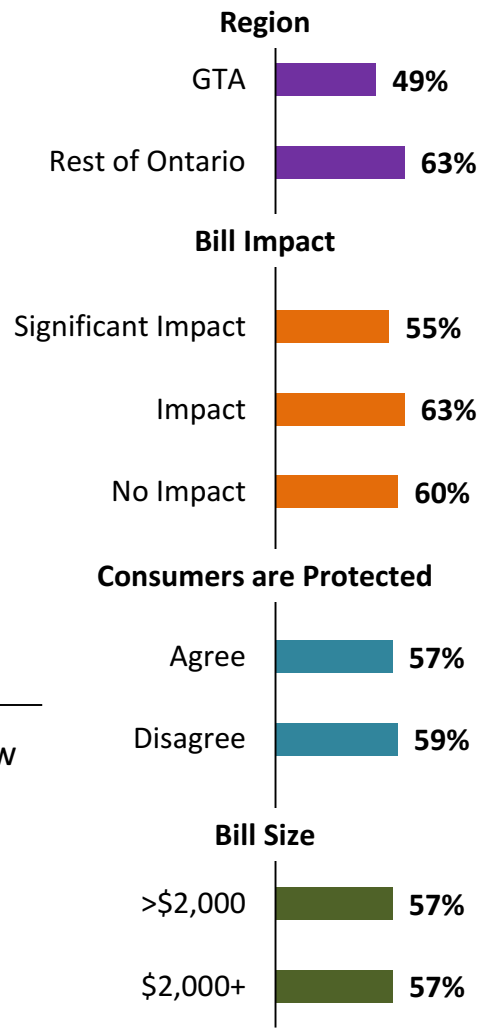
Today, I'd like to talk to you about Ontario Power Generation.

How familiar are you with a company called Ontario Power Generation? Would you say you are very familiar, somewhat familiar, or not familiar at all?
[asked of all respondents, n=200]



Segmentation

*Those who say "**Familiar**":*



INNOVATIVE RESEARCH GROUP

INNOVATIVE RESEARCH GROUP

Background Information

OPG's Share of the Bill

Preamble

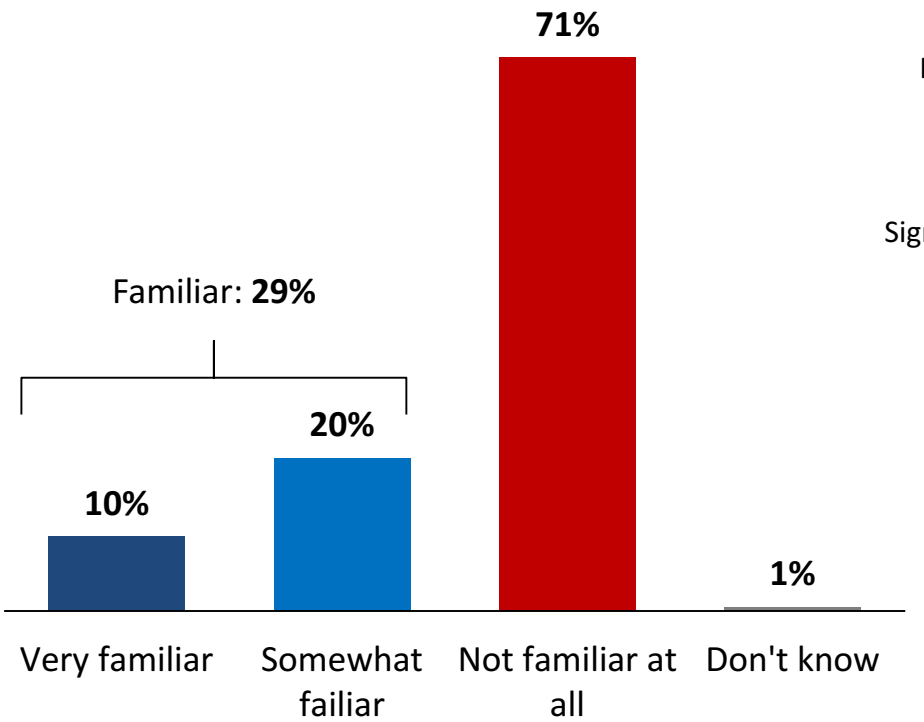
"I'd now like to talk with you about your organization's electricity bill …

While your local distributor is responsible for collecting payment for the entire electricity bill, OPG receives about 20% of the typical small business customer's bill for its portion of the generation. The rest of the bill goes to other power generation companies, transmission companies, distribution companies, the provincial government and regulatory agencies."

INNOVATIVE RESEARCH GROUP

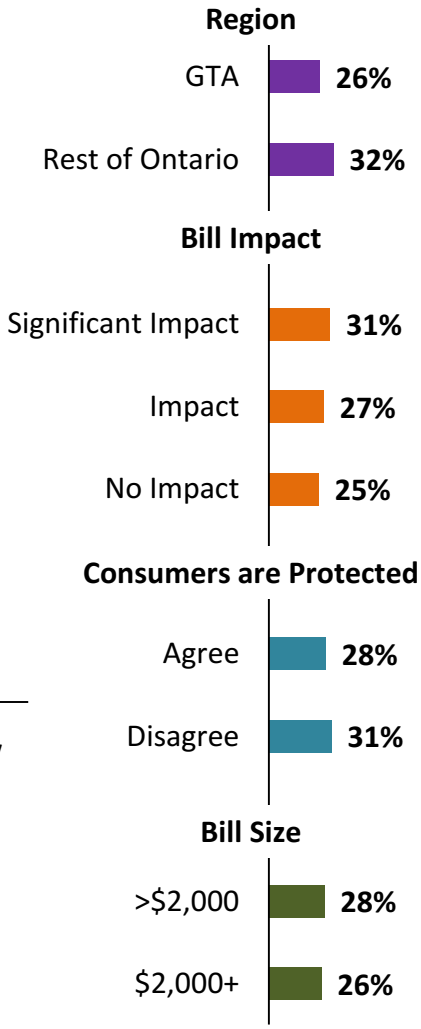
Familiarity with OPG's Share of the Bill

Q Before this survey, how familiar were you with the percentage of your electricity bill that goes to OPG?
[asked of all respondents, n=200]



Segmentation

*Those who say "**Familiar**":*

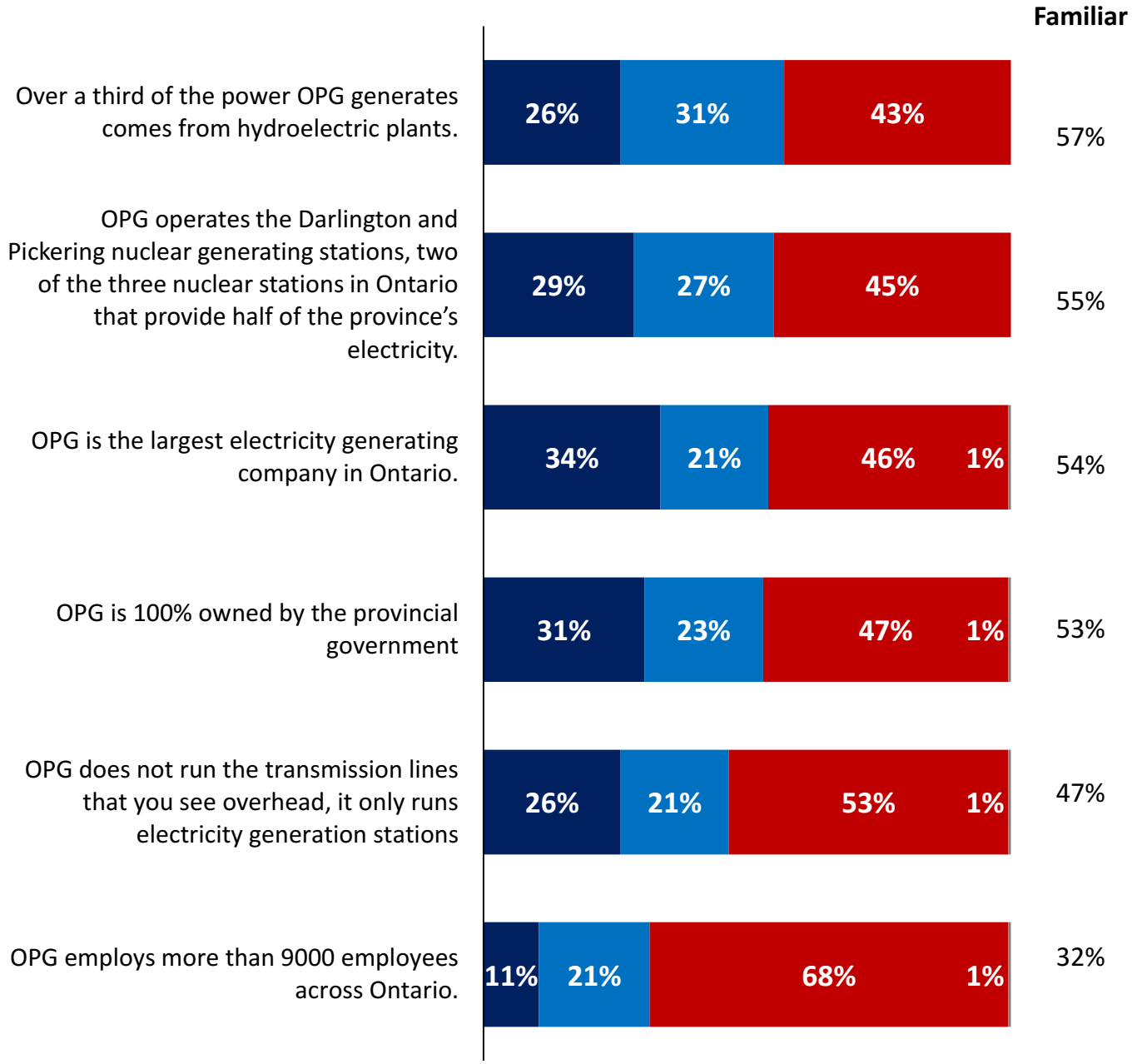


INNOVATIVE RESEARCH GROUP

Knowledge of OPG

Overview

Q I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.
[asked of all respondents, n=200]



Note: The items are arranged in descending order of total "familiar".

INNOVATIVE RESEARCH GROUP

Knowledge of OPG

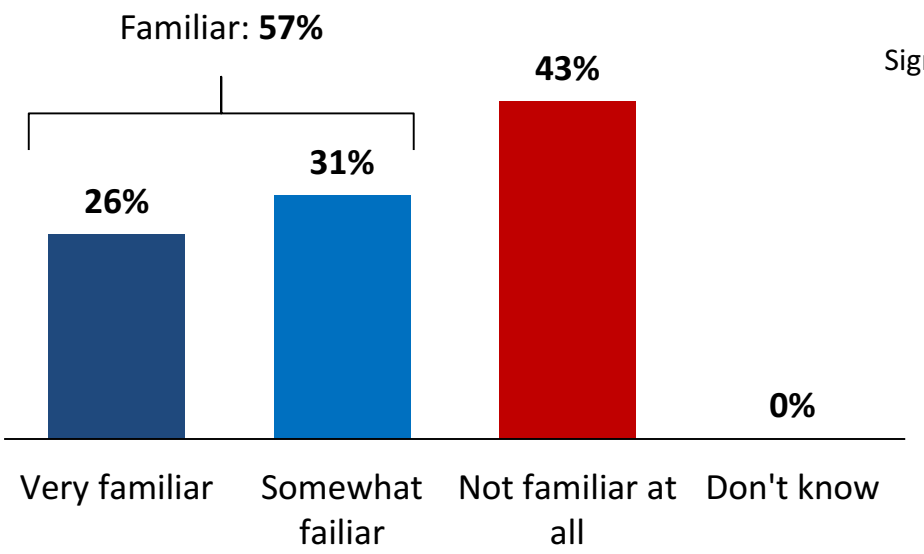
Hydroelectric Plants

Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

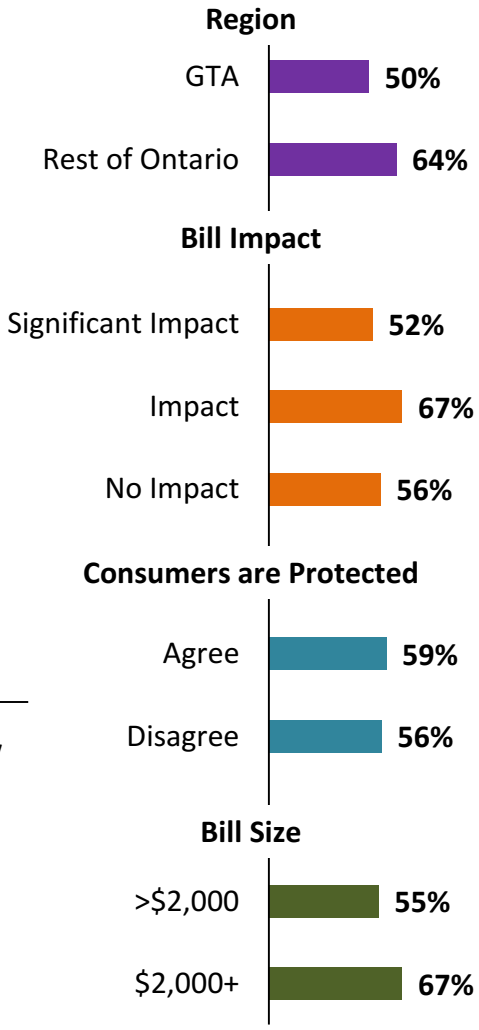
Over a third of the power OPG generates comes from hydroelectric plants.

[asked of all respondents, n=200]



Segmentation

*Those who say "**Familiar**":*



INNOVATIVE RESEARCH GROUP

Knowledge of OPG

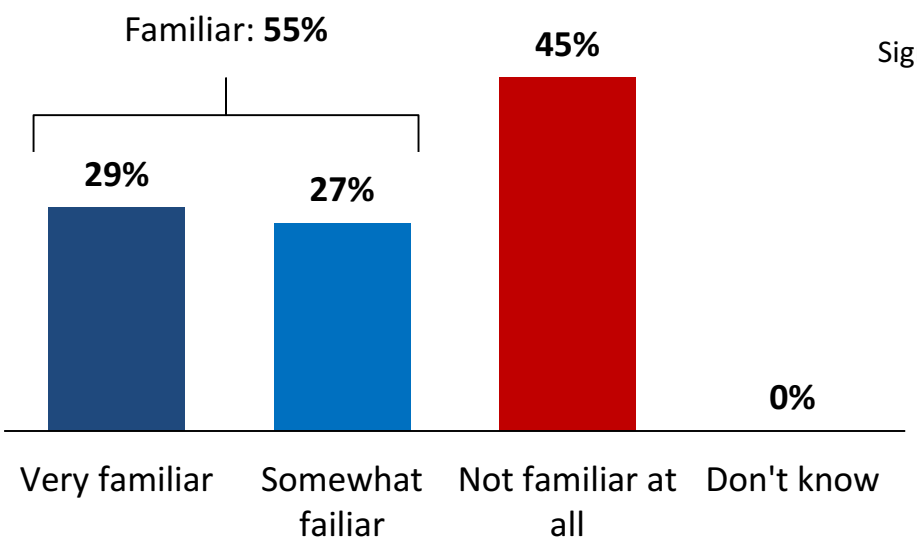
Nuclear Plants

Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

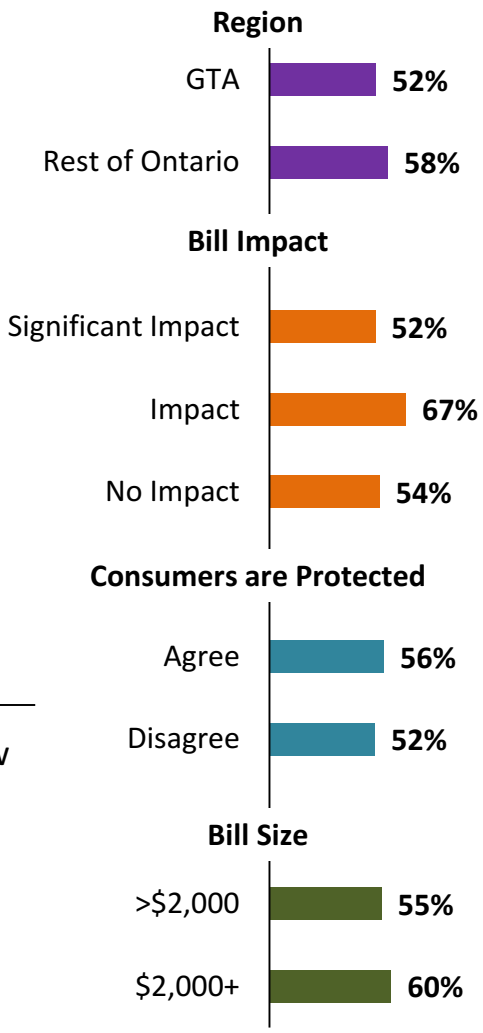
OPG operates the Darlington and Picker nuclear generating stations, two of the three nuclear stations in Ontario that provide half of the province's electricity.

[asked of all respondents, n=200]



Segmentation

*Those who say "**Familiar**":*



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Knowledge of OPG

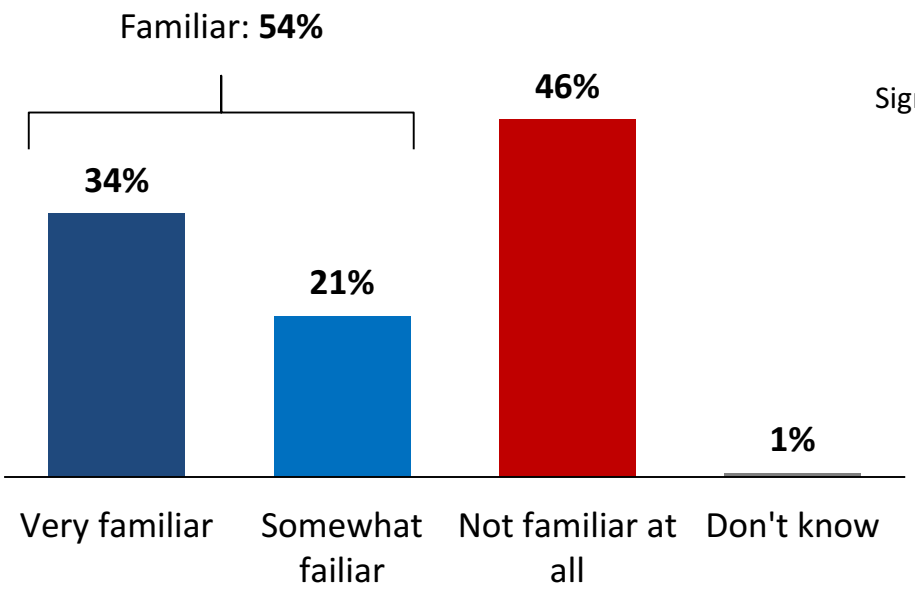
Ontario's Largest Electricty Generator

Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

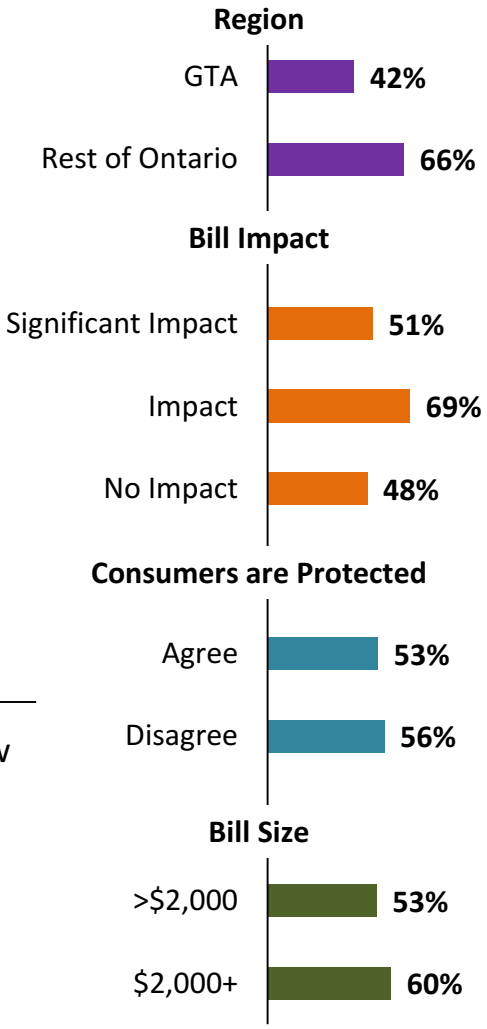
OPG is the largest electricity generating company in Ontario.

[asked of all respondents, n=200]



Segmentation

*Those who say "**Familiar**":*



INNOVATIVE RESEARCH GROUP

Knowledge of OPG

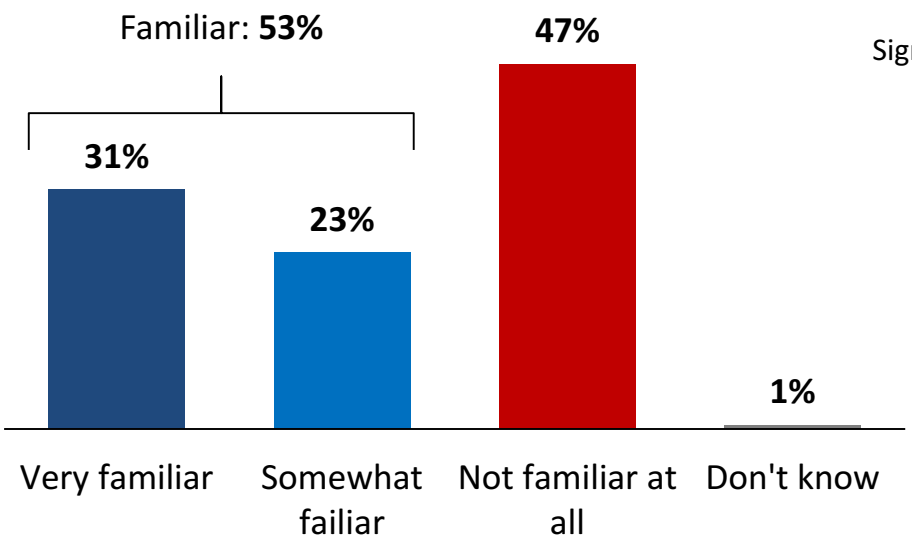
Government Ownership

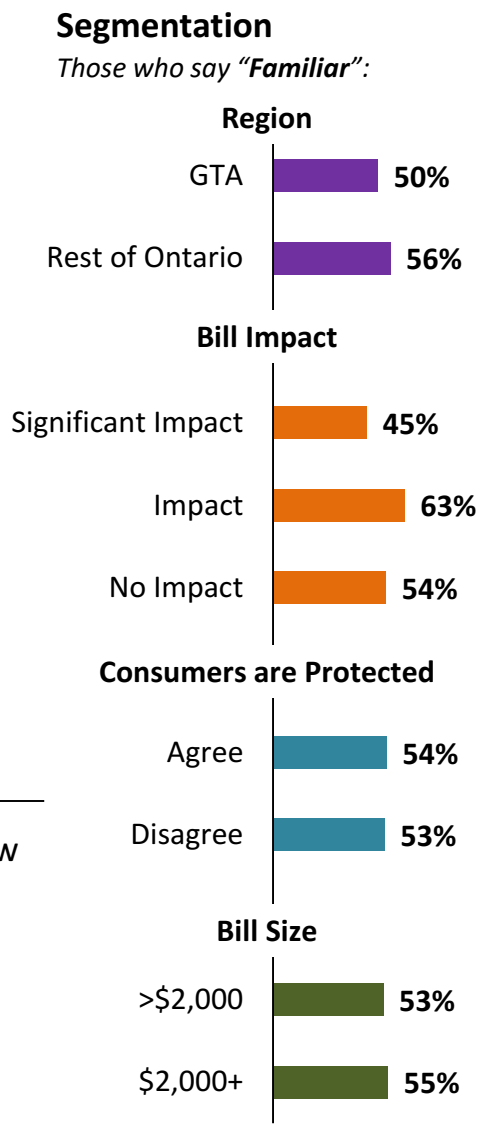
Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

OPG is 100% owned by the provincial government

[asked of all respondents, n=200]





INNOVATIVE RESEARCH GROUP

Knowledge of OPG

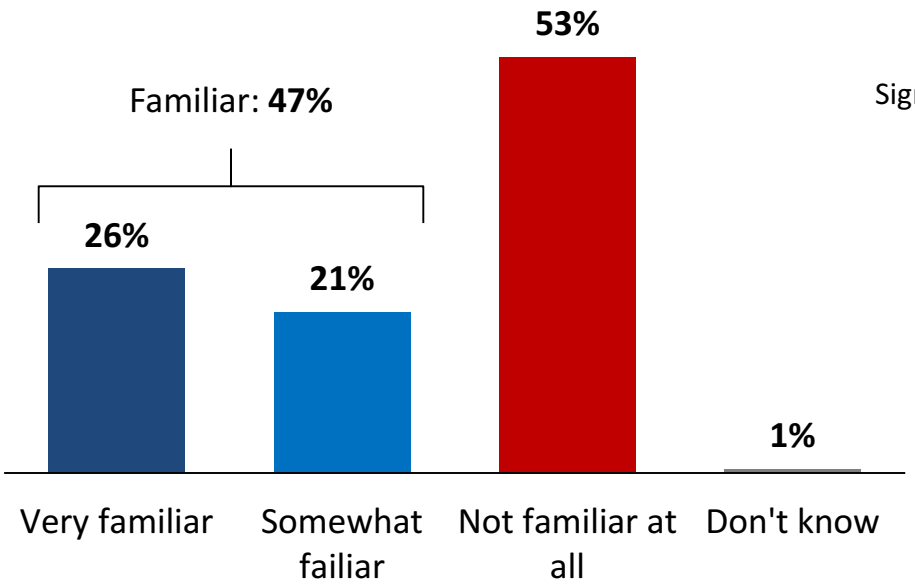
Electricity Generator

Q

I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

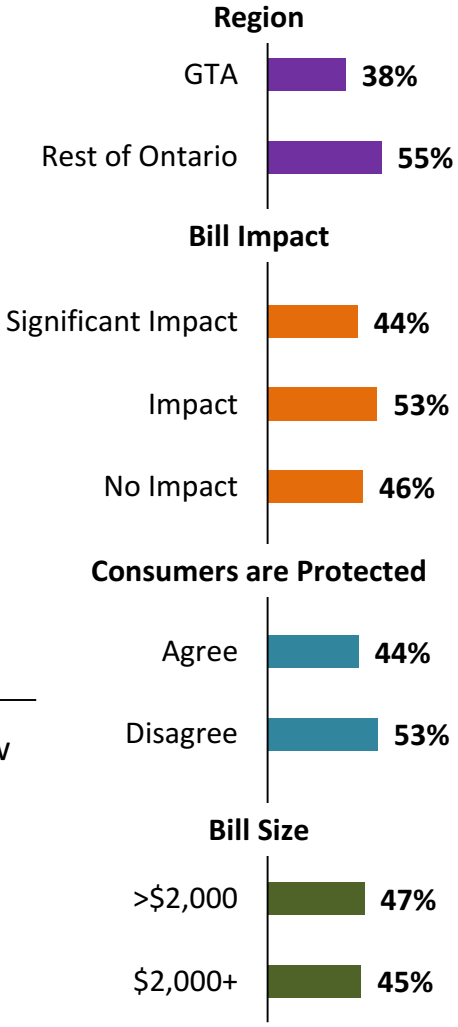
OPG does not run the transmission lines you see overhead, it only runs electricity generation stations

[asked of all respondents, n=200]



Segmentation

*Those who say "**Familiar**":*



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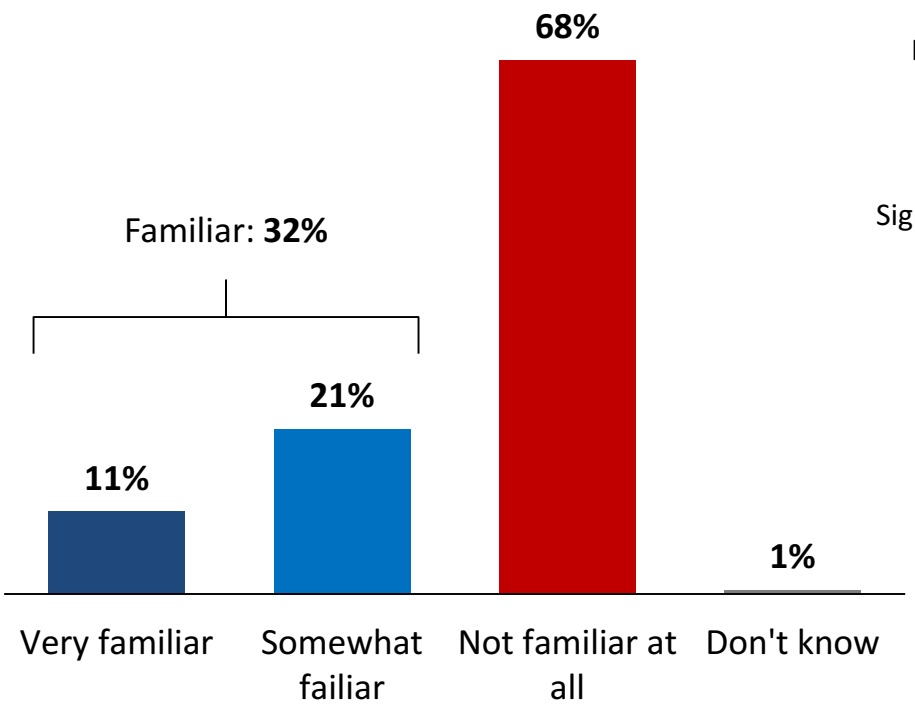
Knowledge of OPG

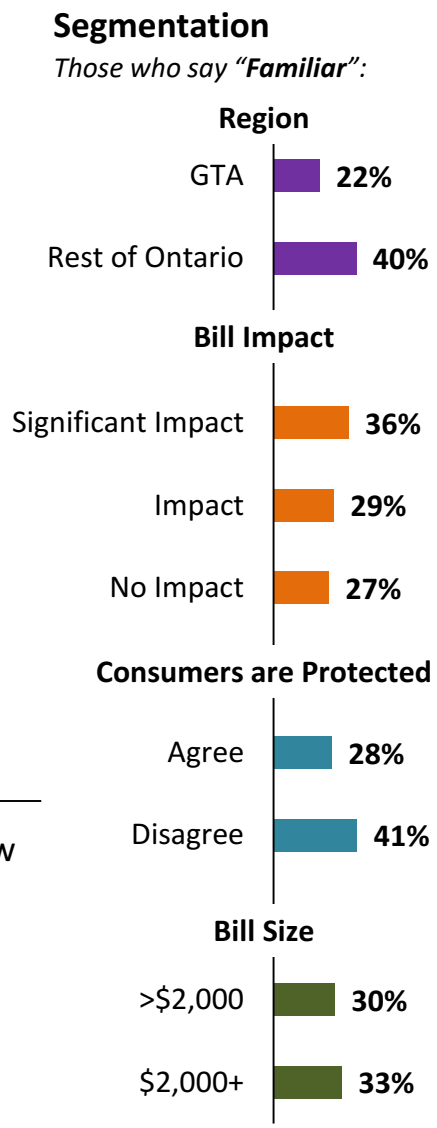
Number of Employees

Q I am now going to read you a list of statements about OPG. After I read each statement, I'd like you to tell me how familiar you were with that statement before this survey.

OPG employees more than 9000 employees across Ontario

[asked of all respondents, n=200]





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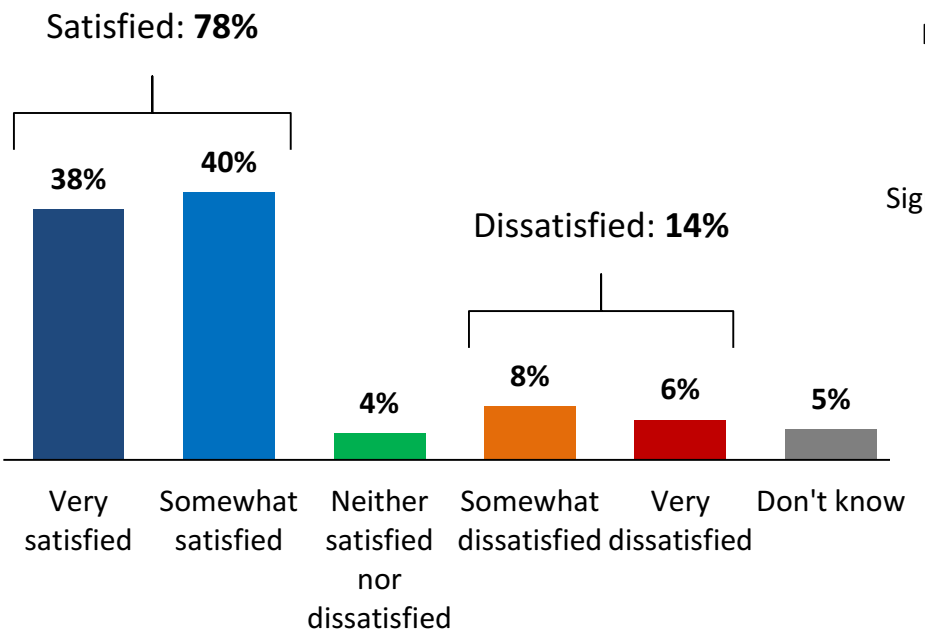
Customer Needs & Preferences

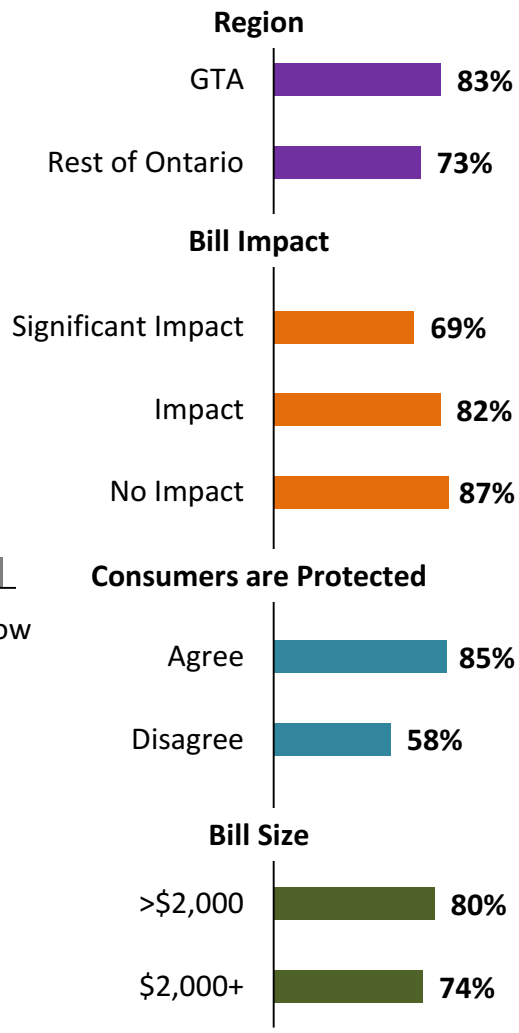
Satisfaction with OPG

Q In general, how satisfied or dissatisfied are you with the services your organization receives from Ontario Power Generation? Would you say you are very satisfied, somewhat satisfied, somewhat dissatisfied, or very dissatisfied?
[asked of all respondents, n=200]



Segmentation

*Those who say "**Satisfied**":*



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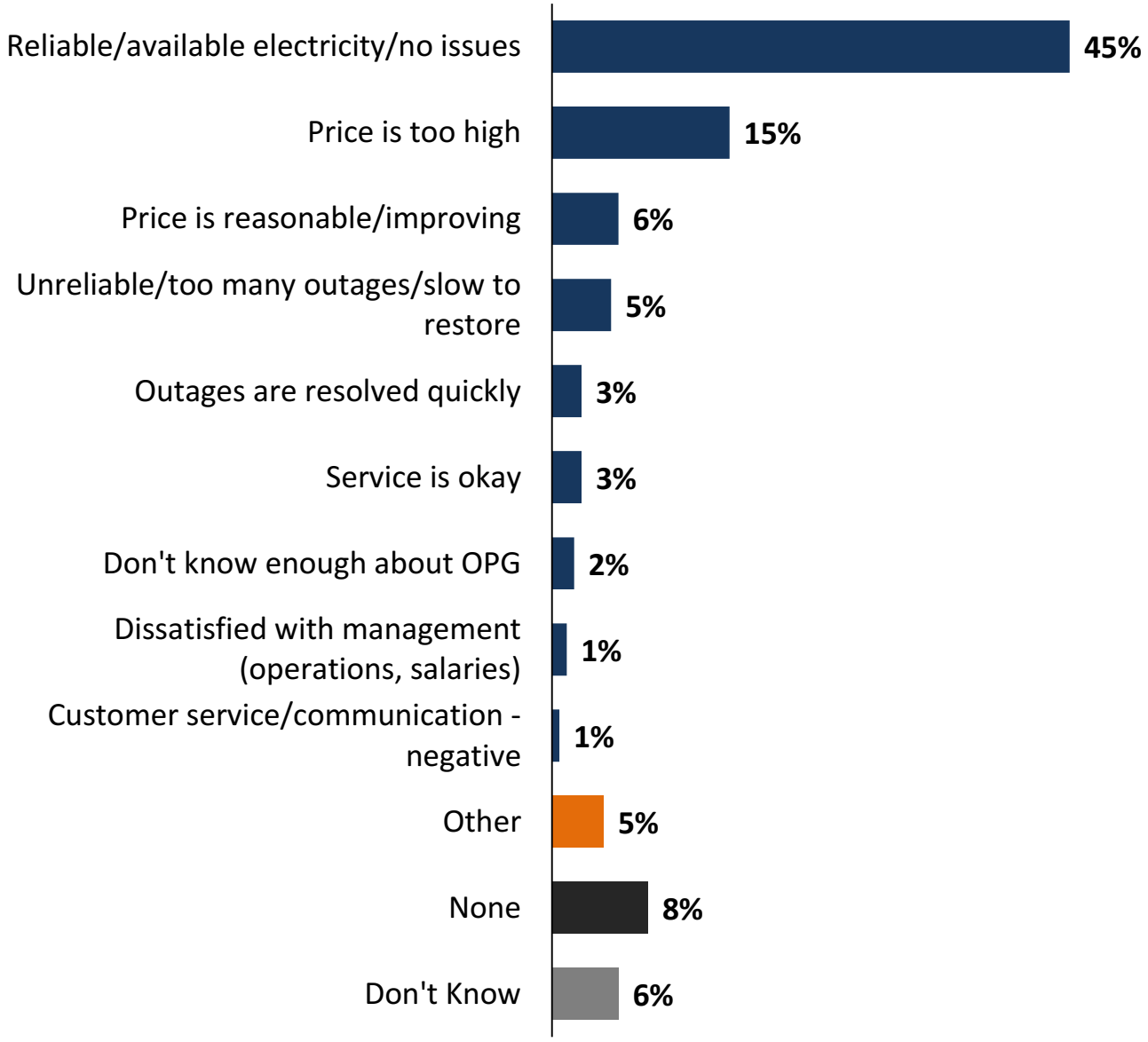
Satisfaction with OPG

Why Satisfied?

Q Why do you feel this way?
[asked of all respondents]

Amongst those who answered: 'Very satisfied' or 'Somewhat satisfied' (n=155)



Note: 'Refused' (1%) not shown.

INNOVATIVE RESEARCH GROUP

Satisfaction with OPG

Why Dissatisfied?

Q Why do you feel this way?
[asked of all respondents]

Amongst those who answered: 'Very dissatisfied' or 'Somewhat dissatisfied' (n=28*)

Note: N-sizes are reported due to small sample size.

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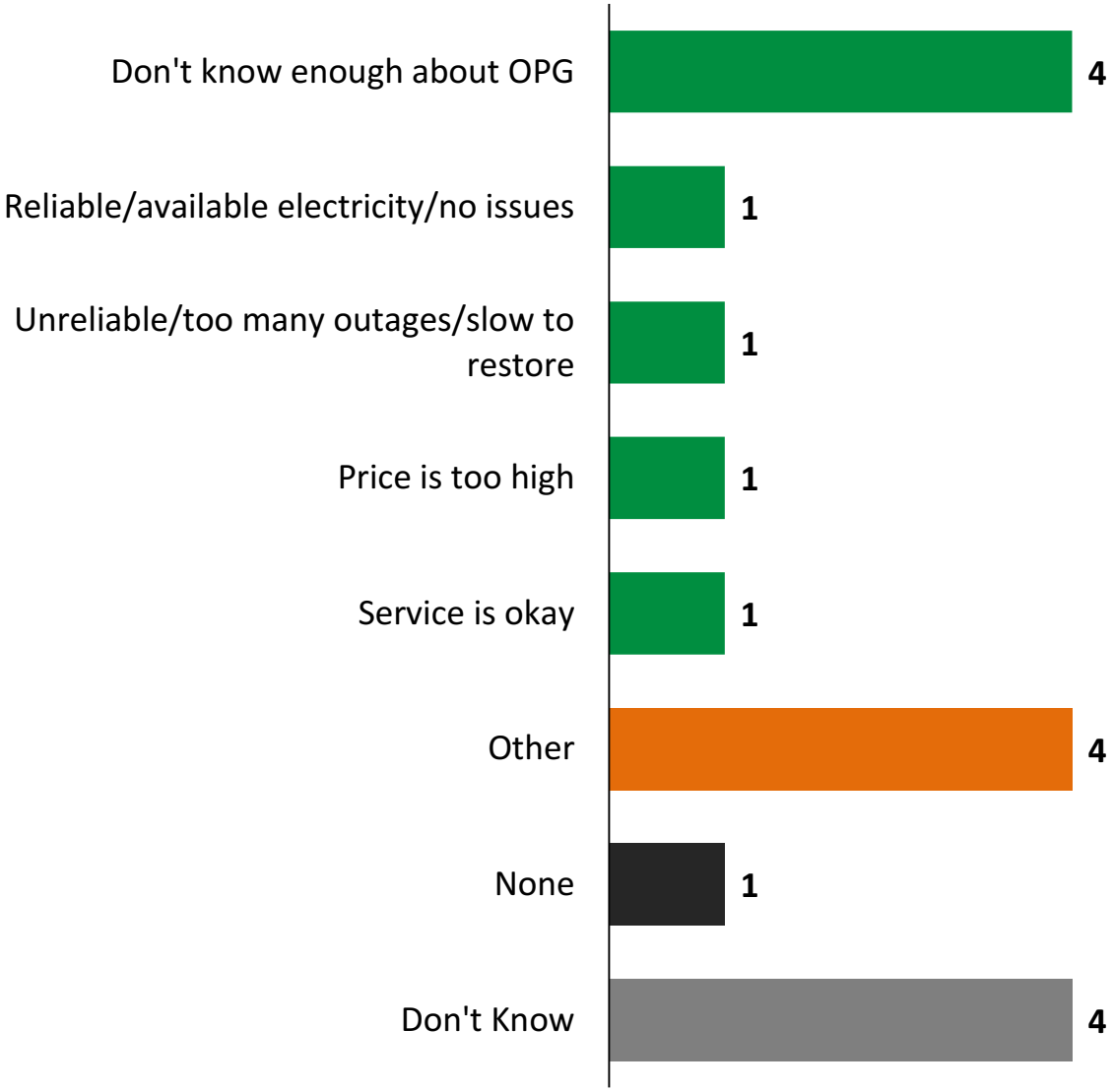
Satisfaction with OPG

Why Neutral?

Q Why do you feel this way?
[asked of all respondents]

Amongst those who answered: 'Neither satisfied nor dissatisfied' or 'Don't know' (n=17*)



Note: N-sizes are reported due to small sample size.

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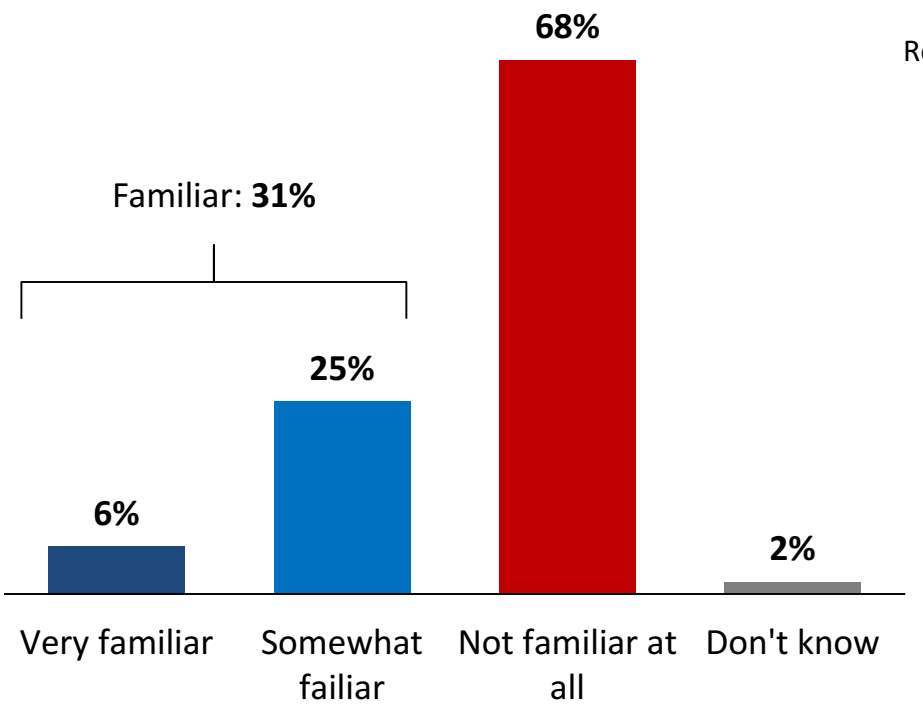
Familiarity with the Long-Term Energy Plan

Q

The Ontario government determines the energy mix for the province and forecasts long term demand for energy in the *Long-Term Energy Plan*. OPG is required by law to follow the direction set by the government in the *Long-Term Energy Plan*.

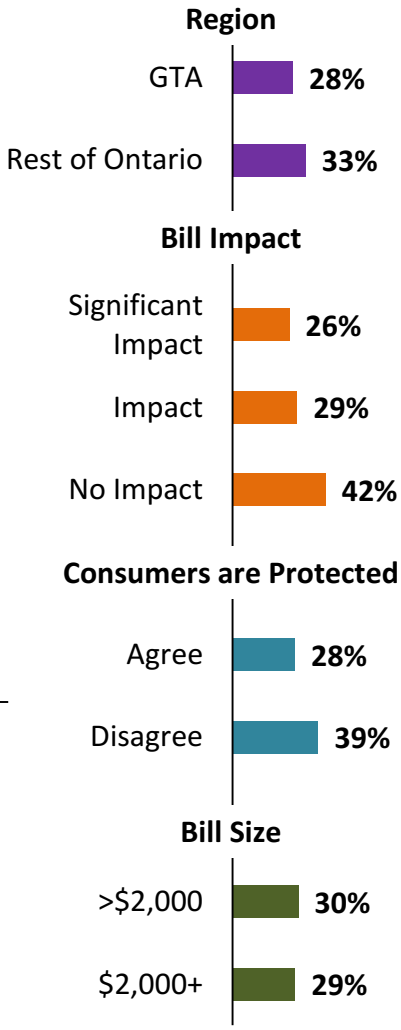
Before this survey how familiar were you with the *Long-Term Energy Plan*?

[asked of all respondents, n=200]



Segmentation

*Those who say "**Familiar**":*

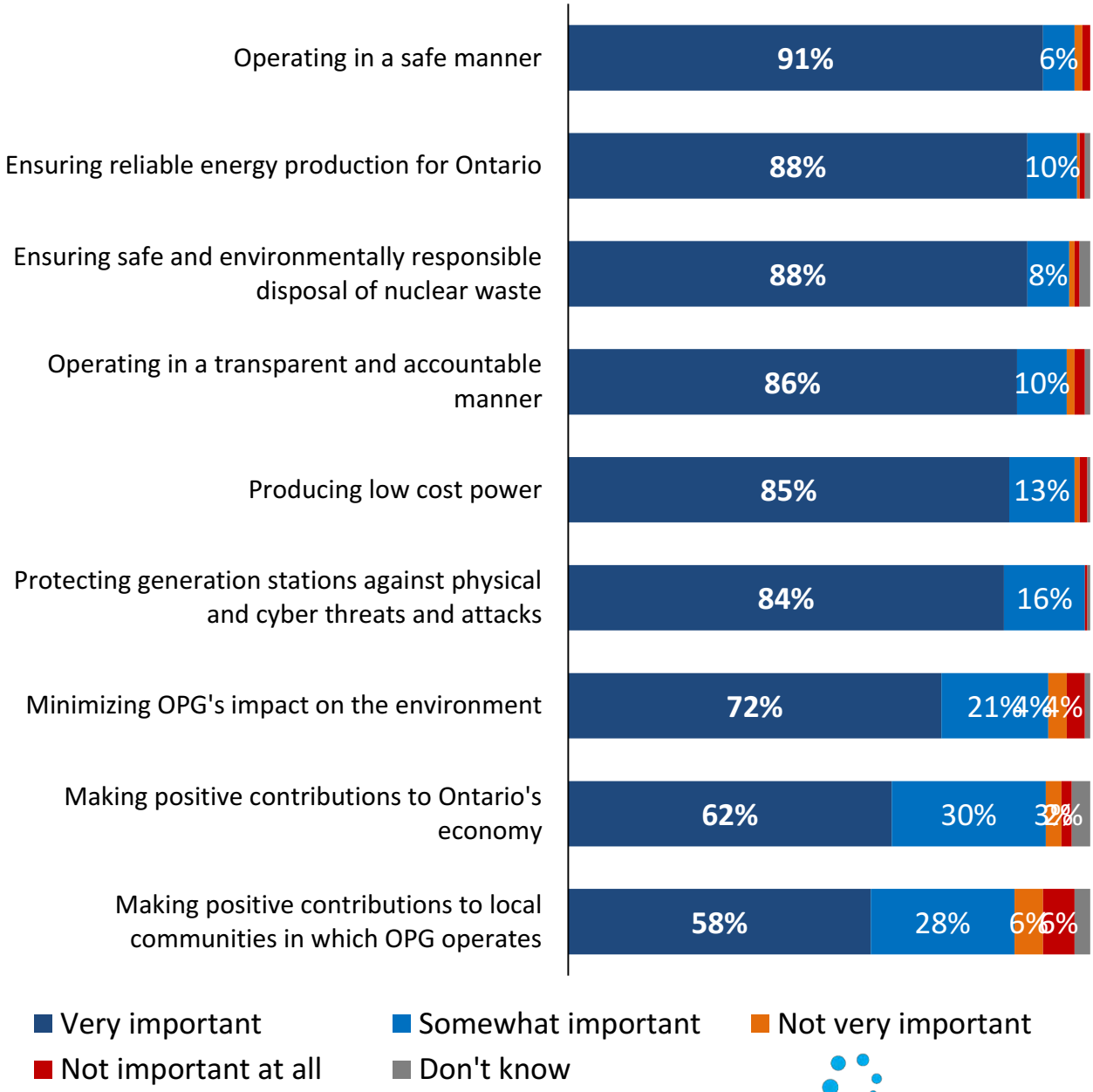


INNOVATIVE RESEARCH GROUP

Outcome Priorities

Overview of Importance Ratings

Q While the government and regulators tell OPG what it must do, OPG has some choices to make in how it does those things. I am going to read you a list of possible outcomes that were developed based on earlier research conducted with people from all around Ontario. For each of the following, please tell me how important it is to you.
[asked of all respondents, n=200]

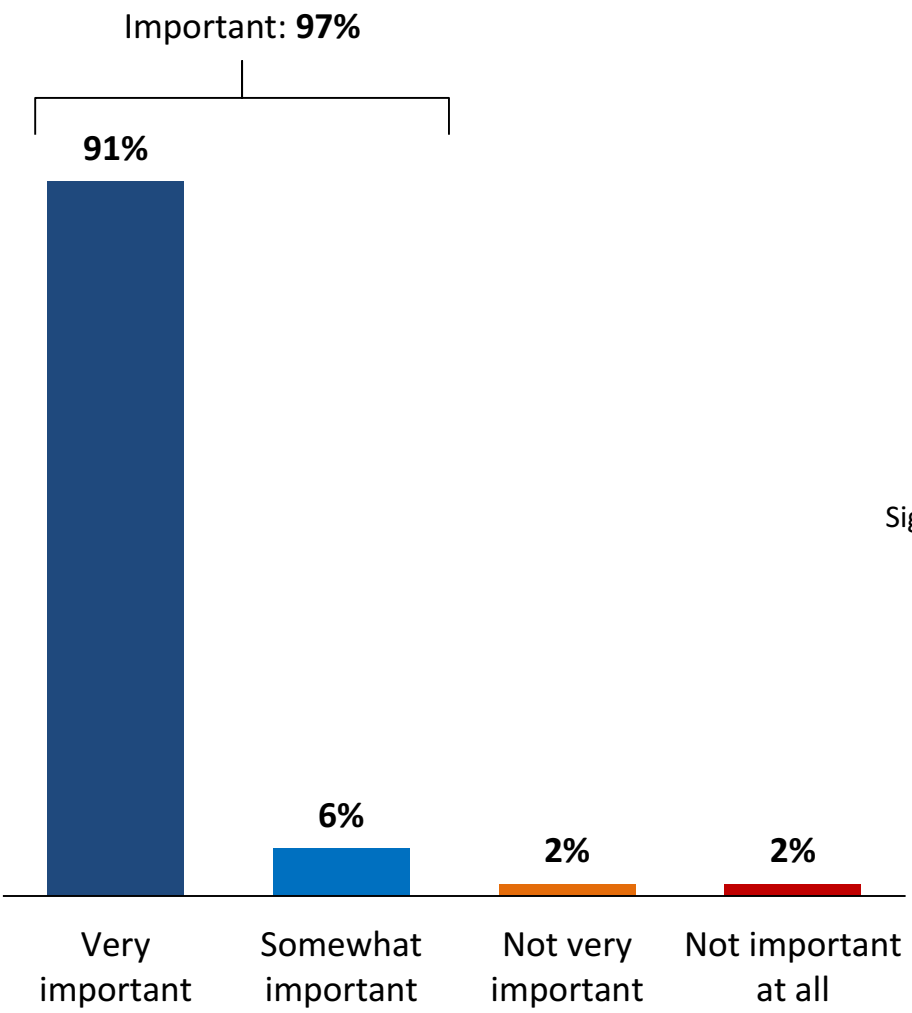


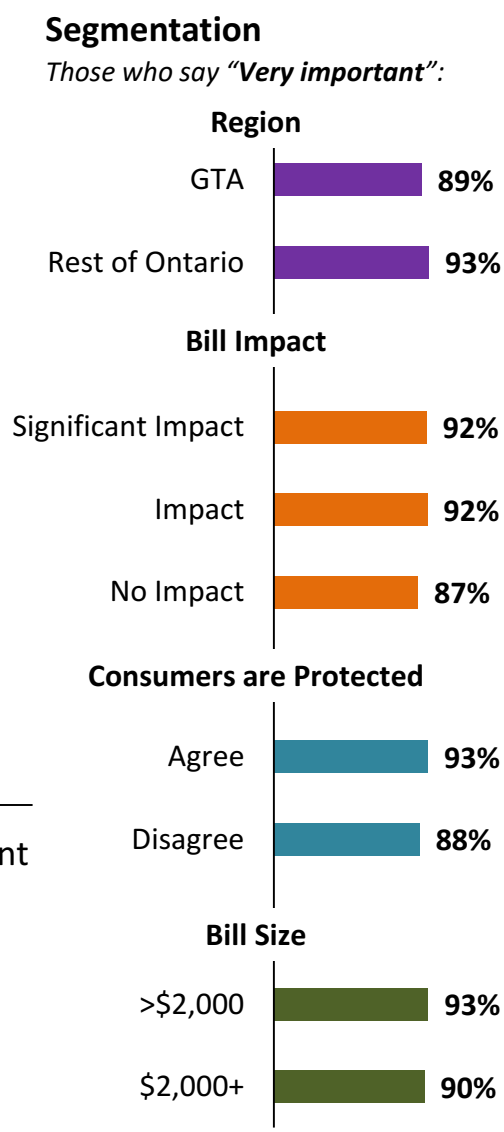
Note: The items are arranged in descending order of "very important".

Outcome Priorities

Operating Safely

Q For each of the following, please tell me how important it is to you.
Operating in a safe manner
[asked of all respondents, n=200]



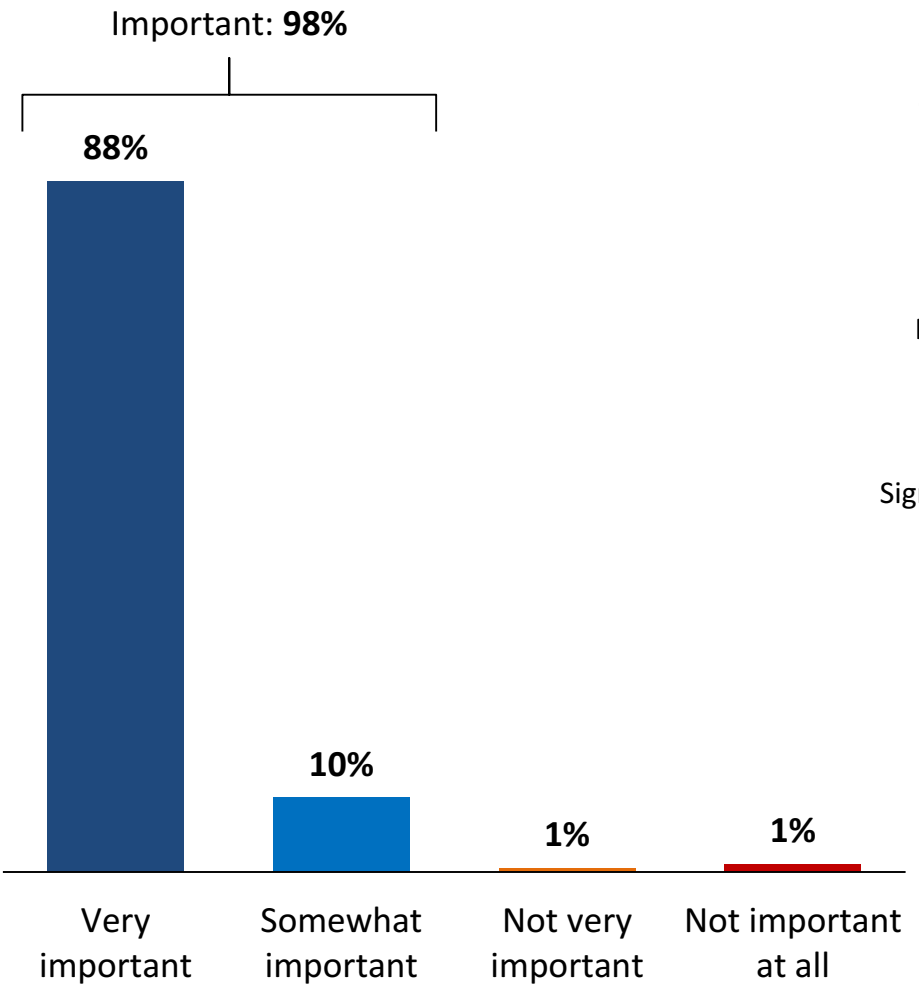


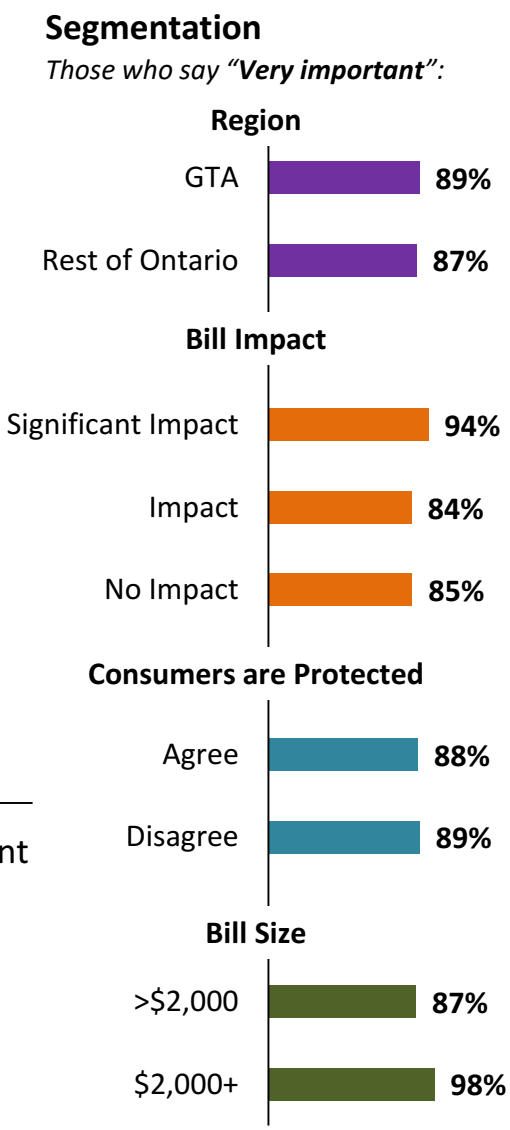
Note: 'Don't know' (0%) not shown.

Outcome Priorities

Reliable Production

Q For each of the following, please tell me how important it is to you.
Ensuring reliable energy production for Ontario
[asked of all respondents, n=200]





Note: 'Don't know' (1%) not shown.

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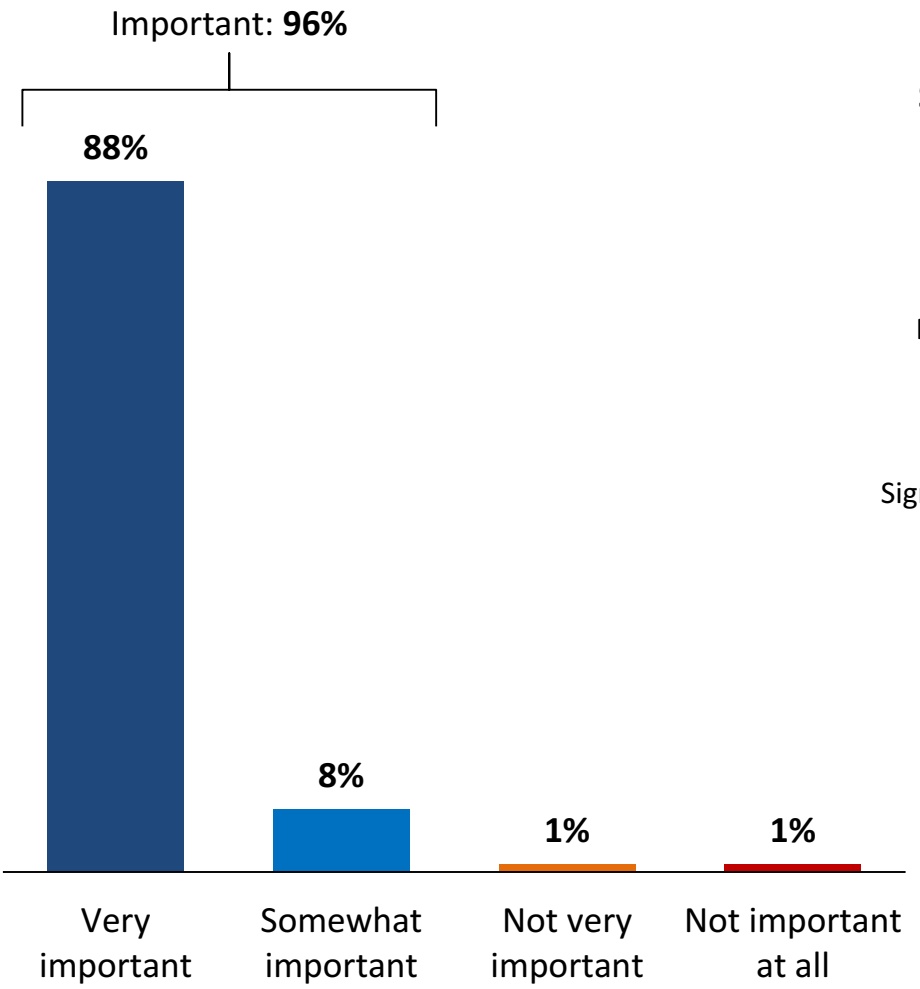
Outcome Priorities

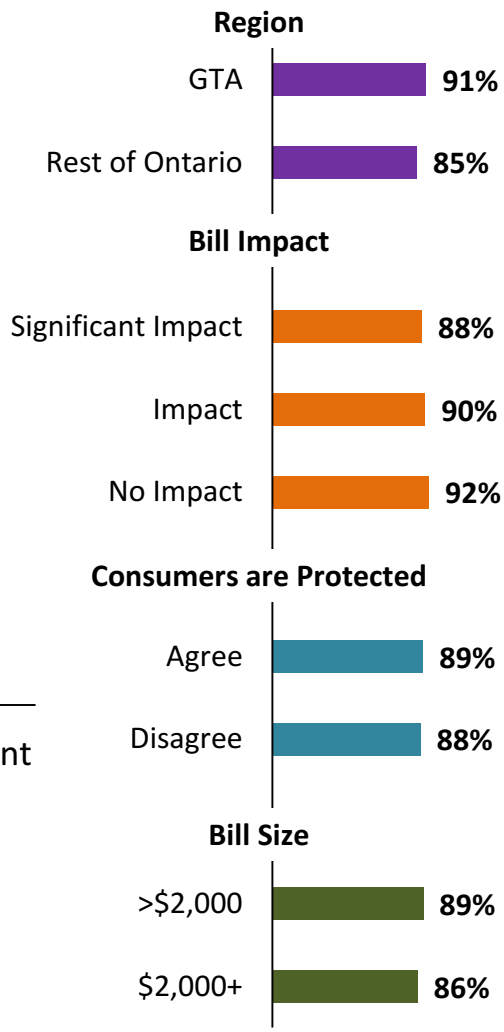
Nuclear Waste Management

Q For each of the following, please tell me how important it is to you.
Ensuring safe and environmentally responsible disposal of nuclear waste
[asked of all respondents, n=200]



Segmentation

*Those who say "**Very important**":*



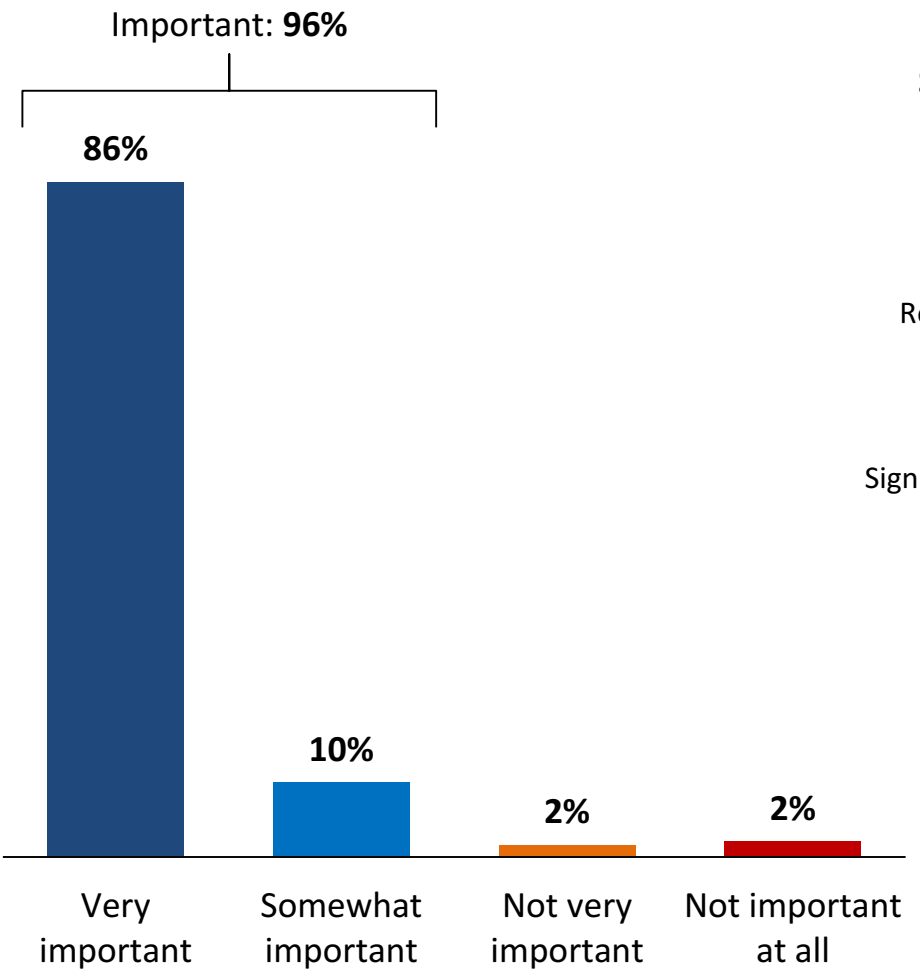
Note: 'Don't know' (2%) not shown.

INNOVATIVE RESEARCH GROUP

Outcome Priorities

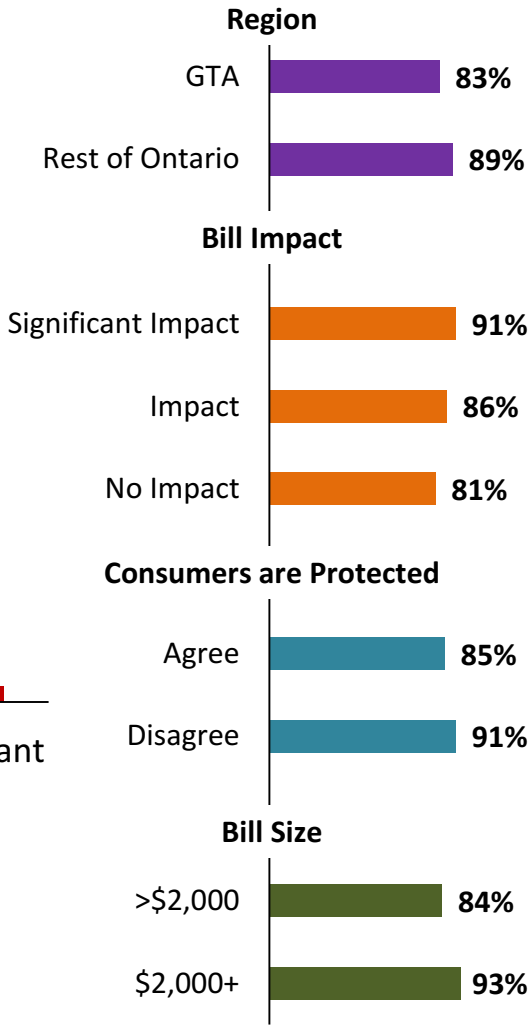
Transparency & Accountability

Q For each of the following, please tell me how important it is to you.
Operating in a transparent and accountable manner
[asked of all respondents, n=200]



Segmentation

*Those who say "**Very important**":*



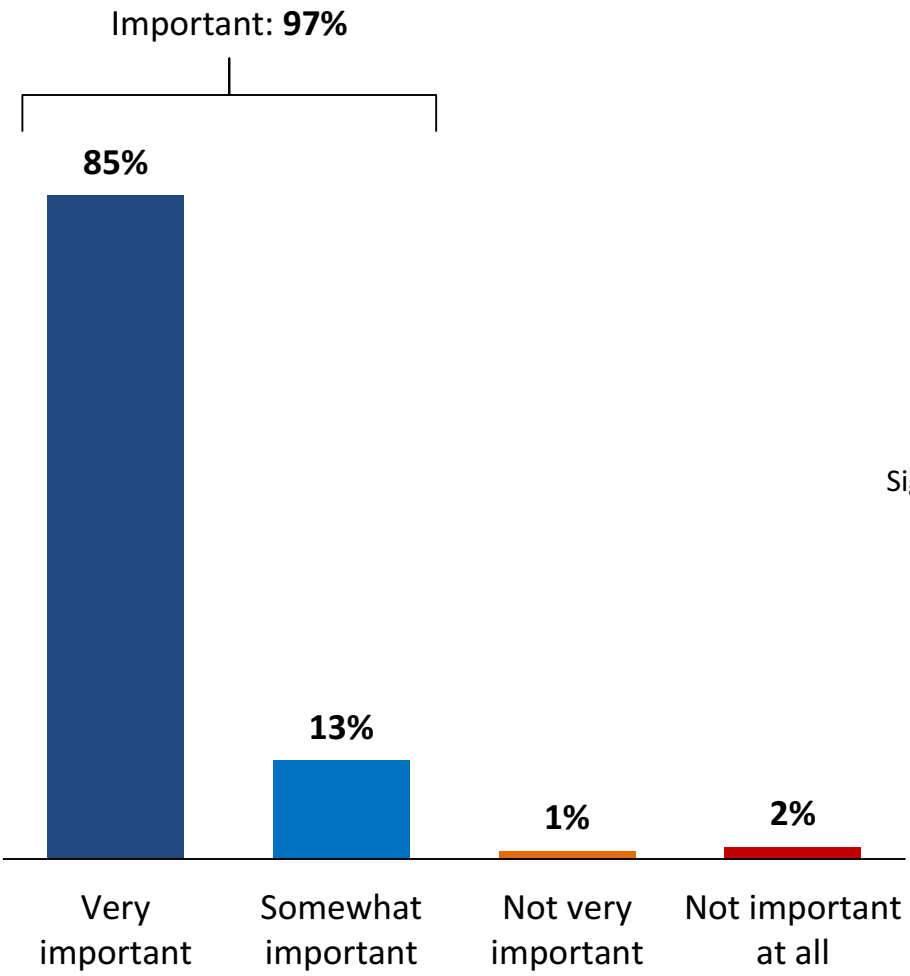
Note: 'Don't know' (1%) not shown.

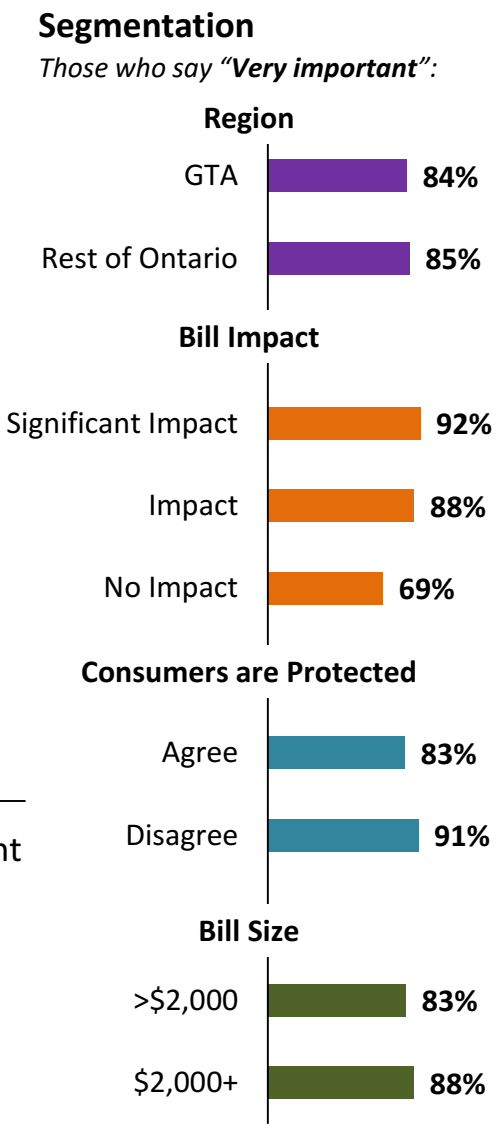
INNOVATIVE RESEARCH GROUP

Outcome Priorities

Producing Low Cost Power

Q For each of the following, please tell me how important it is to you.
Producing low cost power.
[asked of all respondents, n=200]





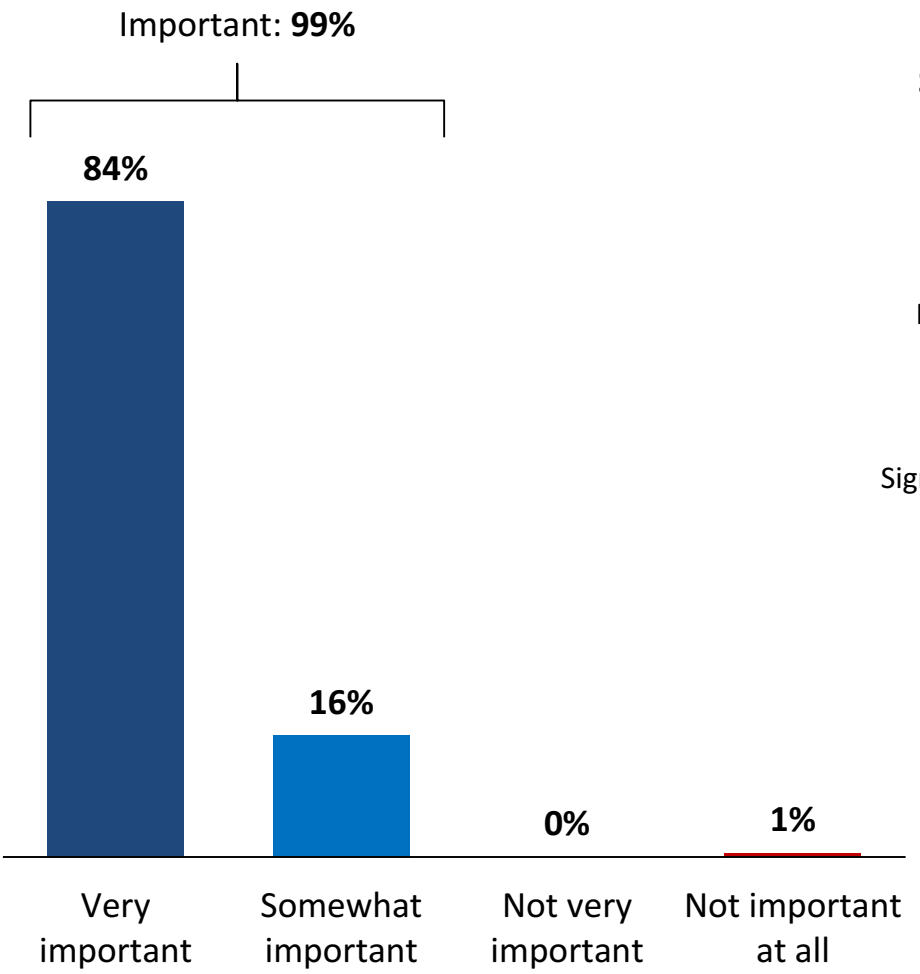
Note: 'Don't know' (1%) not shown.

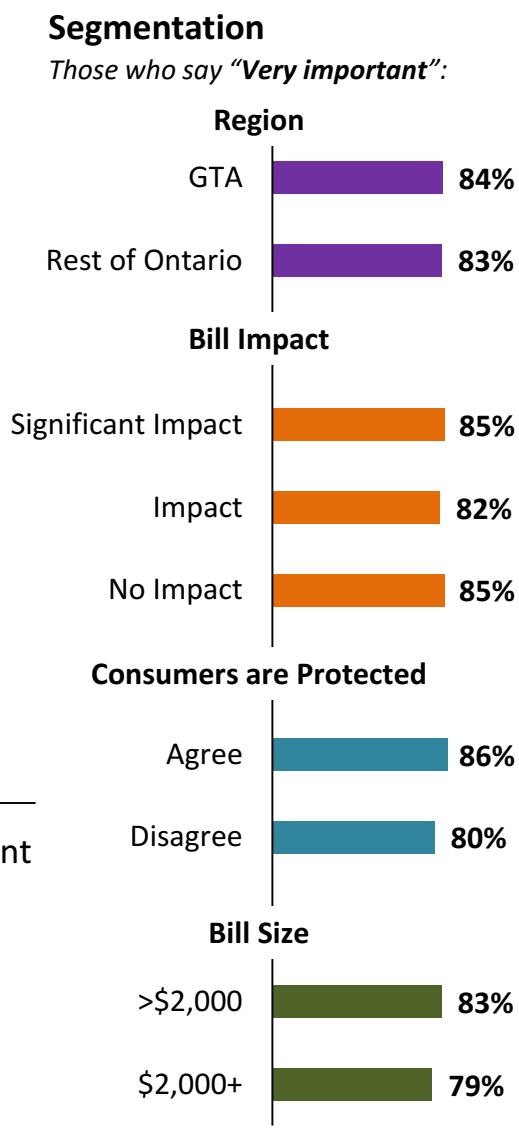
INNOVATIVE RESEARCH GROUP

Outcome Priorities

Protecting Against Threats

Q For each of the following, please tell me how important it is to you.
Protecting generation stations against physical and cyber threats and attacks
[asked of all respondents, n=200]





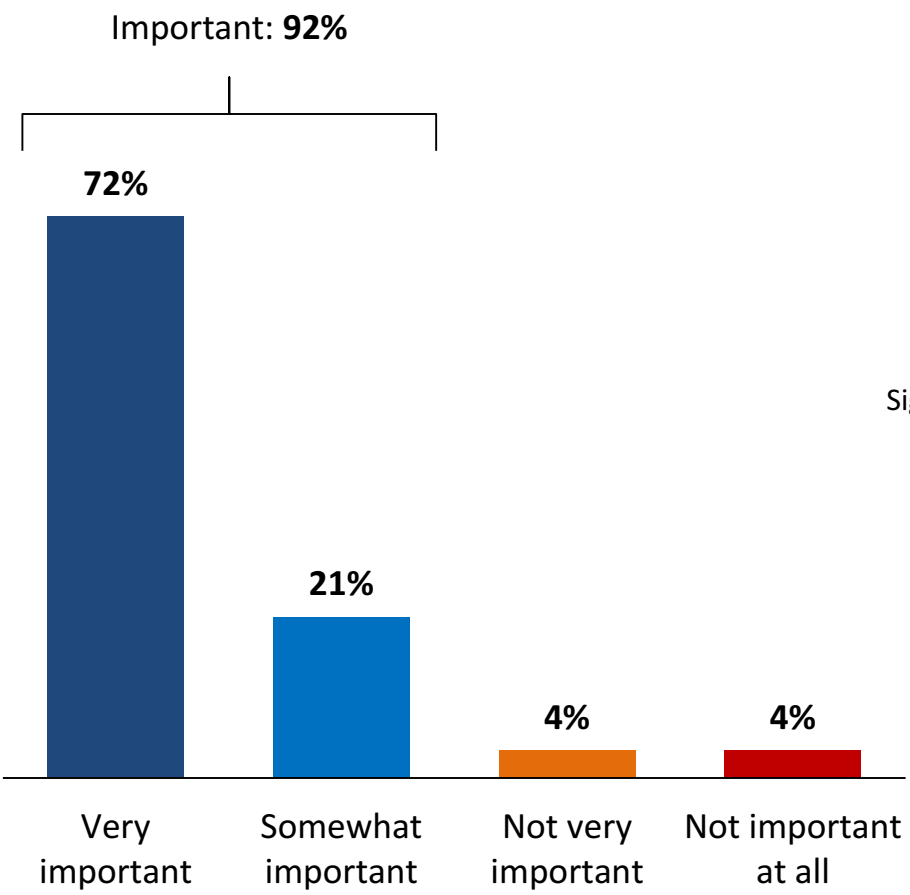
Note: 'Don't know' (1%) not shown.

INNOVATIVE RESEARCH GROUP

Outcome Priorities

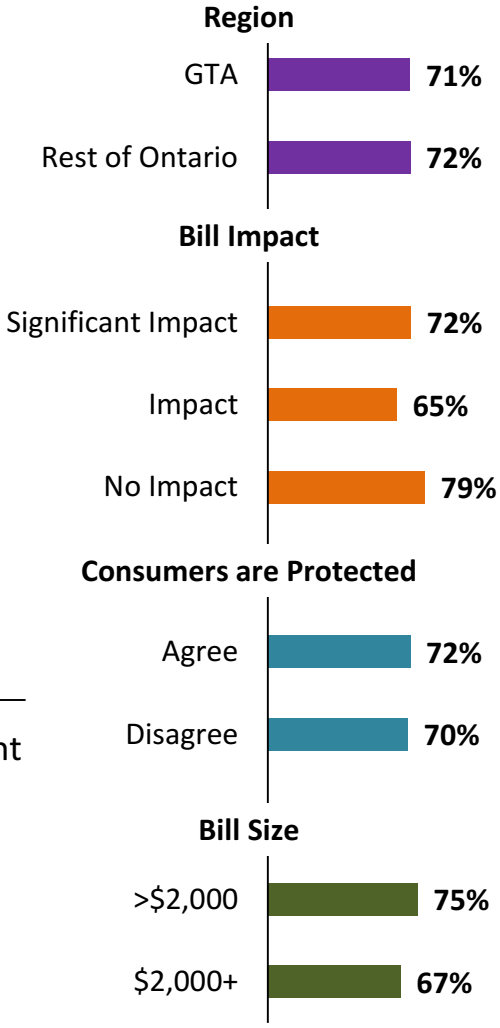
Minimizing Environmental Impact

Q For each of the following, please tell me how important it is to you.
Minimizing OPG's impact on the environment
[asked of all respondents, n=200]



Segmentation

*Those who say "**Very important**":*



Note: 'Don't know' (1%) not shown.

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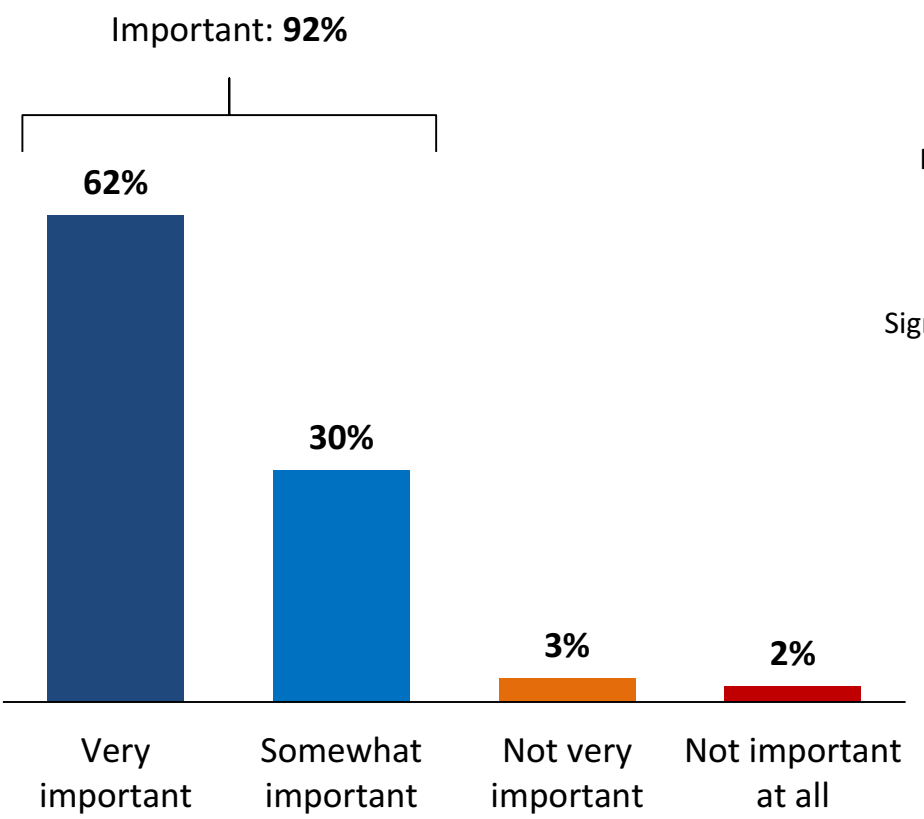
Outcome Priorities

Contributing to Ontario's Economy

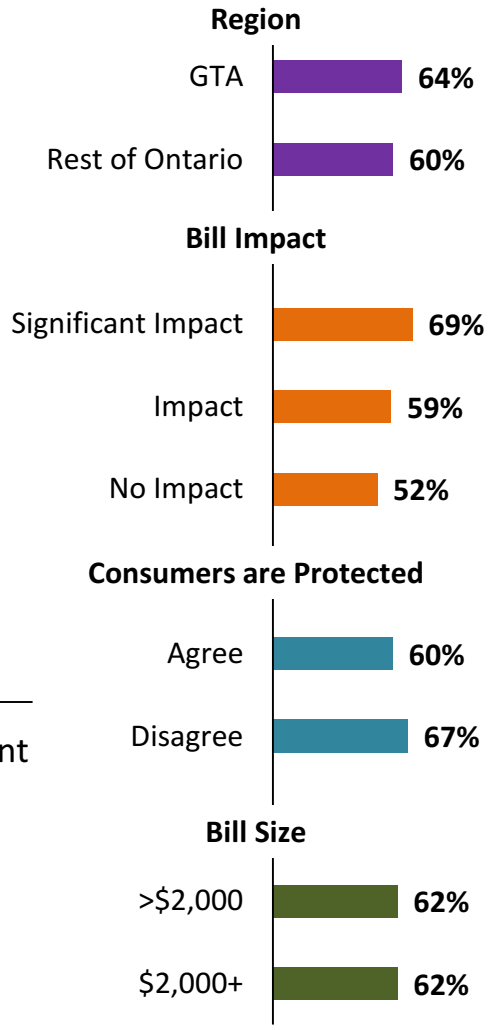
Q

For each of the following, please tell me how important it is to you.
Making positive contributions to Ontario's economy
[asked of all respondents, n=200]



Segmentation

*Those who say "**Very important**":*

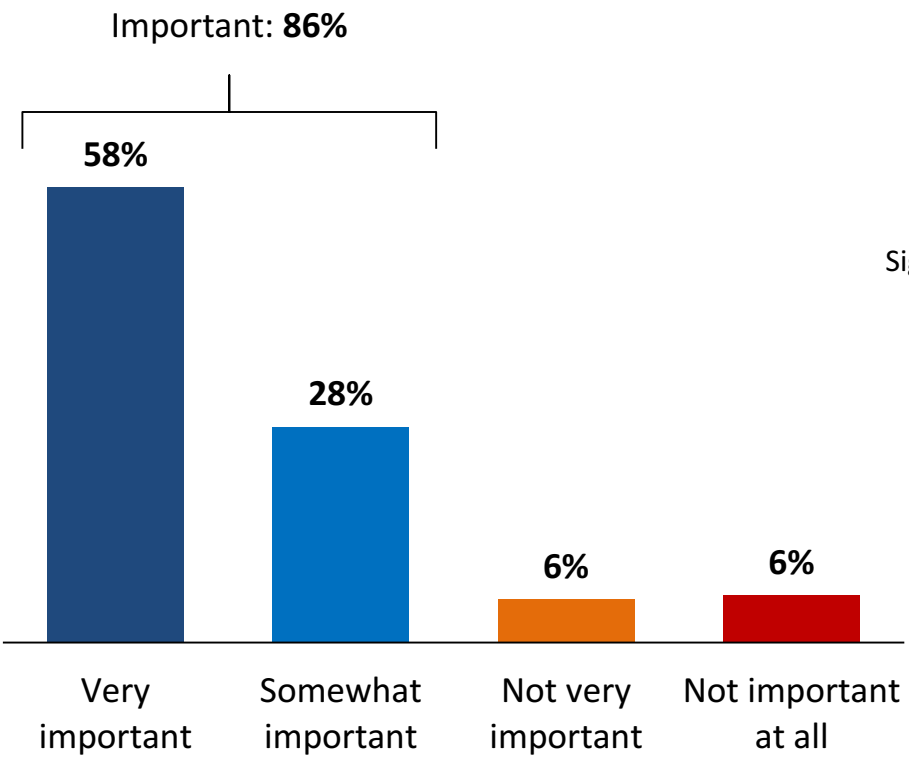


Note: 'Don't know' (2%) not shown.

Outcome Priorities

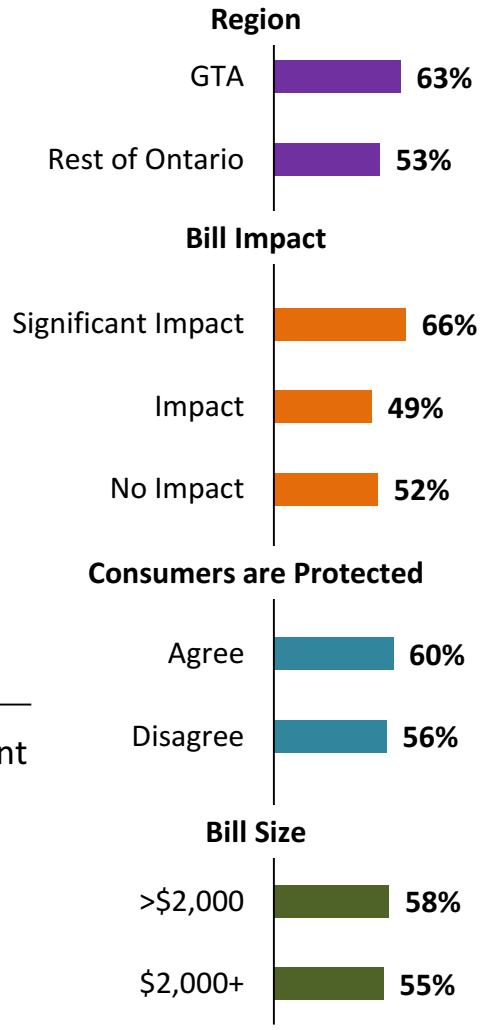
Contributing to Local Communities

Q For each of the following, please tell me how important it is to you.
Making positive contributions to local communities in which OPG operates
[asked of all respondents, n=200]



Segmentation

*Those who say "**Very important**":*



Note: 'Don't know' (3%) not shown.

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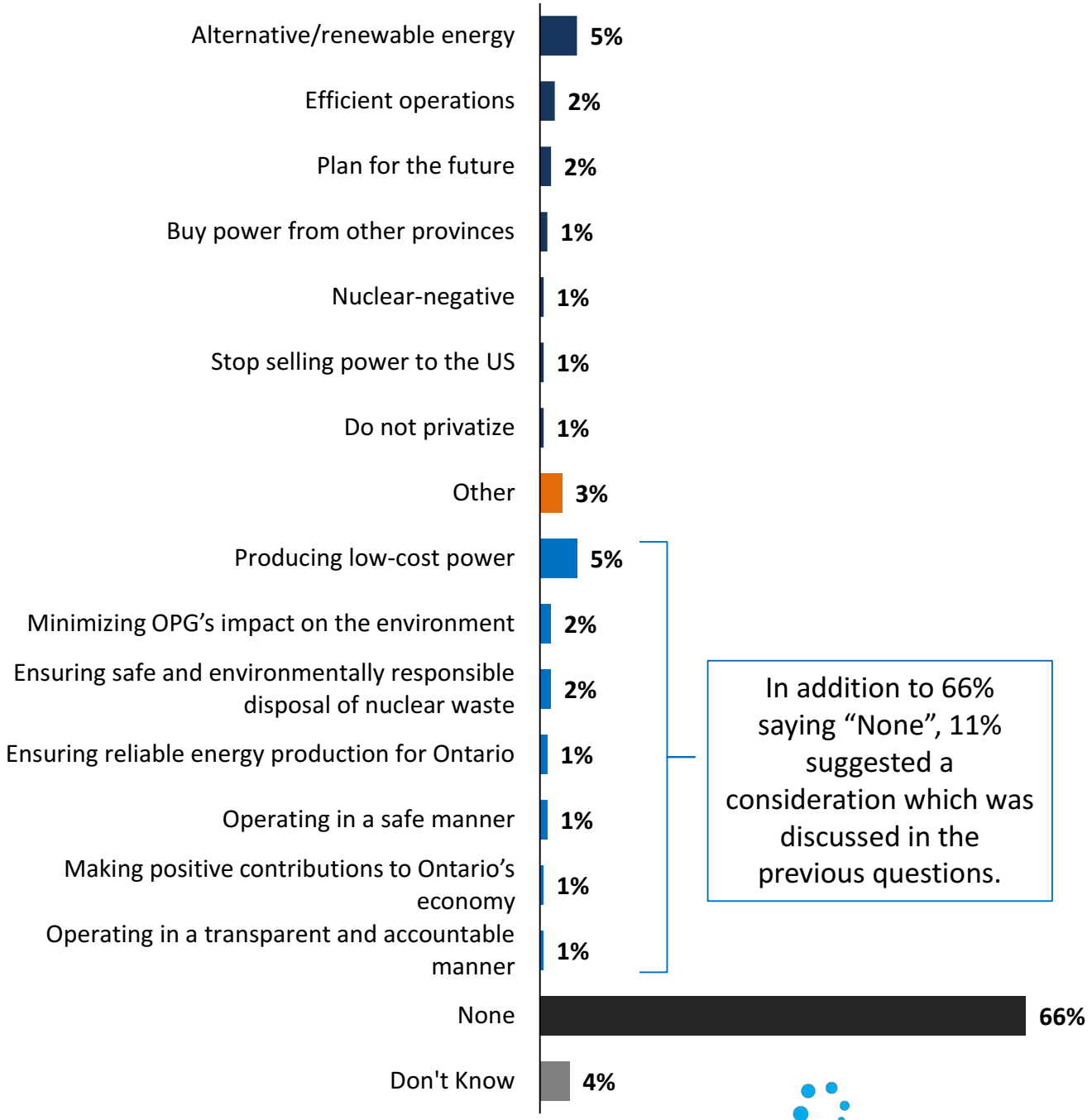
Outcomes Priorities

Additional Outcomes

Q Are there any other outcomes you feel OPG should be considering in developing its plans?
[asked of all respondents, n=200]



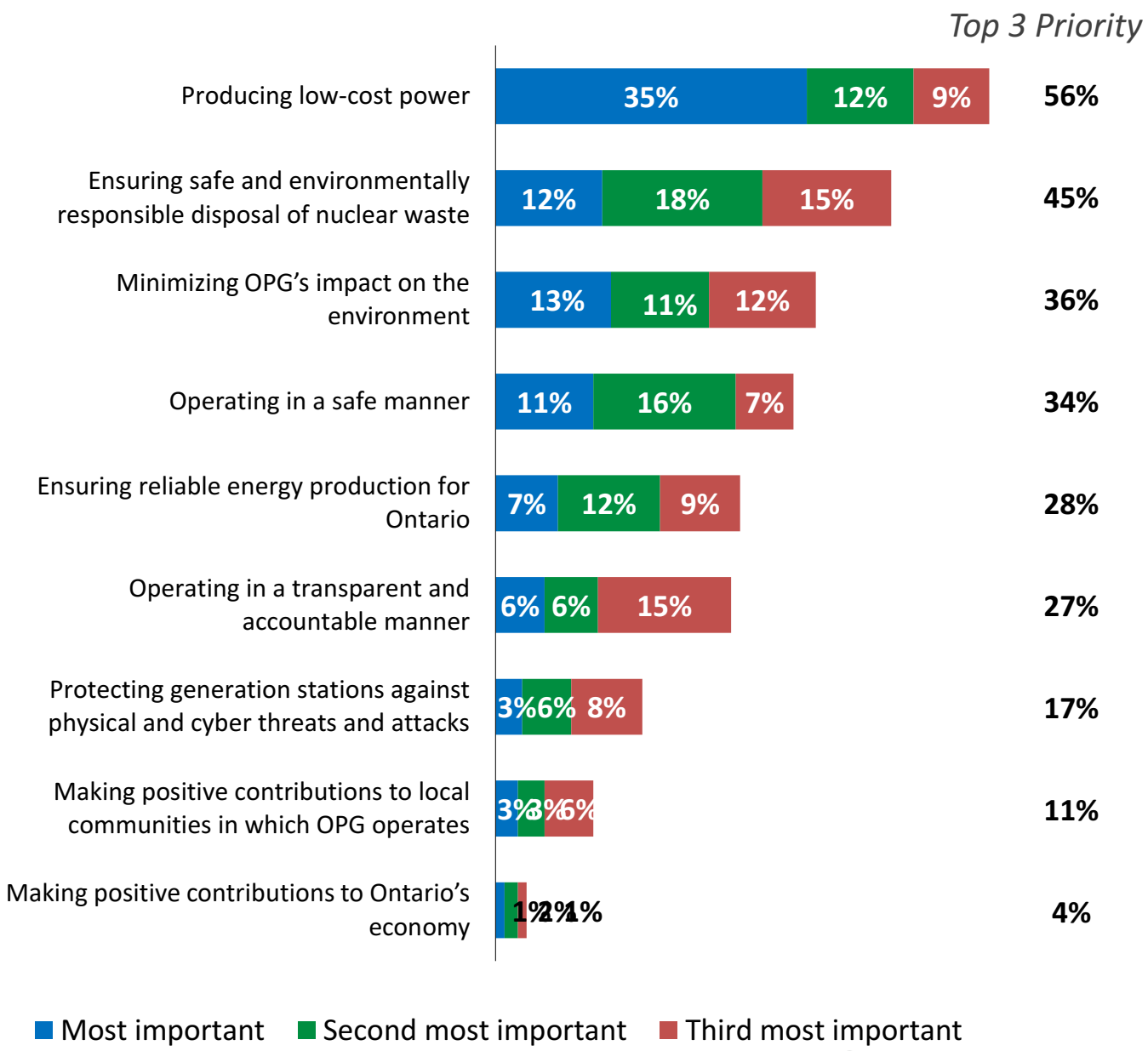
Note: 'Refused' (6%) not shown.

Outcome Priorities

Ranking the Top Three

Q I am going to read you that list of outcomes again, and I would like you to tell me which one you feel should be OPG's first priority. And which is the second most important? And which is the third most important?

[asked of all respondents, n=200, percentages are calculated based on the full sample]



Note: 'Don't know' not shown.

INNOVATIVE
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Filed: 2020-12-31
EB-2020-0290
Exhibit A2-2-1
Attachment 4
Page 314 of 421

INNOVATIVE RESEARCH GROUP

Online Workbook Report

2018 Customer Engagement

ONTARIO POWER GENERATION

February 2019

STRICTLY PRIVILEGED AND CONFIDENTIAL

Online Workbook Methodology

Ontario Power Generation (OPG) commissioned INNOVATIVE to develop an online workbook to provide all customers with an opportunity to learn more about OPG and to tell OPG what their priorities should be moving forward.

Field Dates & Completes

The Online Workbook was accessible to Ontario residents and small businesses from November 18th to December 14th, 2018.

- A total of 2,862 residential respondents completed the survey.
- The number of small business completes was 75.
  Due to the small sample number of small business respondents, their results are displayed as frequencies, denoted by n-size, throughout the report.

Promoting the Online Workbook

To make the workbook accessible to as many people as possible it was promoted through a variety of channels including:

- Ontario Power Generation corporate website promotions;
- Social media promotion on Facebook.

Validating Responses

Because the survey was posted publicly, the sample was also screened for respondents who were not seriously answering the questions. This was done by analyzing the content of open ended responses, and responses deemed invalid were removed from the final sample.

Despite the large number of completes, this is a sample of volunteers and not a systematic sample on Ontarians. Their responses provided important direction as we finalized the random telephone survey. However, these results cannot be generalized to the broader public.

Note: *Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers. Caution interpreting results with small n-sizes.*

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INNOVATIVE RESEARCH GROUP

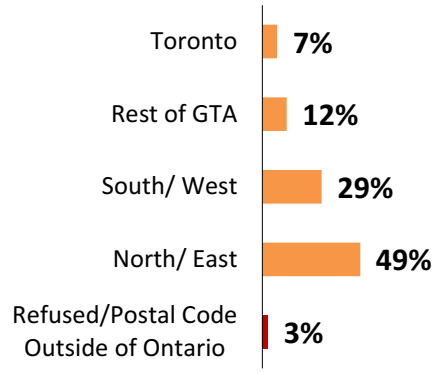
Residential Workbook

Residential

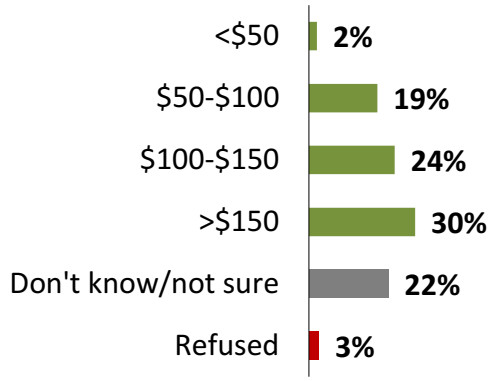
Demographics

Respondent Profile

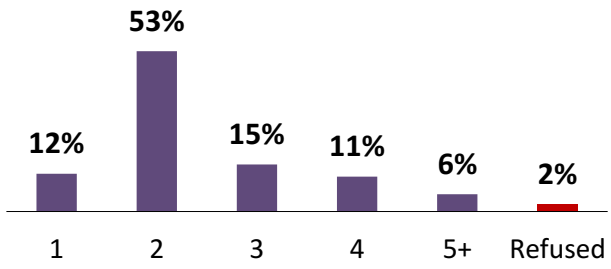
Region



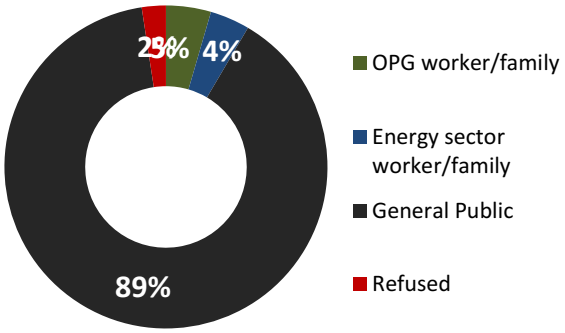
Bill Size



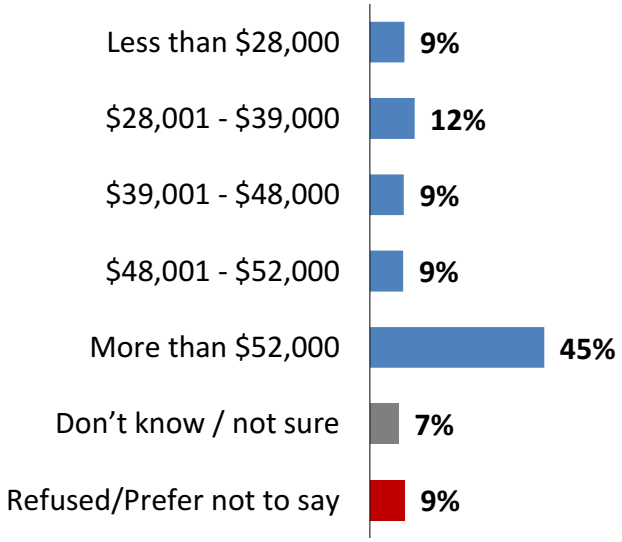
Household Size



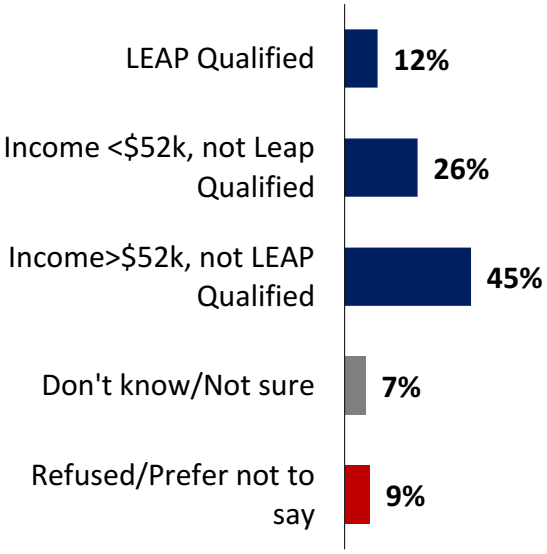
Relationship to OPG/ Energy Sector



Household Income

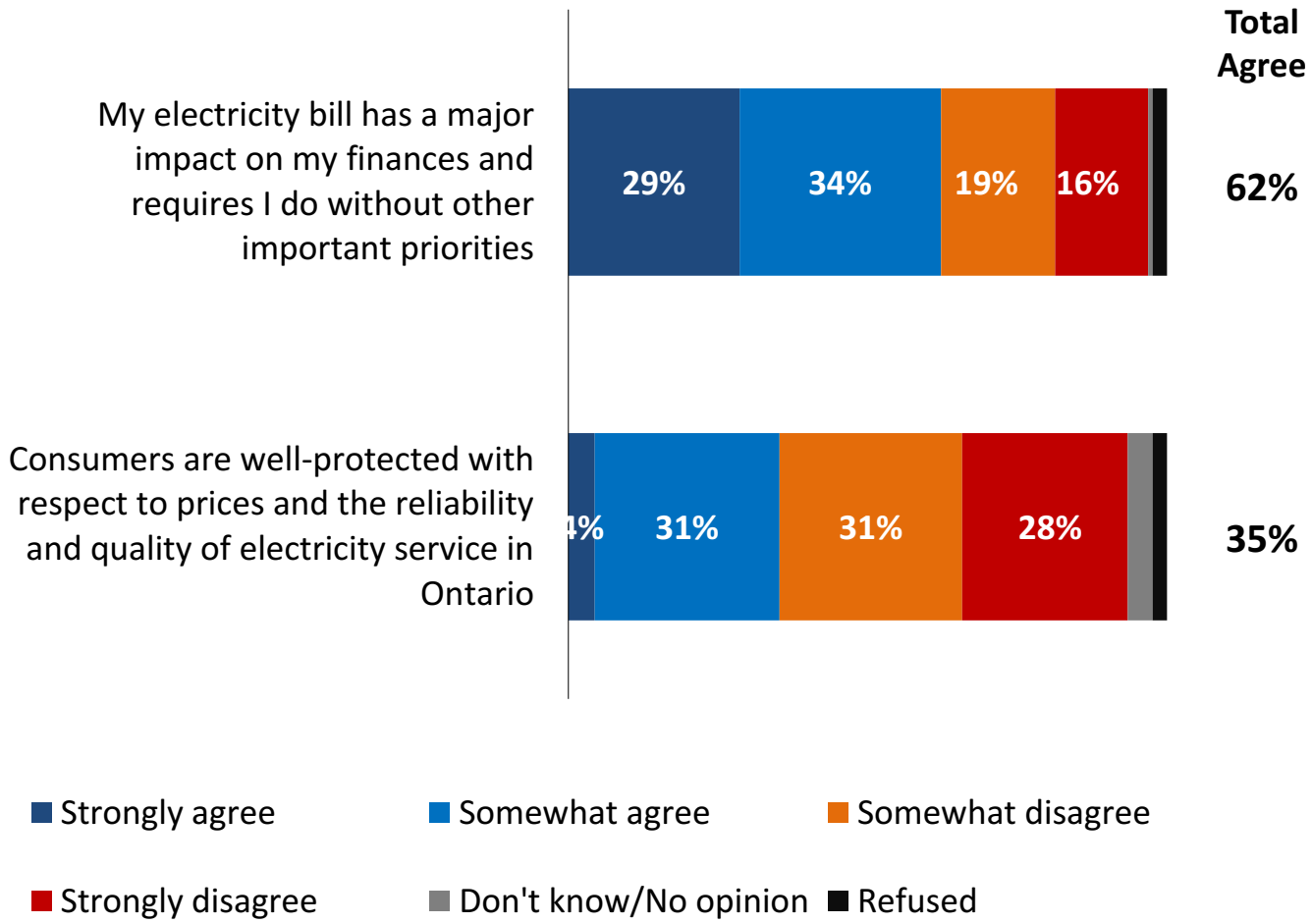


LEAP Qualification



Segmentation

Q To what extent do you agree or disagree with the following statement?
[asked of all respondents, n=2,862]



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Background Information

Residential

Electricity 101

Understanding OPG's Role in Ontario's Electricity System

Ontario's electricity system is owned and operated by provincial, municipal, and private corporations across the province. It is made up of three key components: **generation**, **transmission** and **distribution**.

Generation

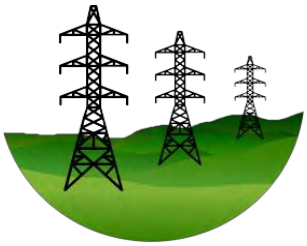
Where electricity comes from.

Ontario gets its electricity from a mix of energy sources. About half of our electricity comes from nuclear power. The remainder comes from a mix of hydroelectric, natural gas, wind and solar.

Most of Ontario's electricity generating stations are located in the southern part of the province close to where the demand for power is greatest. The majority of these power stations are owned and operated by **OPG**, a government owned company that generates about half of Ontario's electricity. The other half comes from multiple generators who have contracts with the grid operator to provide power from a variety of sources.

Transmission

Electricity travels across Ontario.



Once electricity is generated, it must be transported to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. The province has more than 30,000 km of transmission lines.

Local Distribution

Delivering power to homes and businesses in your community.

Your local utility is responsible for the distribution of electricity. This local distribution system includes transformer stations of various sizes and designs that decrease the voltage of the electricity so it can be used in your home or business.

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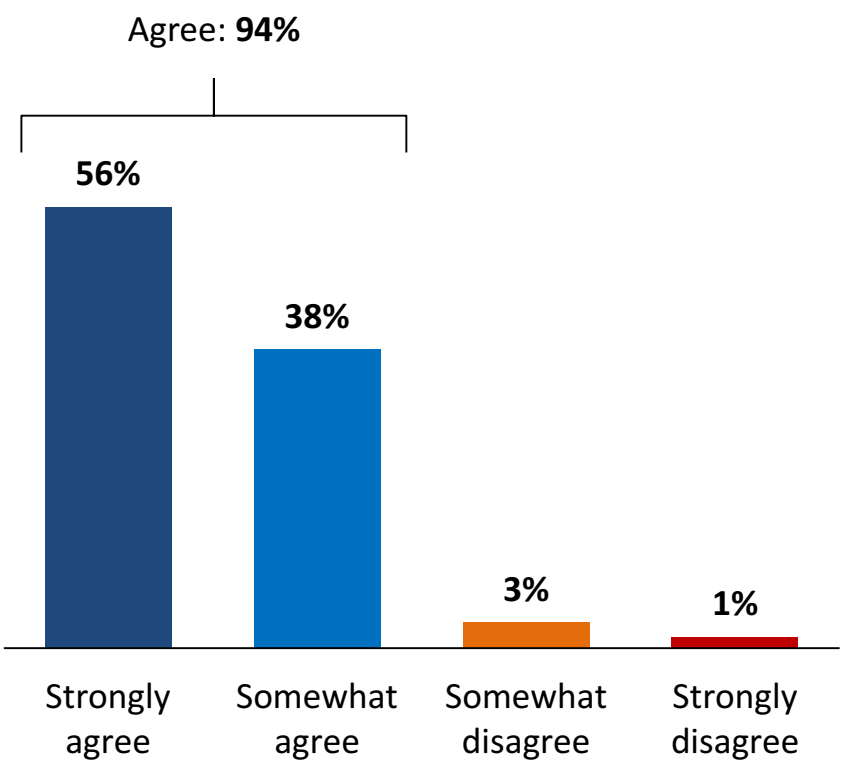
Electricity 101

Understanding OPG's Role in Ontario's Electricity System

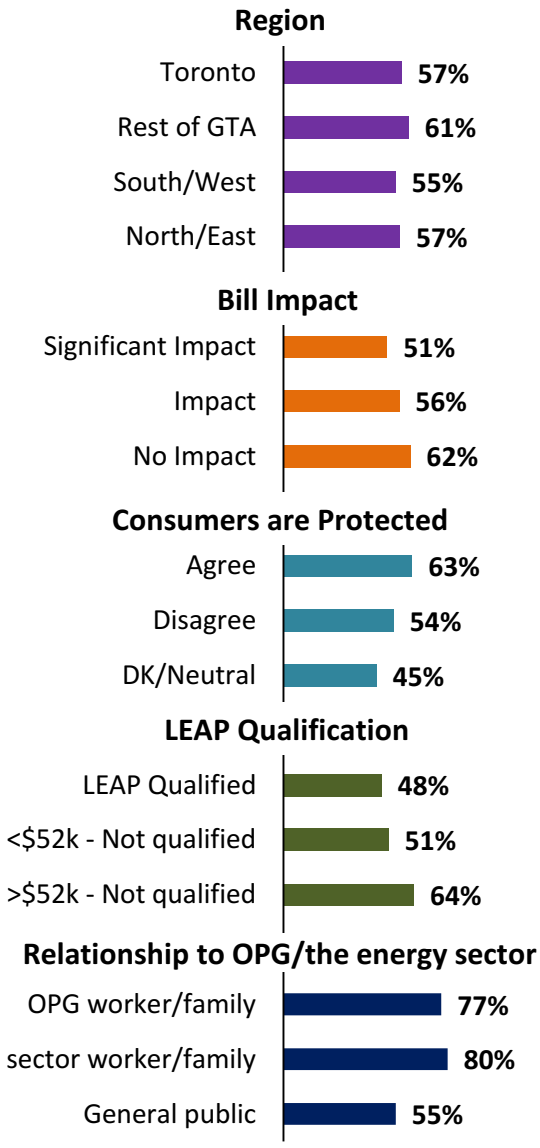
Q

To what extent do you agree or disagree with the following statement?
I generally understand how the various parts of the electricity system work together.
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Strongly agree**":*



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Note: 'Don't know' (1%) not shown

Residential

Ontario Power Generation (OPG)

Fast Facts

Who is OPG?

- Ontario Power Generation is owned by the province of Ontario.
- It was established in 1999 to operate the electricity generation facilities of the utility that was previously known as Ontario Hydro.
- Today, OPG is one of the largest and most complex generating companies in North America with more than 9,000 employees across the Province.
- The Ontario Energy Board (OEB) sets the rates that OPG can charge its customers for most of the electricity it generates. OPG is the only "regulated" electricity generator in Ontario. For the other generators, electricity prices are set in their contracts.
- **OPG's regulated electricity comes from two sources**:

This consultation is about that "regulated" electricity.

Nuclear

OPG's two nuclear generating stations (GS) play a significant role in Ontario's energy mix. Darlington Nuclear GS and Pickering Nuclear GS operate continuously to meet the minimum level of power demand for the province while emitting virtually no air pollution.

To maintain these stations, OPG began the refurbishment of Darlington Nuclear GS in October 2016. The refurbishment will extend the station's life by another 30 years.

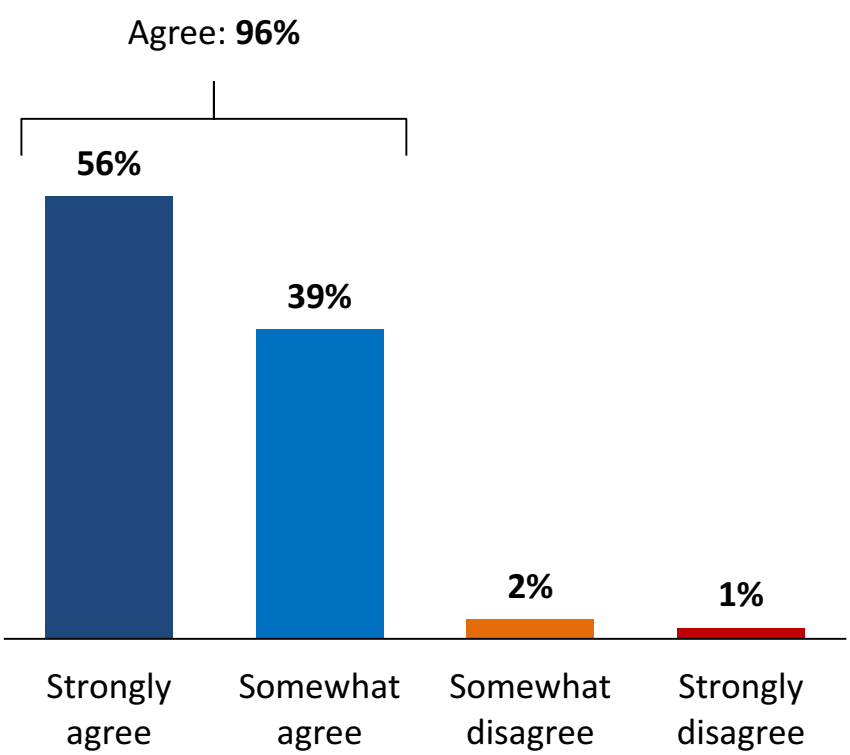
Hydroelectric

More than one third of the electricity that OPG produces comes from hydroelectric facilities. This renewable resource has fueled Ontario's economic growth since the beginning of the 20th century and it remains an important contributor of clean, low-cost power in the province.

Understanding of OPG

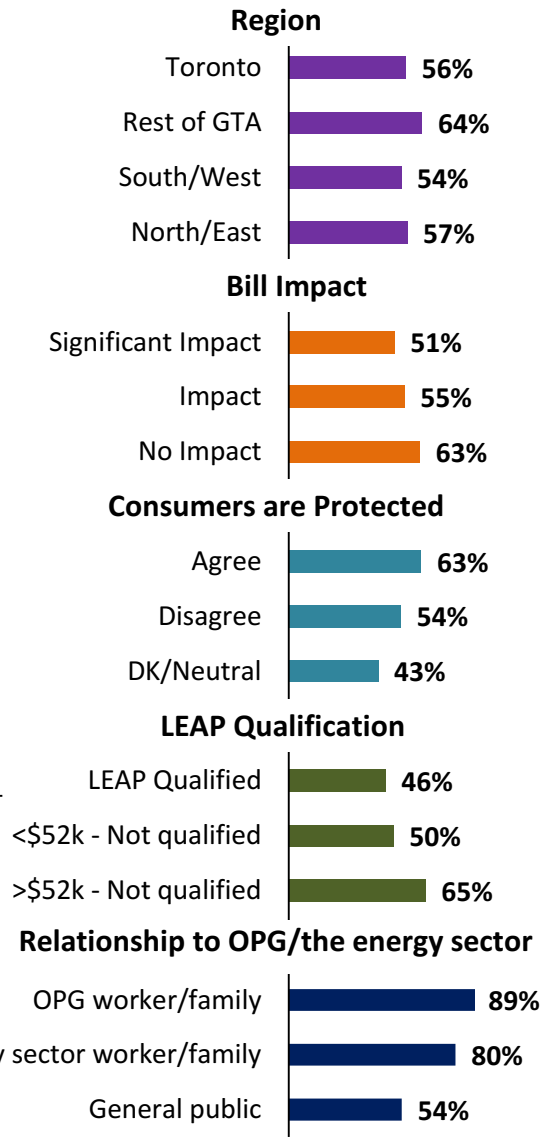
Q

To what extent do you agree or disagree with the following statement?
I have a general understanding of who OPG is.
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Strongly agree**":*



Note: 'Don't know' (<1%) not shown.

Residential

How much does OPG's electricity generation cost me?

How much of my bill goes to OPG?

For the typical residential customer, about half of the monthly electricity bill goes to pay for power generation. **The cost of OPG's power represents about 20% of a customer's bill**.

The rest of the bill goes to other generators, transmission companies, and distribution companies, regulatory agencies, and government taxes.

Sample Residential Bill

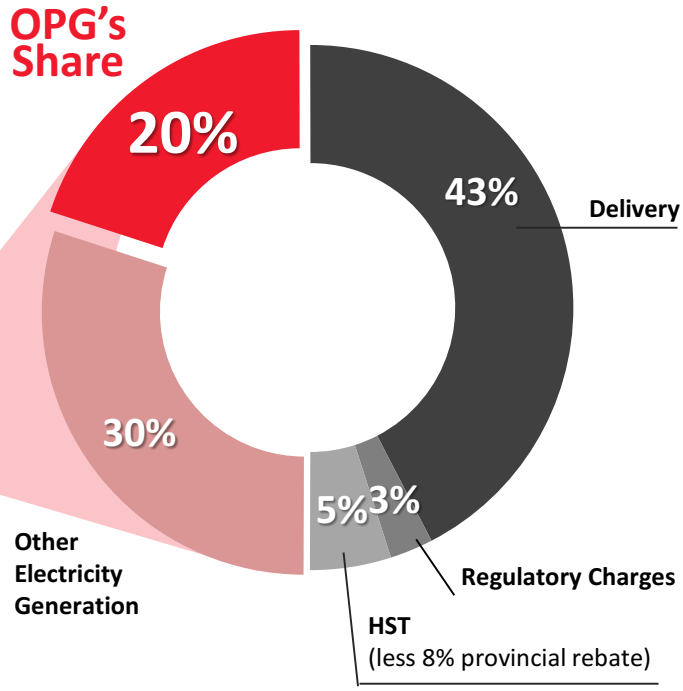
Monthly Hydro Bill
(Based on consumption of 750 kWh)

Account Number:
000 000 000 000 0000

Meter Number:
00000000

Your Electricity Charges	
Electricity	
Off-Peak @ 6.5 ¢/kWh	31.69
Mid-Peak @ 9.4 ¢/kWh	11.99
On-Peak @ 13.2 ¢/kWh	17.82
Delivery	52.21
Regulatory Charges	3.28
Total Electricity Charges	**$116.99**
HST	15.21
8% Provincial Rebate*	**(-$9.36)**
Total Amount	**$122.84**

*The Ontario government is providing a rebate on your electricity costs equal to the provincial portion of the HST

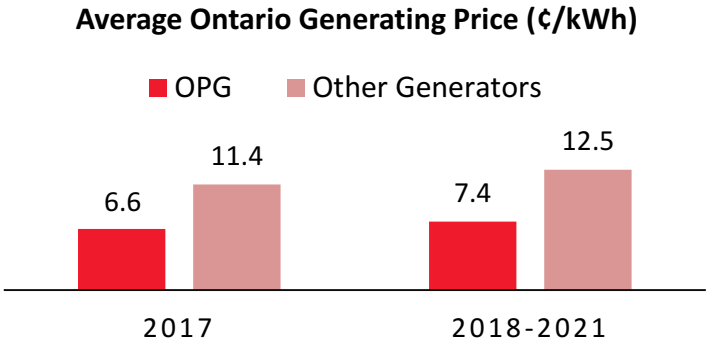


Note: *Graphs may not always total 100% due to rounding.*

How much does OPG's energy cost compared to others?

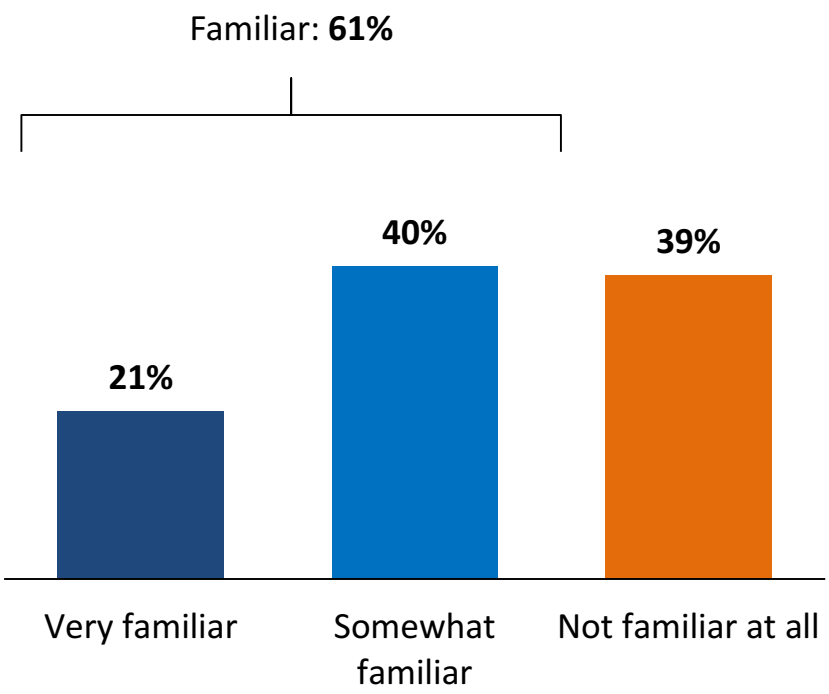
The OEB sets the prices that OPG can charge its customers.

The electricity OPG generates cost you about 40% less than the average price paid to other generators in the province.



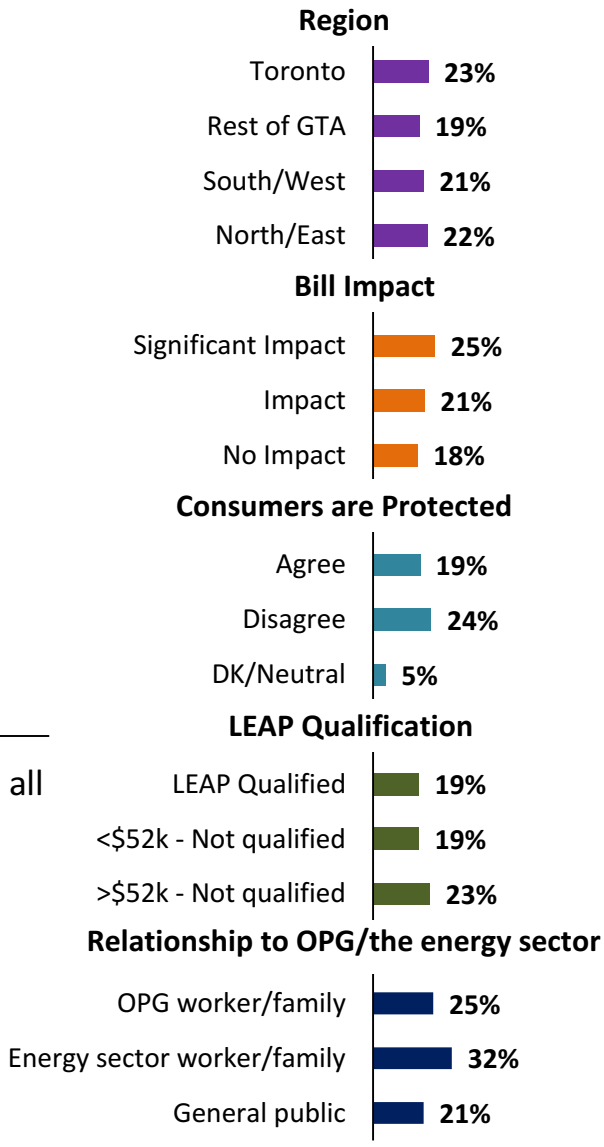
Familiarity with OPG's Share of the Bill

Q Before this workbook, how familiar were you with the percentage of your electricity bill that goes to OPG?
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Very familiar**":*



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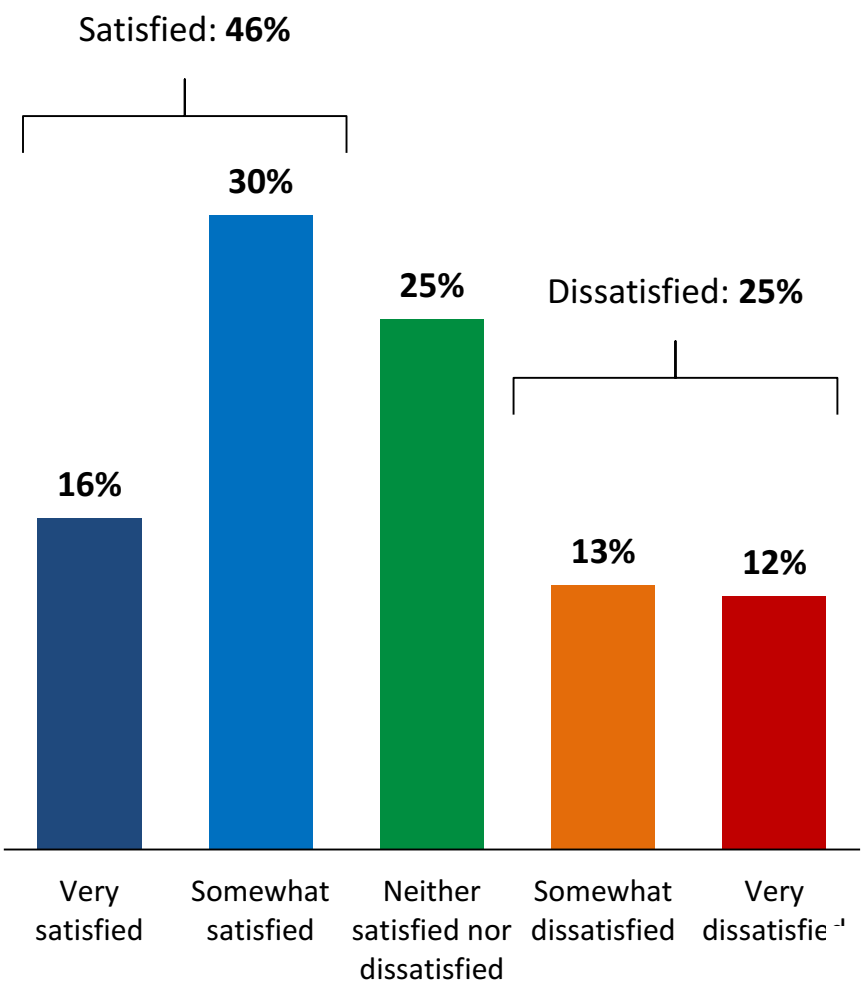
Customer Needs & Preferences

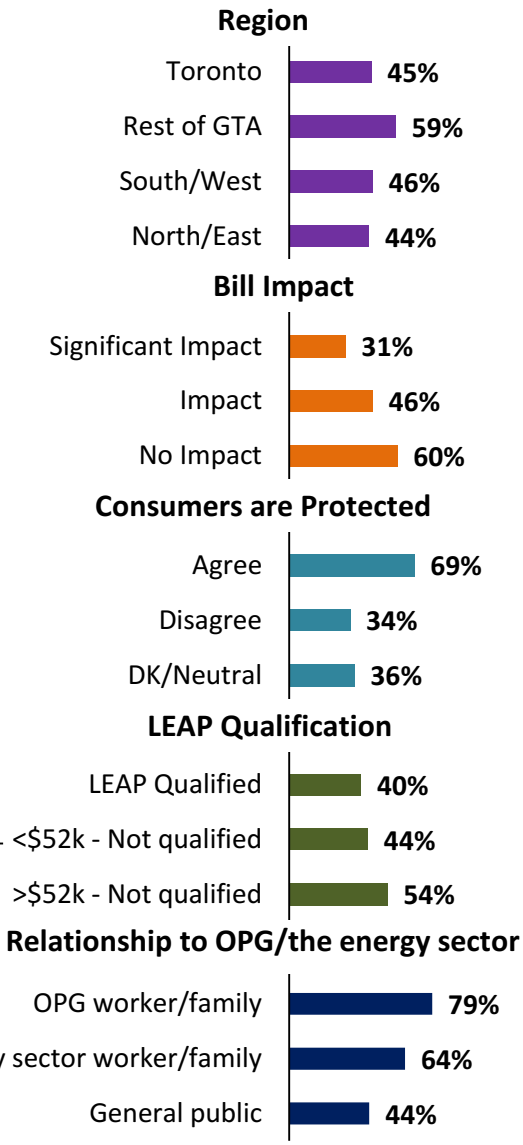
Satisfaction with OPG

Q Now that you've read a bit more about OPG and how it fits into Ontario's electricity system, how satisfied are you with OPG's performance?
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Satisfied**":*



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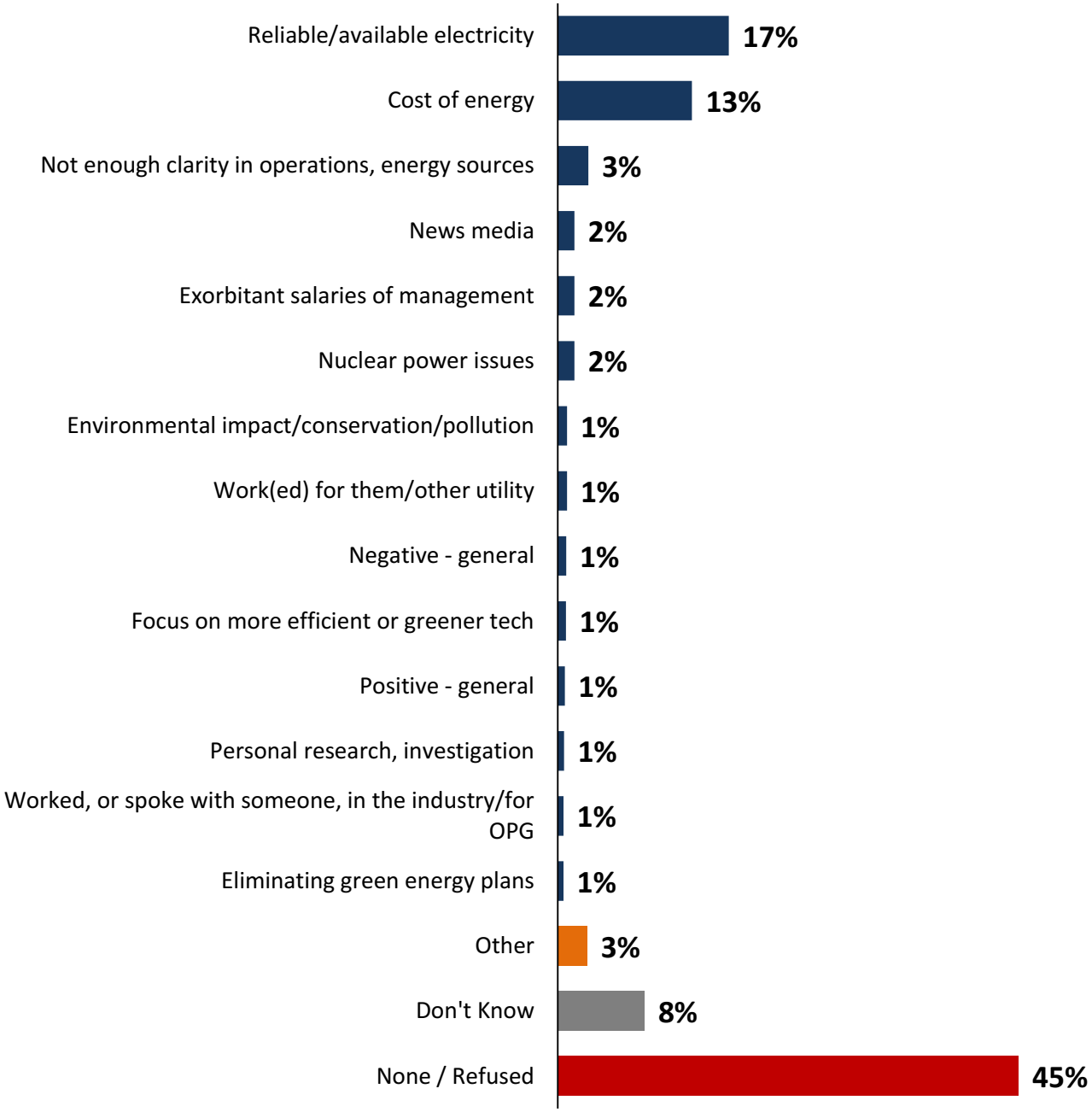
Note: 'Don't know' (3%) not shown.

Residential

Satisfaction with OPG

Judgement Criteria

Q How do you know if OPG is doing a good job for you or not?
[asked of all respondents, n=2,862]



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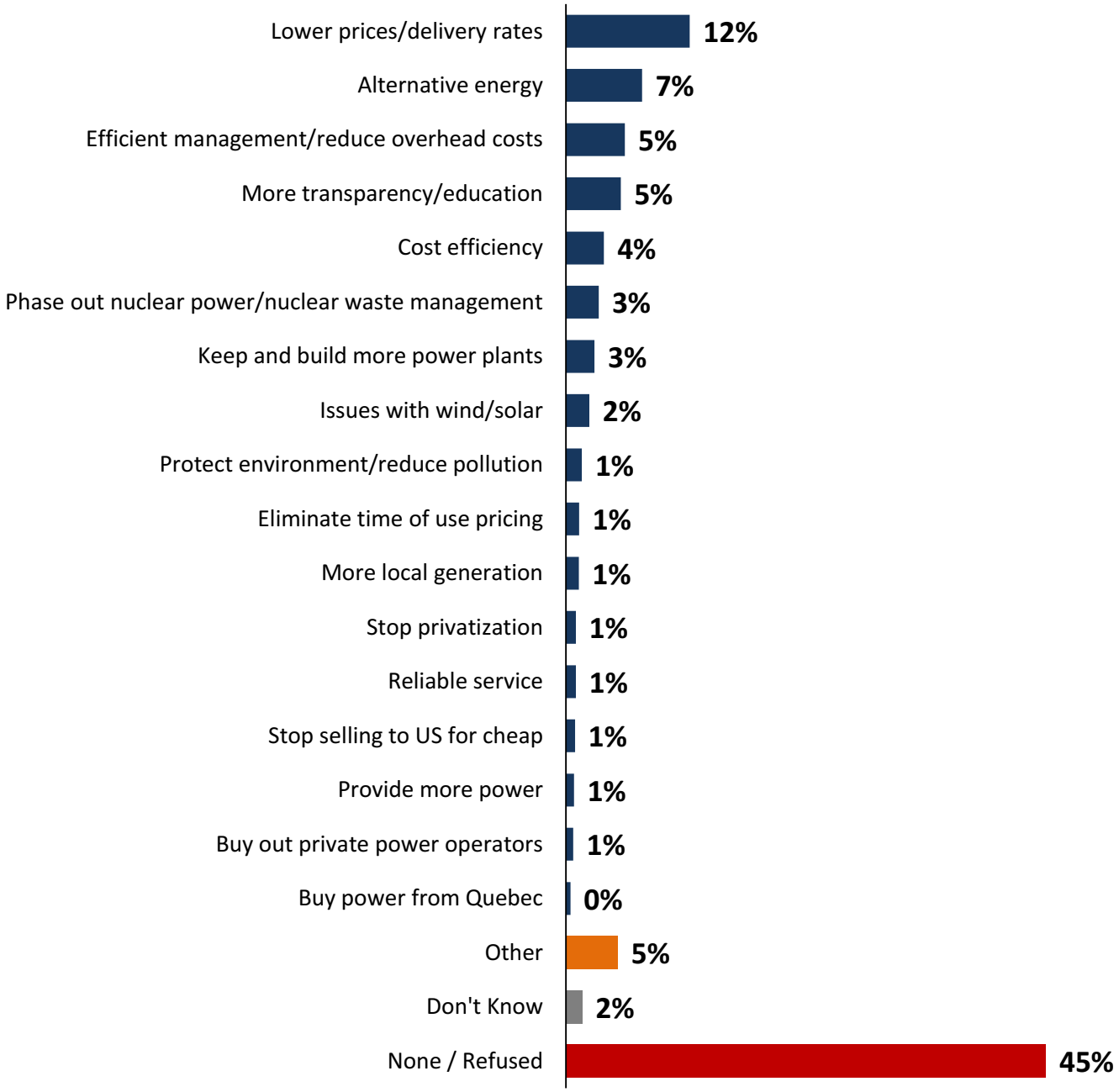
Residential

Satisfaction with OPG

Suggestions for Improvement

Q Is there anything in particular that OPG could do better for you?
[asked of all respondents, n=2,862]



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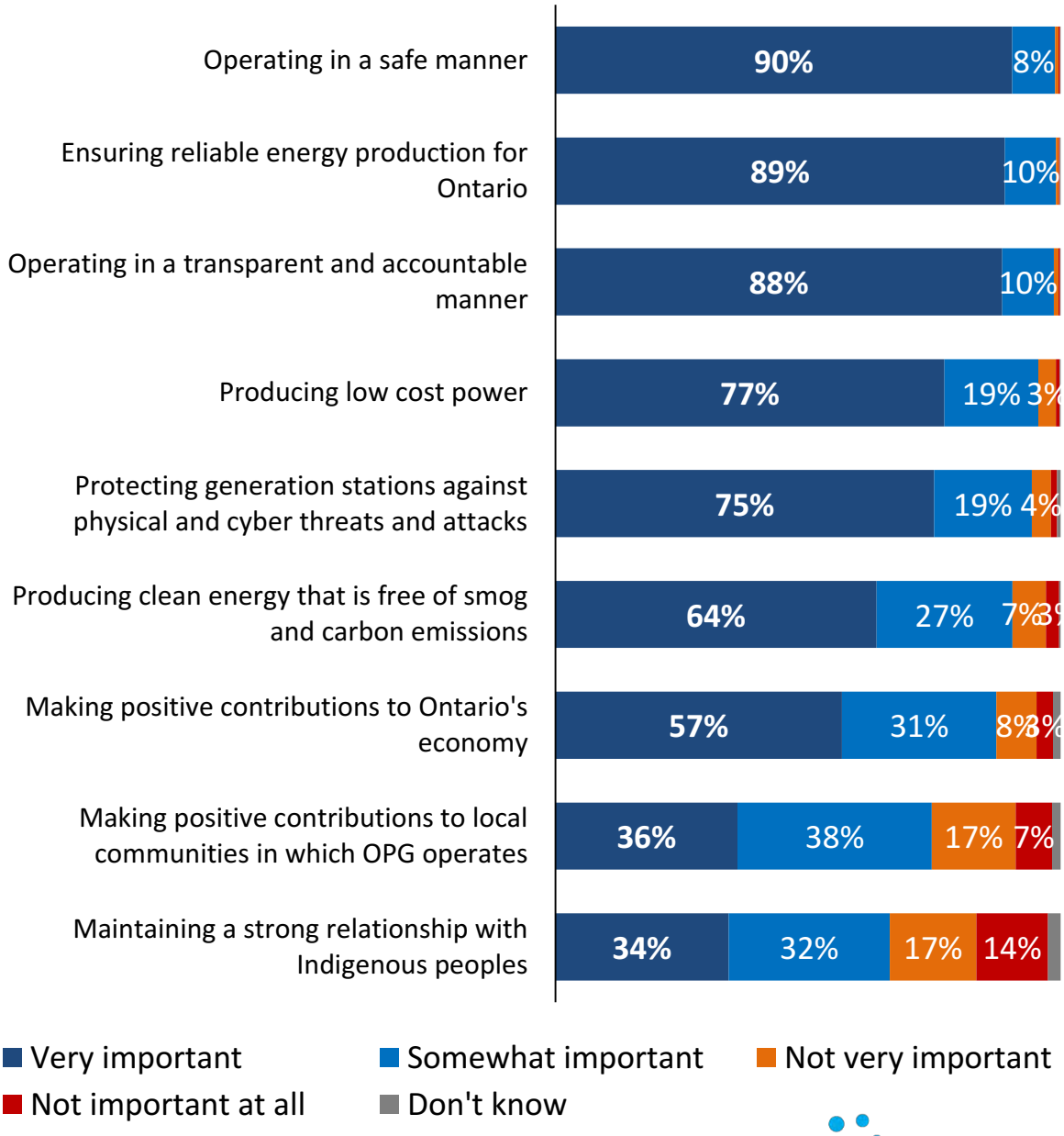
Outcome Priorities

Overview of Importance Ratings

Q When the OEB assesses OPG's business plan, it will ask OPG what outcomes matter to customers and how the business plan delivers on those outcomes. Below is a list of outcomes created from earlier customer input. For each of the following, please indicate how important they are to [you/your organization].

[asked of all respondents, n=2,862]



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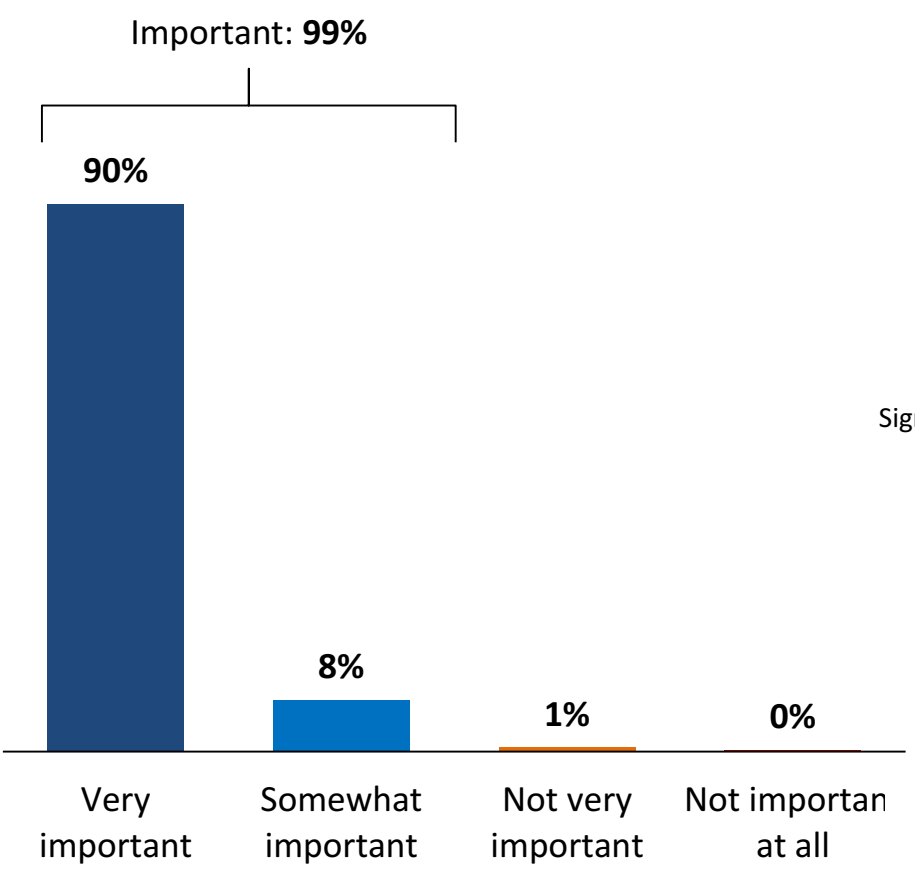
Outcome Priorities

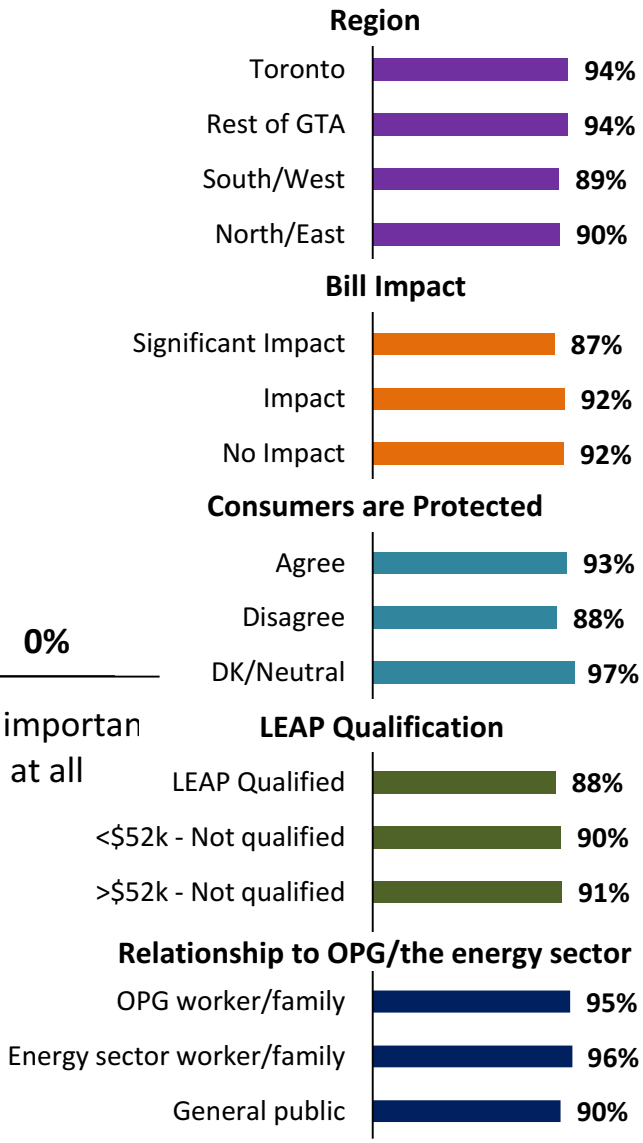
Operating Safely

Q For each of the following, please indicate how important they are to [you/your organization].
Operating in a safe manner.
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Very important**":*

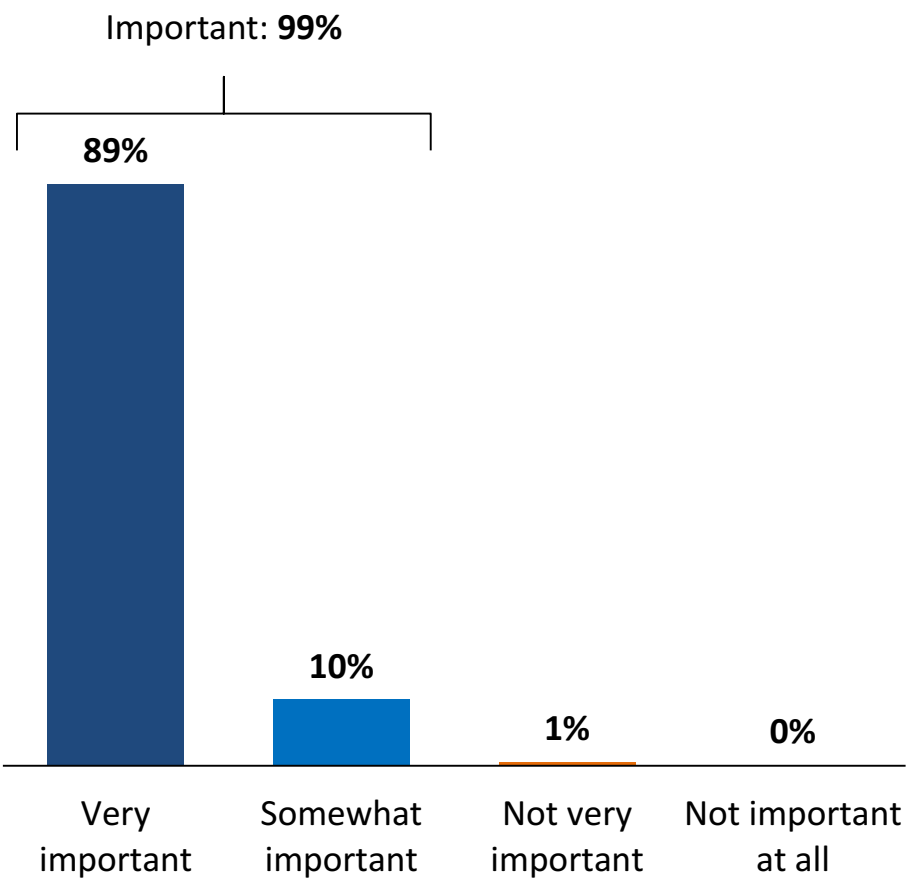


Note: 'Don't know' (0%) not shown.

Outcome Priorities

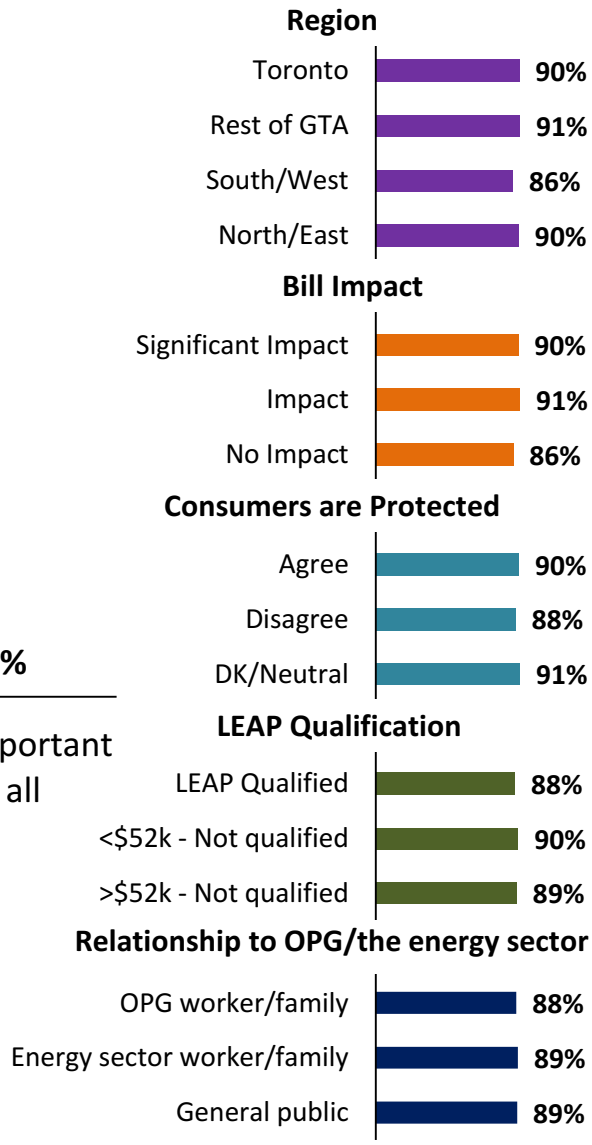
Reliable Production

Q For each of the following, please indicate how important they are to [you/your organization].
Ensuring reliable energy production for Ontario.
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Very important**":*



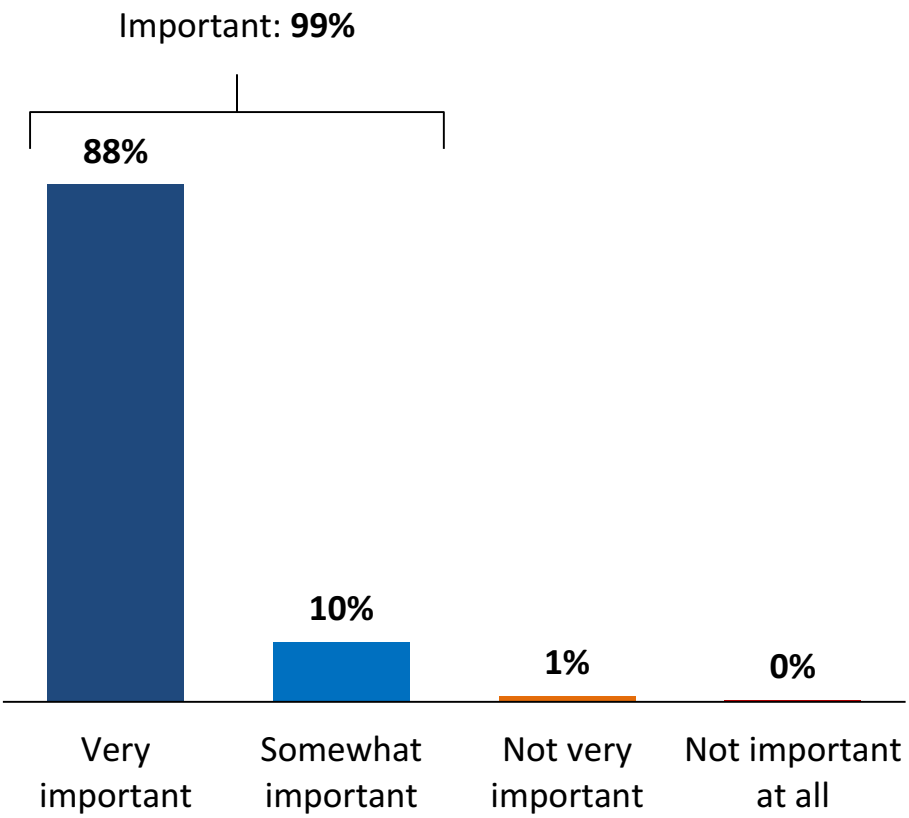
Note: 'Don't know' (0%) not shown.

Residential

Outcome Priorities

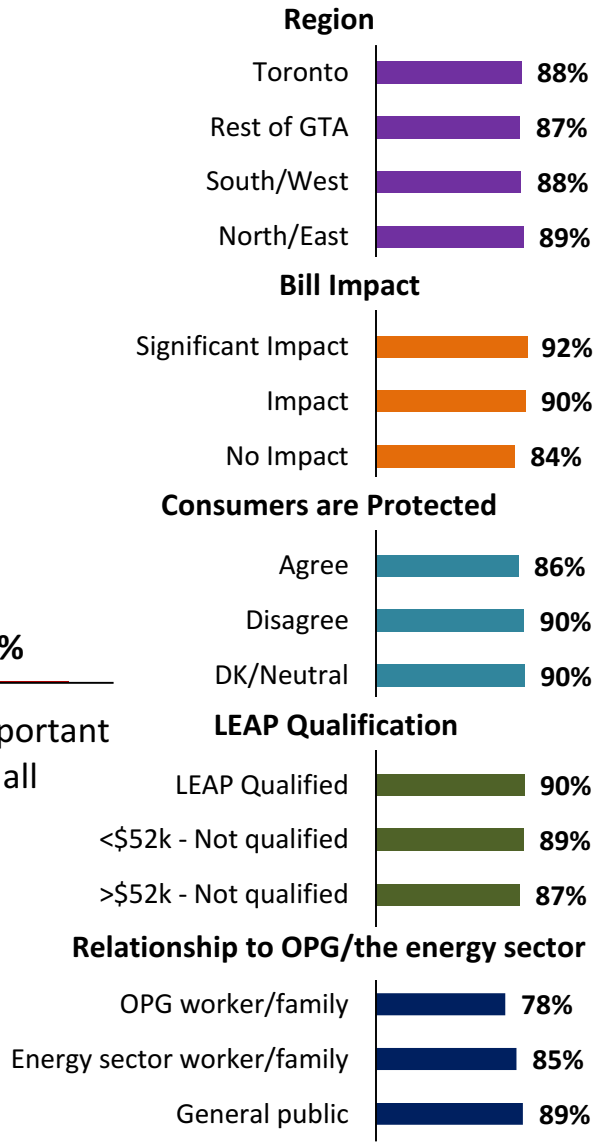
Transparency & Accountability

Q For each of the following, please indicate how important they are to [you/your organization].
Operating in a transparent and accountable manner.
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Very important**":*



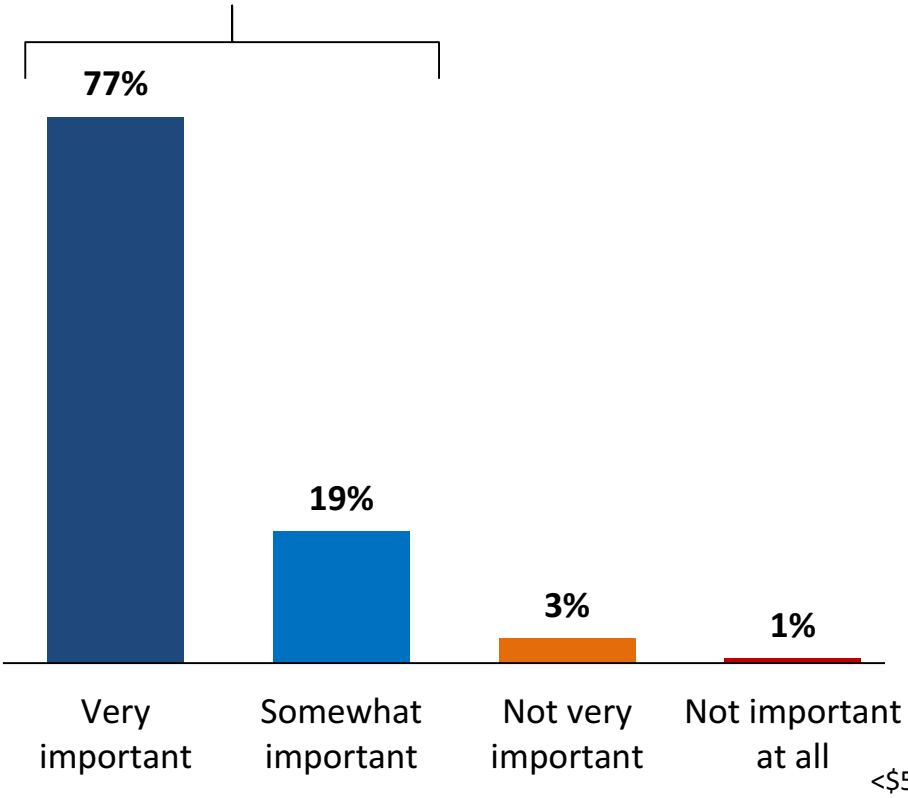
Note: 'Don't know' (0%) not shown.

Outcome Priorities

Producing Low Cost Power

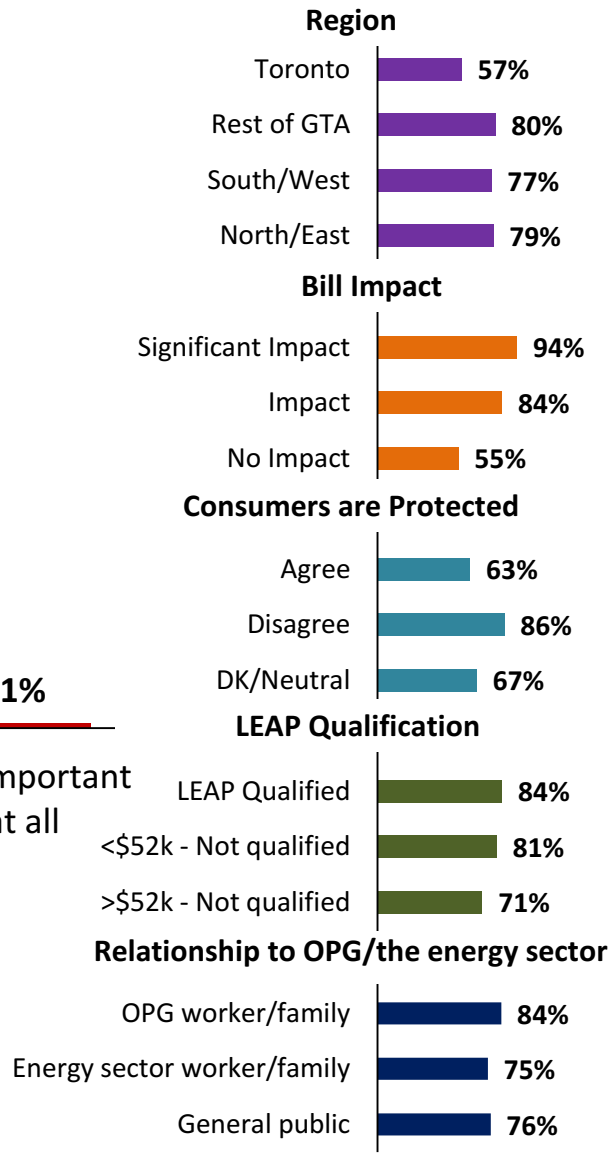
Q For each of the following, please indicate how important they are to [you/your organization]. ***Producing low cost power.***
[asked of all respondents, n=2,862]

Important: **96%**



Segmentation

*Those who say "**Very important**":*



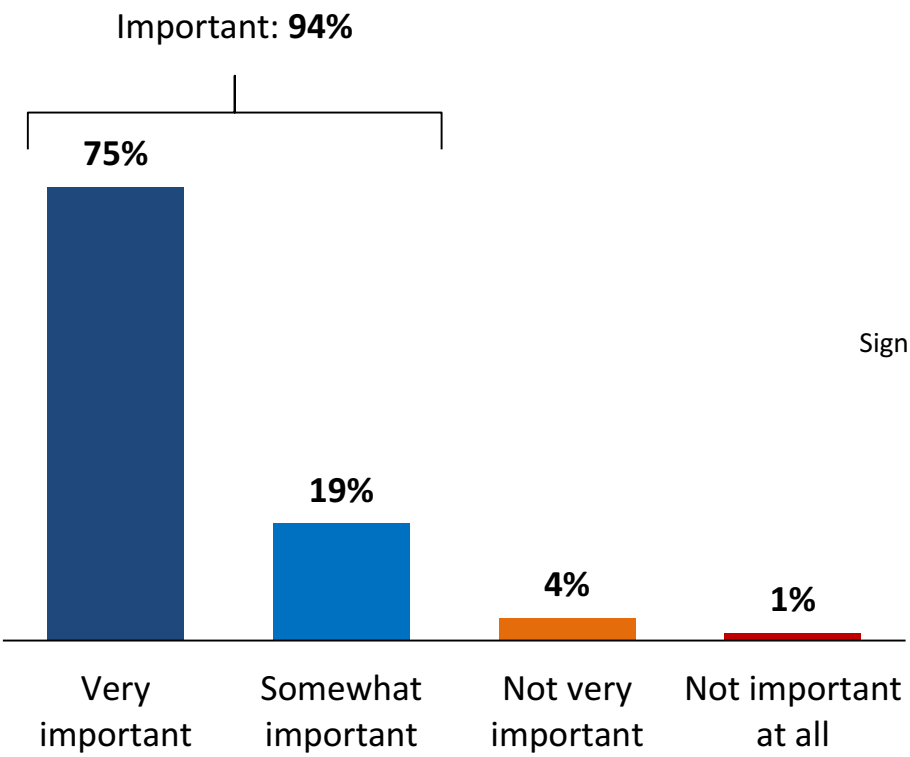
Note: 'Don't know' (0%) not shown.

Residential

Outcome Priorities

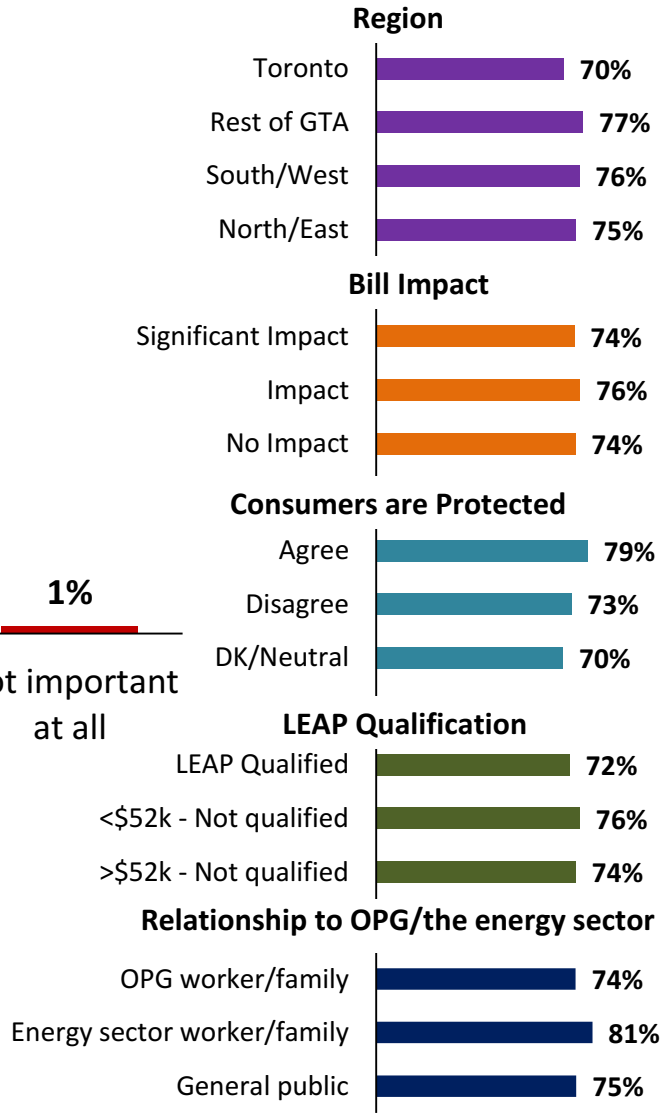
Protecting Against Threats

Q For each of the following, please indicate how important they are to [you/your organization].
Protecting generation stations against physical and cyber threats and attacks.
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Very important**":*



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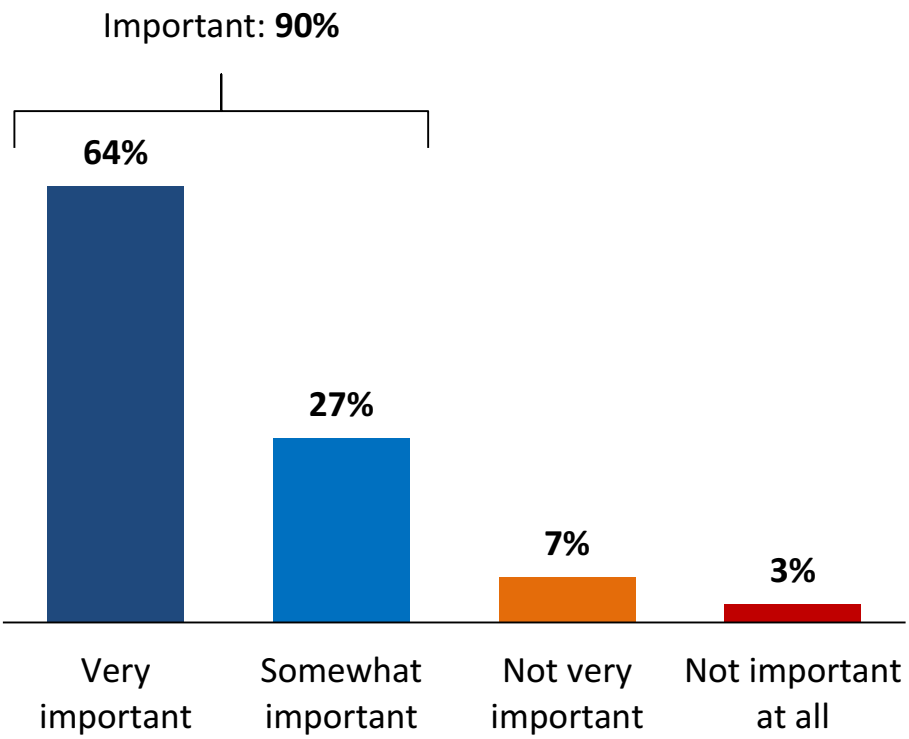
Note: 'Don't know' (1%) not shown.

Outcome Priorities

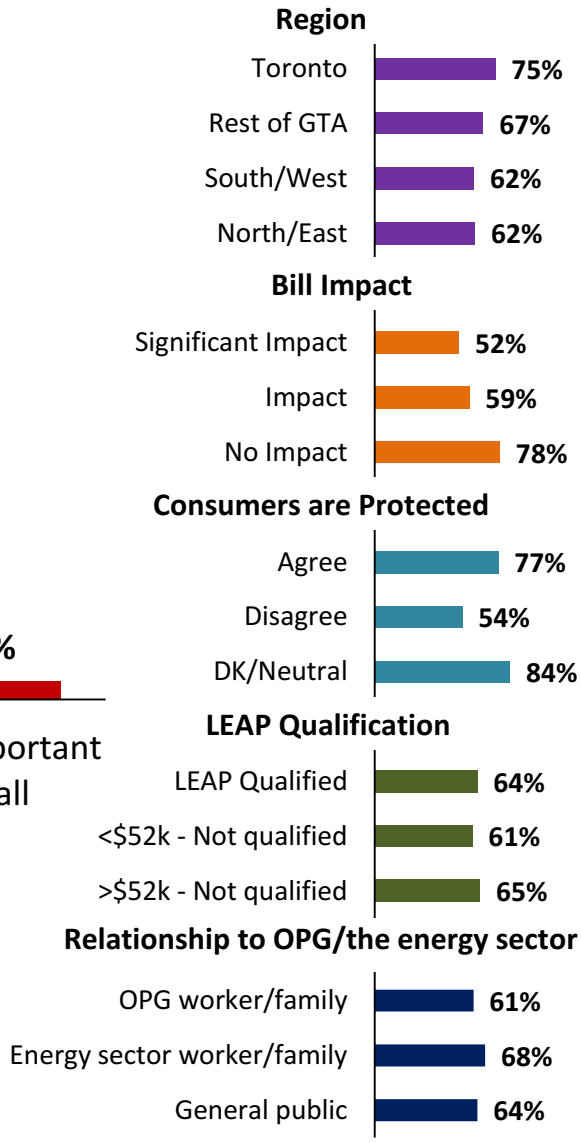
Clean Energy

Q For each of the following, please indicate how important they are to [you/your organization].
Producing clean energy that is free of smog and carbon emissions.
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Very important**":*



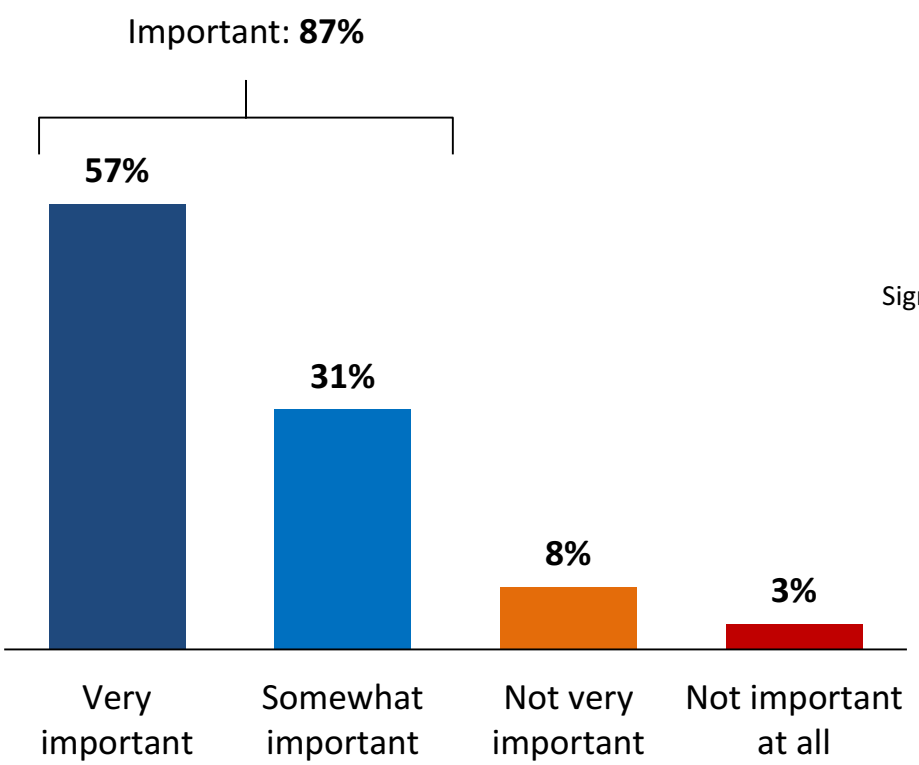
Note: 'Don't know' (0%) not shown.

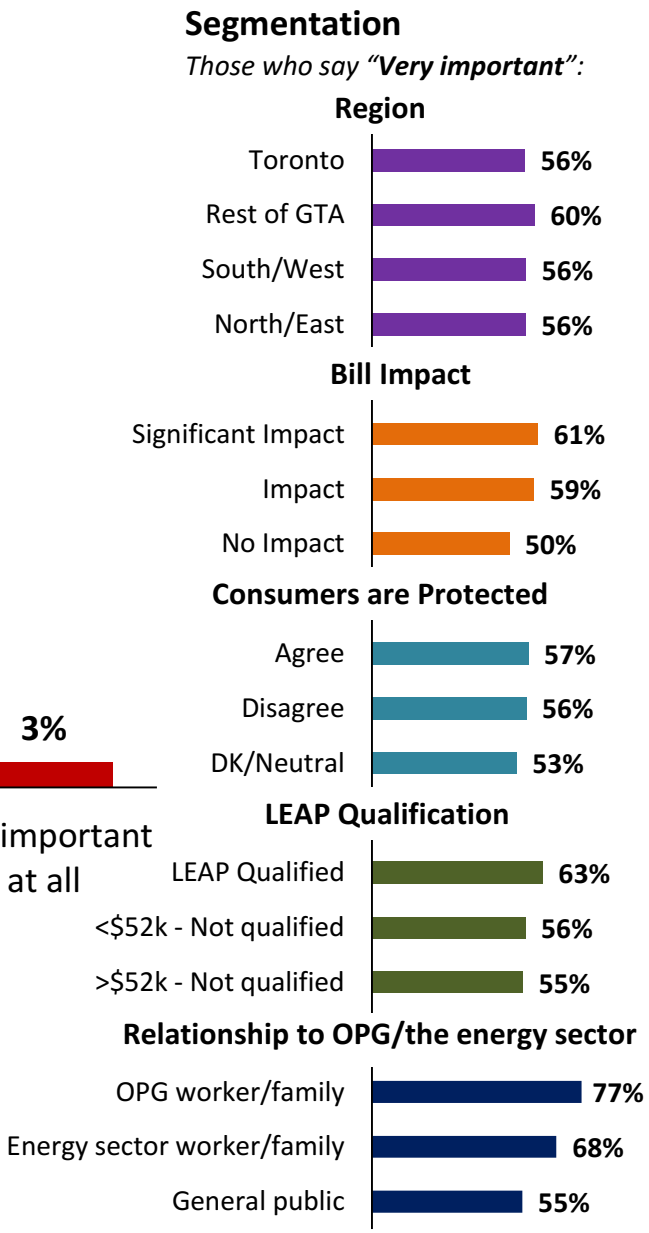
Residential

Outcome Priorities

Contributing to Ontario's Economy

Q For each of the following, please indicate how important they are to [you/your organization].
Making positive contributions to Ontario's economy
[asked of all respondents, n=2,862]





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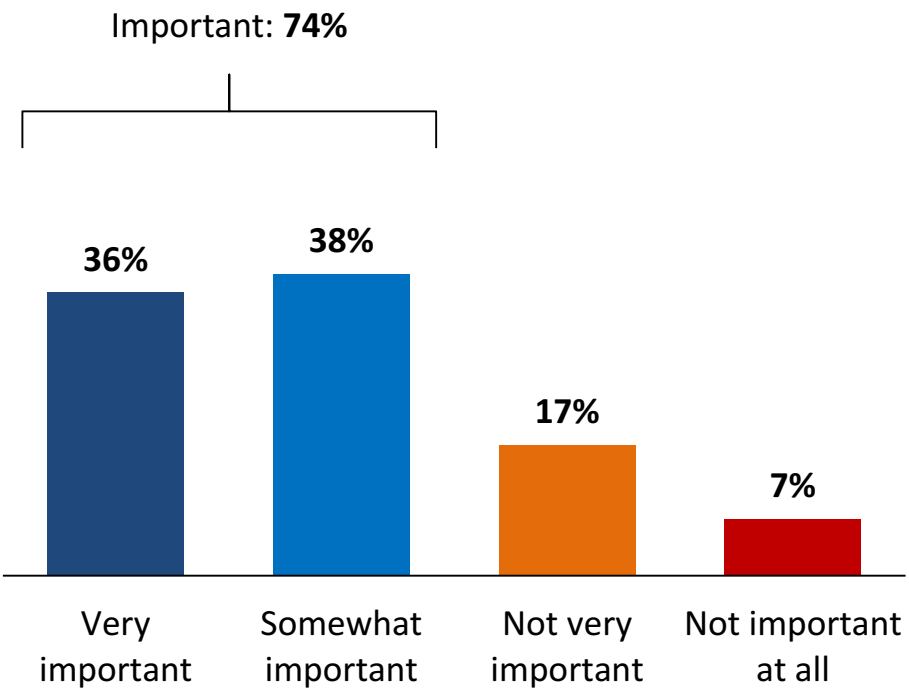
Note: 'Don't know' (2%) not shown.

Outcome Priorities

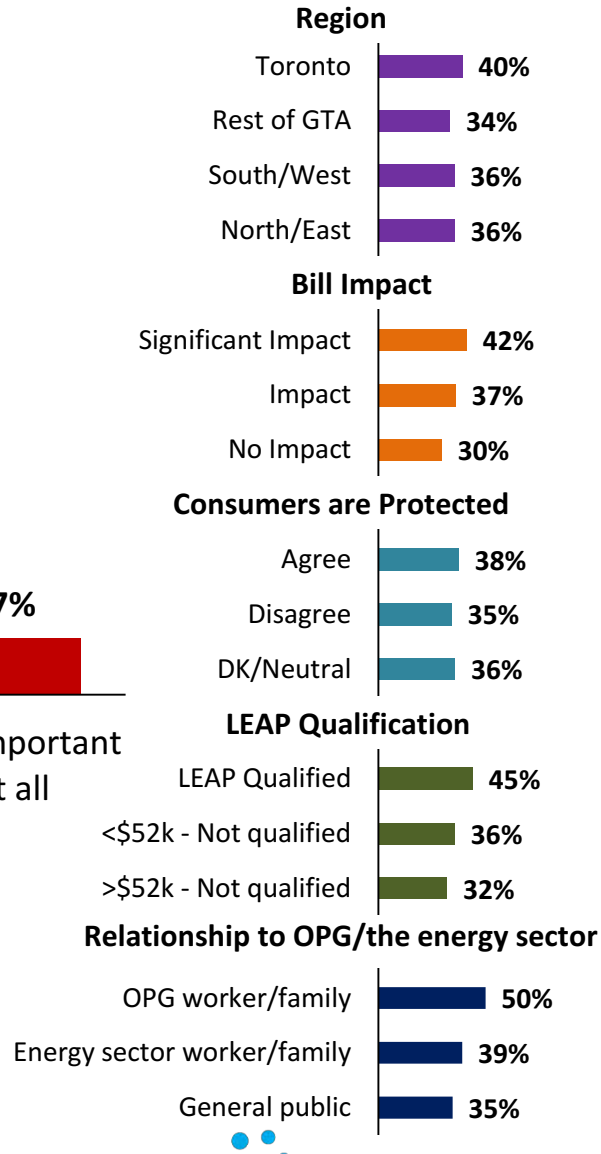
Contributing to Local Communities

Q For each of the following, please indicate how important they are to [you/your organization].
Making positive contributions to local communities in which OPG operates.
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Very important**":*



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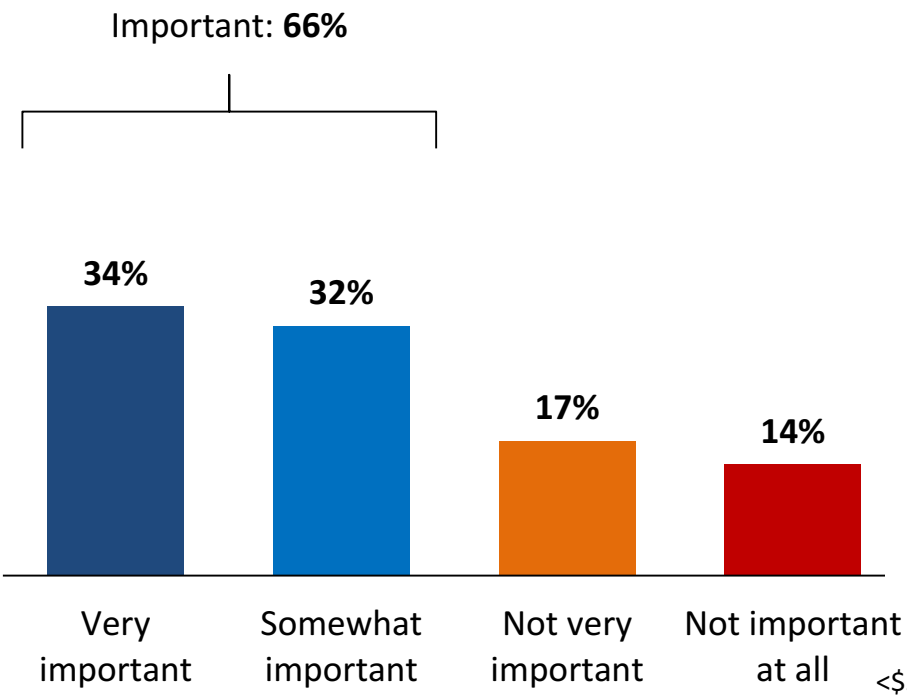
Note: 'Don't know' (2%) not shown.

Residential

Outcome Priorities

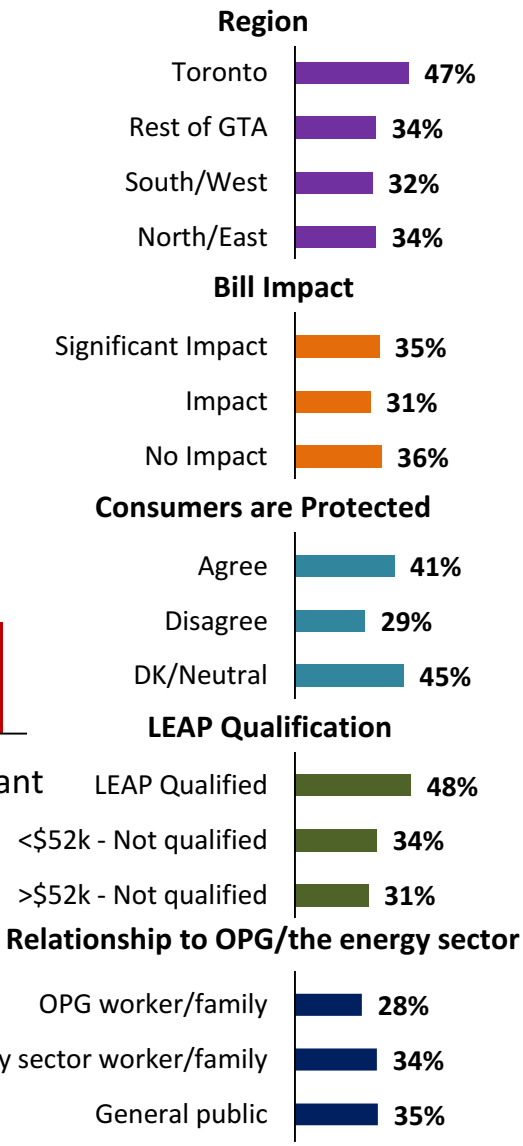
Indigenous Relations

Q For each of the following, please indicate how important they are to [you/your organization].
Maintaining a strong relationship with Indigenous peoples.
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Very important**":*



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Note: 'Don't know' (3%) not shown.

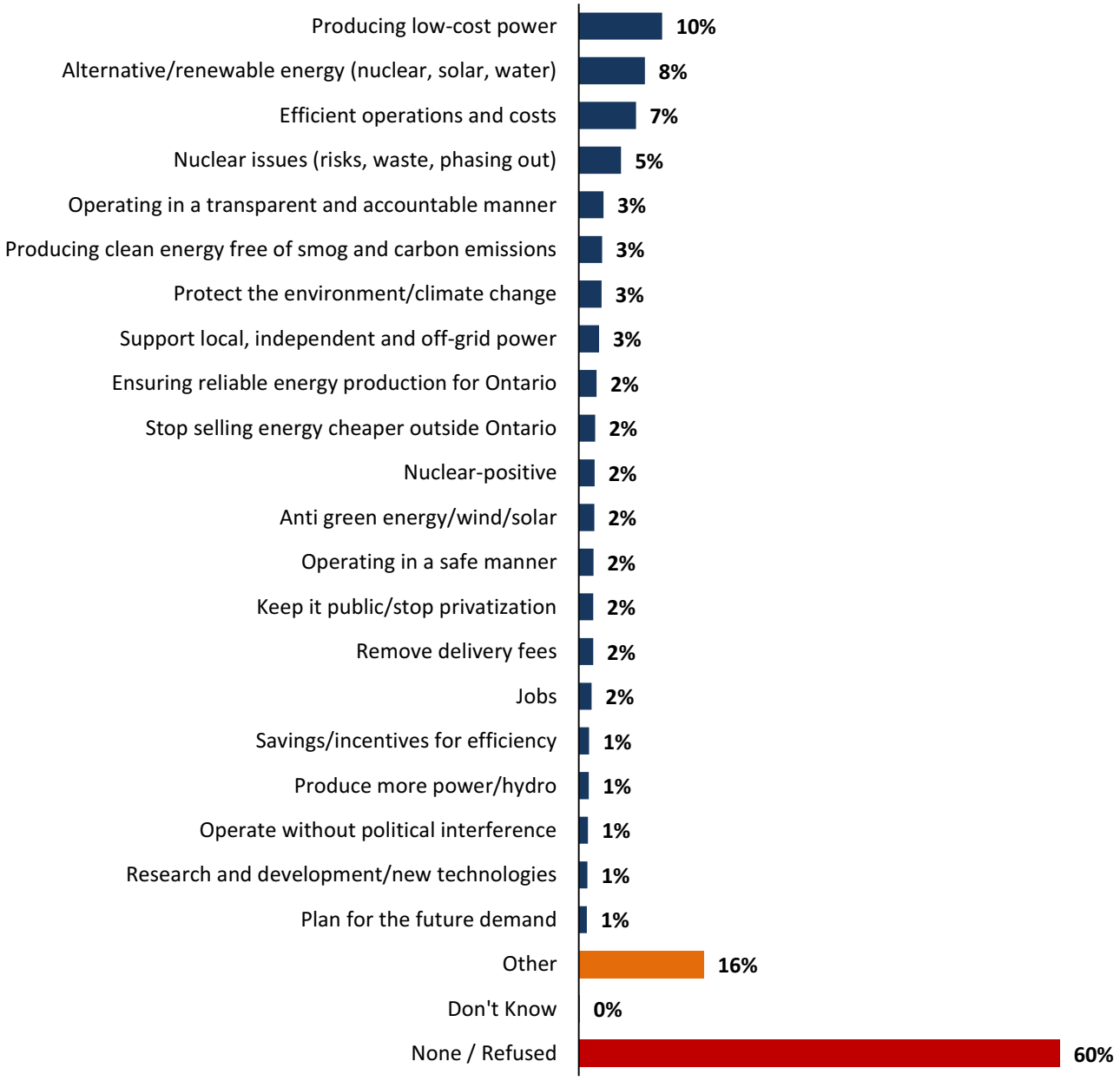
Residential

Outcome Priorities

Additional Outcomes

Q The list above may not include all the outcomes that matter to you. Are there any other important priorities that OPG should be focusing on that weren't included in the list above? If so, please list what you think is missing below.

[asked of all respondents, up to 3 answers allowed, n=2,862]



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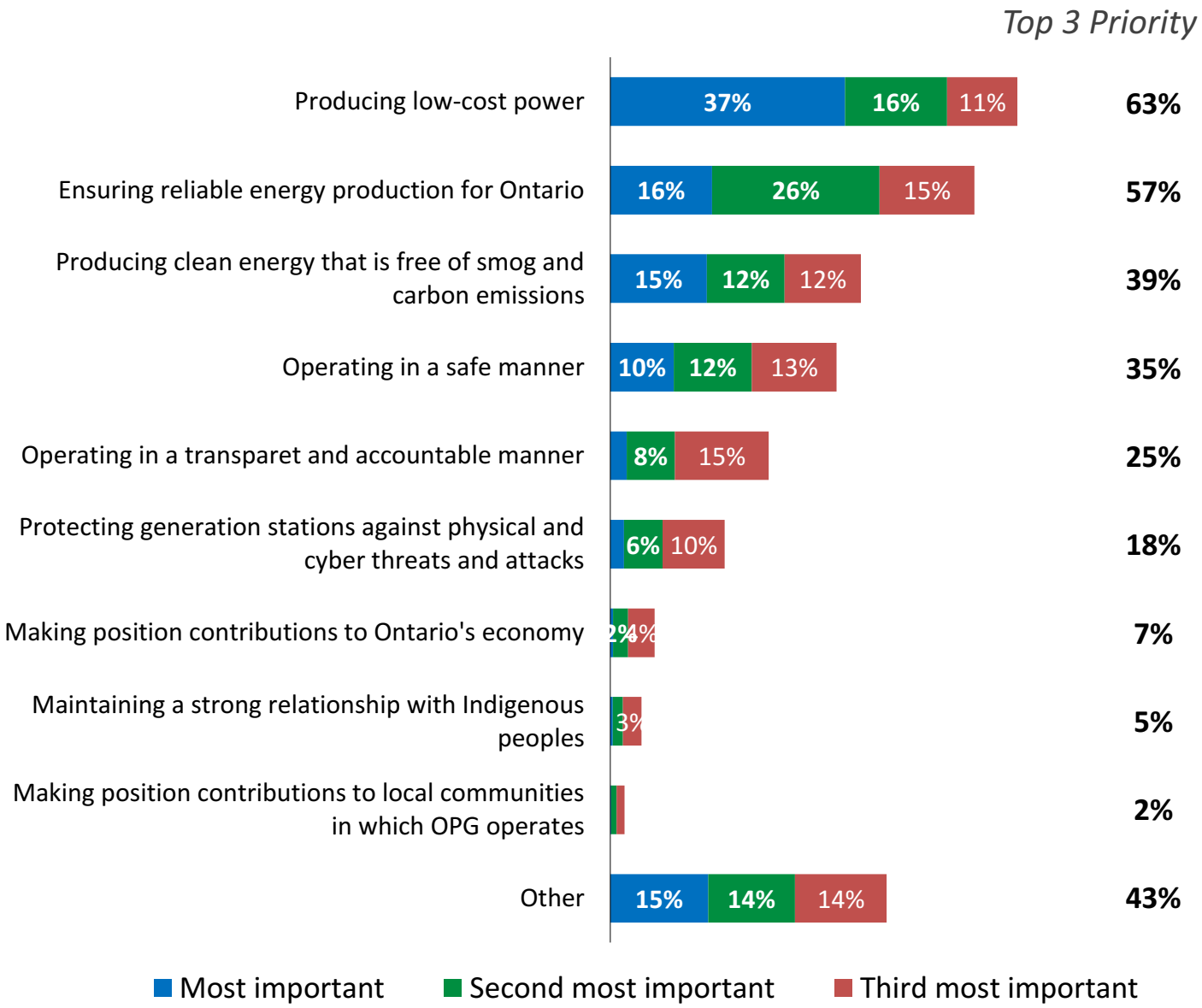
Outcome Priorities

Ranking the Top Three

Q Thinking again about the things OPG should be focussing on, please rank your/your organization's top 3 priorities—where "1" would be the most important, "2" the second most important, and "3" the third most important.

[asked of all respondents, n=2,862, percentages are calculated based on the full sample]



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Nuclear Priorities

OPG's nuclear business is in the process of refining its framework for assessing specific investment decisions. OPG is considering using the criteria listed in the table below. However, before implementing this framework, OPG would like to hear what you think about this approach.

SAFETY	OPG lists the safety of the public, its staff and its contractors as a priority. To achieve its goal for safety, OPG considers the following types of safety risks: • **Conventional safety risk** – the risk of workplace safety hazards and injuries. • **Nuclear safety risk** – risk of unplanned reactor shutdowns or unsafe shutdown conditions. • **Radiological safety risk** – the risk of unplanned radiation exposure or contamination to station personnel and the public.
GENERATION RELIABILITY	For OPG, generation reliability is about getting the most out of a power plant. The less down-time a power plant has, the more "reliable" it is. **Generation reliability** is highest when OPG can: • Maximize the hours that a plant is producing power or • Minimize the hours spent on equipment repairs or unplanned events that reduce its ability to produce that power.
REGULATORY	OPG's operations are subject to extensive laws and regulations that are enforced by various bodies such as the OEB, Canadian Nuclear Safety Commission and the IESO. Collectively, these institutions set out many of the constraints within which OPG is permitted to operate its facilities and manage its business.
REPUTATION & SOCIAL LICENCE	OPG considers input from the public and its employees in operating its generation stations and conducting business. This includes considerations of public safety and corporate citizenship, environmental stewardship, transparency, community engagement, and Indigenous relations.
FINANCIAL	OPG's financial priority is to achieve a consistent level of strong financial performance that allows the company to make investments in its generation facilities to meet operational needs and reduce equipment damage, creating a profit for the Province of Ontario through increasing revenue and reducing costs.
ENVIRONMENTAL STEWARDSHIP	Electricity generation can have an impact on biodiversity. OPG's operations and facilities must work within **environmental requirements** that include protection of land, water, air, living organisms and natural systems.
SECURITY	OPG also considers two types of security risks: • **Cyber security risk** – threats to networks, computers, programs and data from attack, damage or unauthorized access. • **Physical security risk** – threats to generating stations and personnel.

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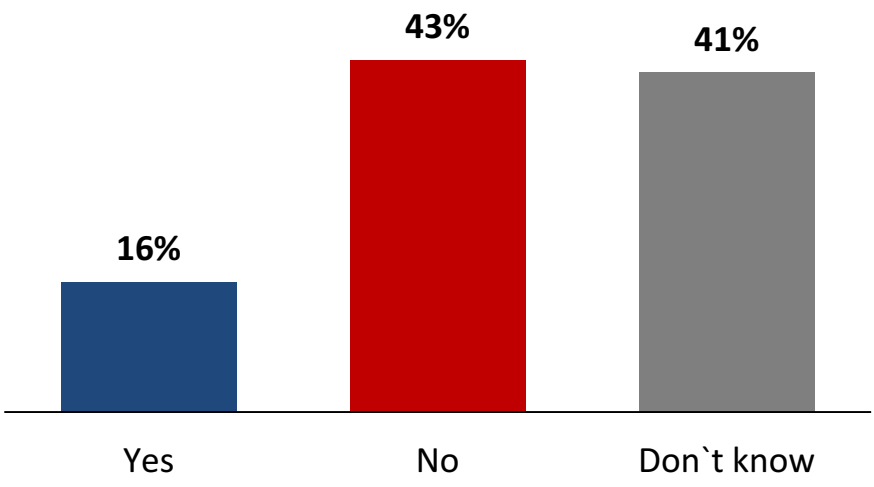
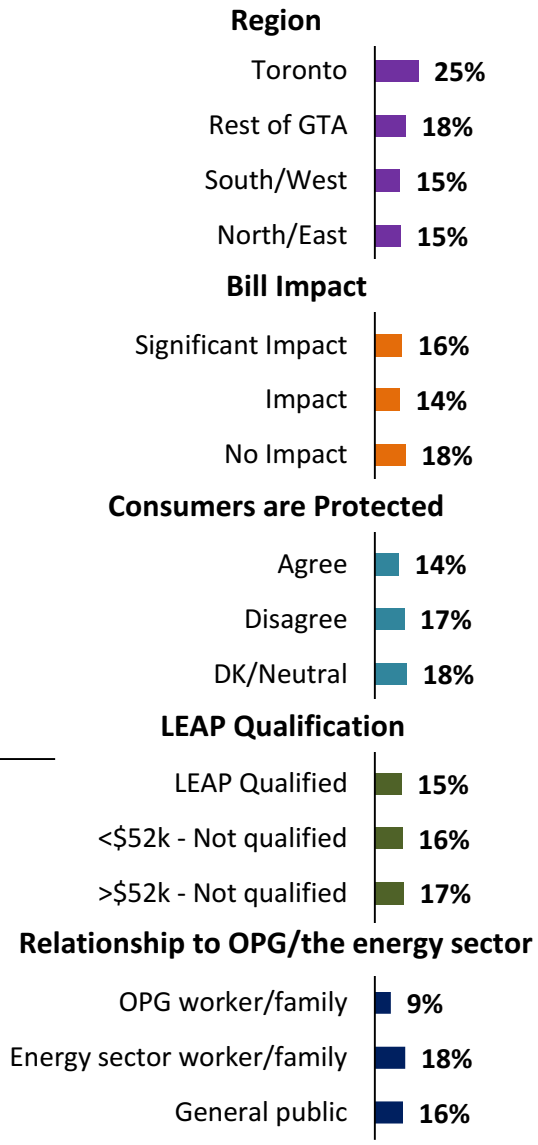
Nuclear Priorities

Q Is there anything missing from this list?
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Yes**":*



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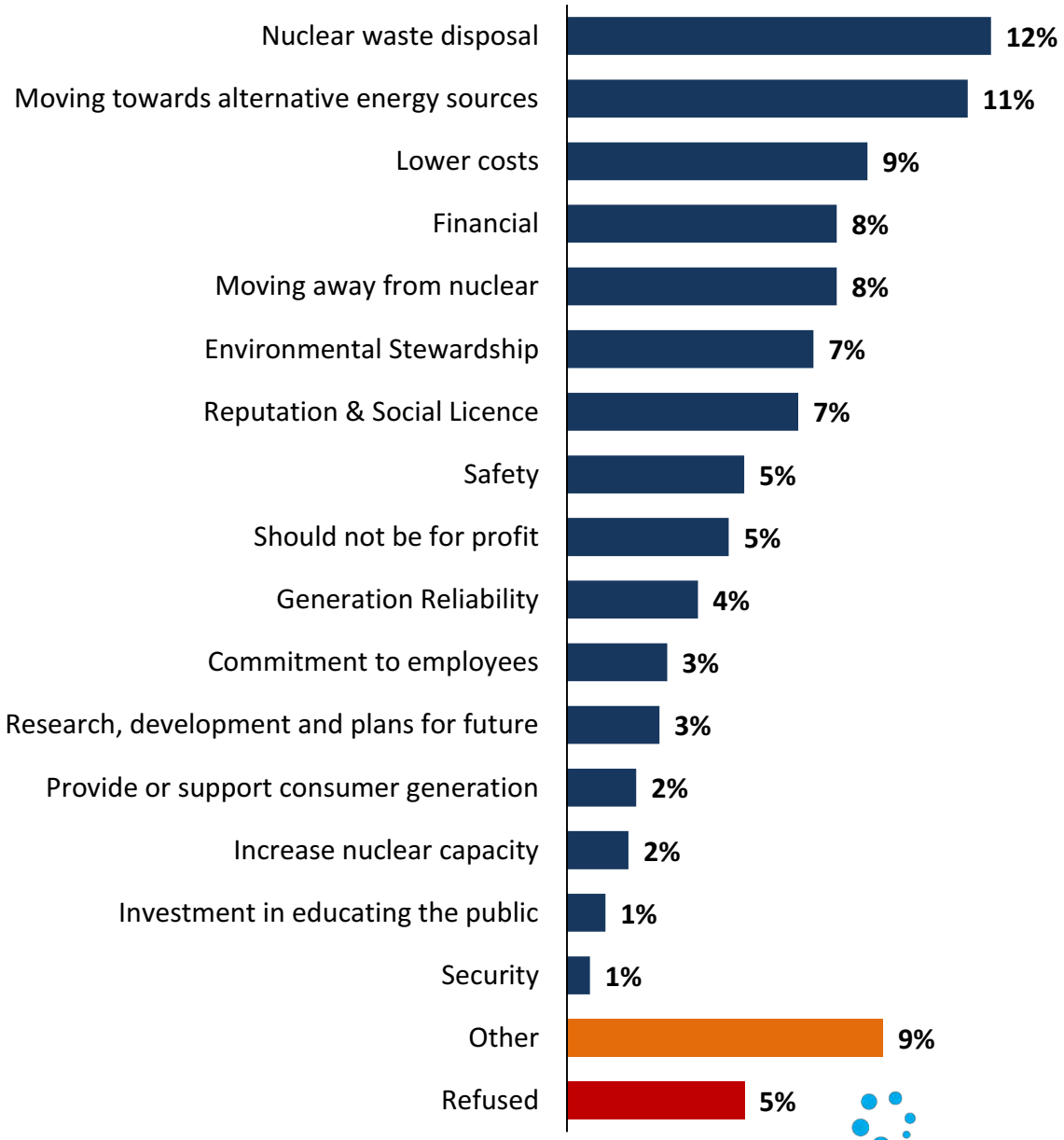
Nuclear Priorities

Q

Is there anything missing from this list?
[asked only of respondents who said "yes, there are missing priorities", n=453]

Amongst those who answered: 'Yes' there are missing priorities (n=453)



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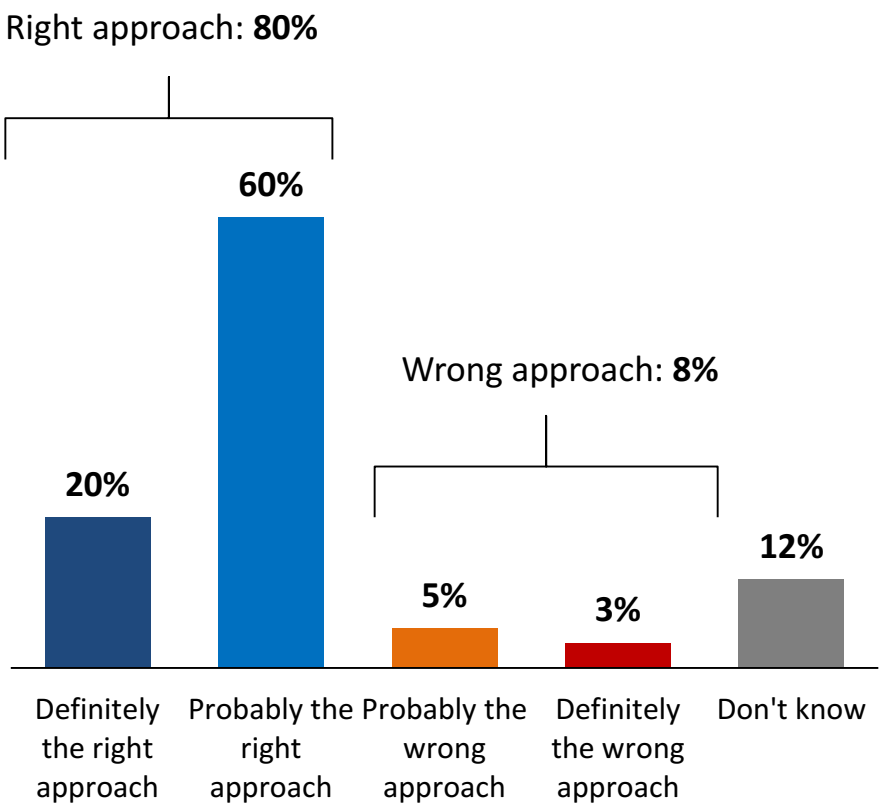
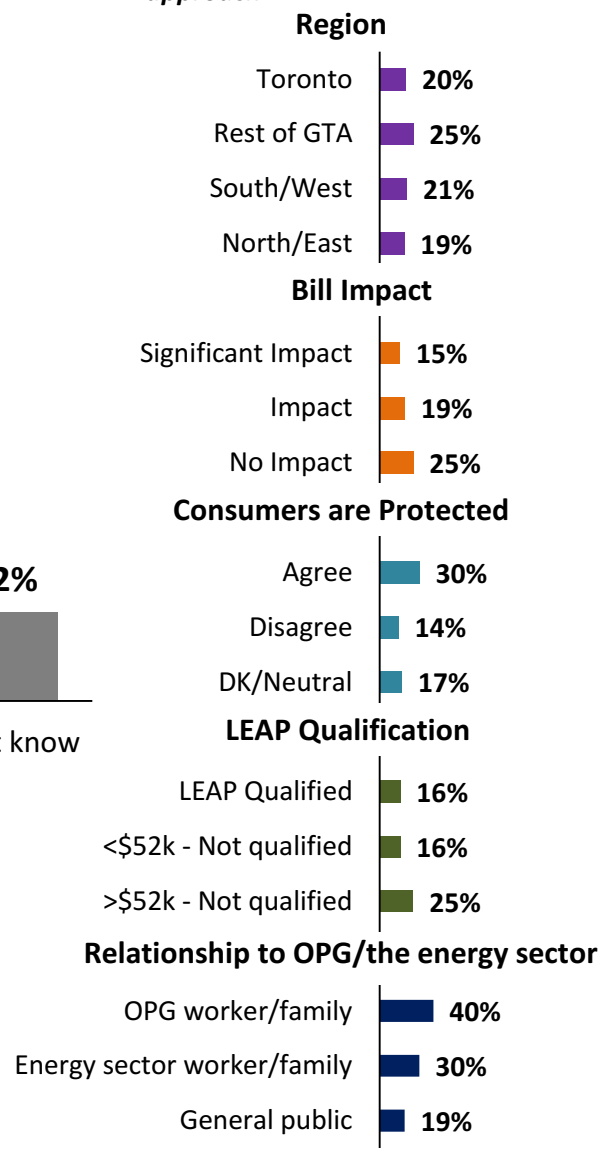
Nuclear Priorities

Q Do you think this is the right or the wrong approach?
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Definitely the right approach**":*



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Strategic Imperatives

OPG uses a company-wide approach to achieve the goals outlined on the previous pages. At the highest level, OPG works to achieve the four core values listed below. OPG calls these values its "**Strategic Imperatives**." These four values guide all of the decisions that OPG makes. Each year, OPG uses targeted initiatives to achieve more specific goals that fall under the four Strategic Imperatives. OPG would like to hear what you think about this approach and the values in it.

OPERATIONAL EXCELLENCE

Operational Excellence at OPG means the safe and environmentally responsible generation of reliable and cost-effective electricity from the company's generating stations through a highly trained and engaged workforce.

OPG uses measures such as how much energy it produces in total, and the amount of electricity generated by a nuclear plan relative to the maximum potential to assess Operational Excellence.

PROJECT EXCELLENCE

Project Excellence at OPG means being an industry leader in project management capability and performance. As part of the commitment to project excellence, OPG continues to enhance and streamline its approach to project planning and execution, with the goal of delivering all projects safely, on time, on budget, and with high quality.

OPG measures Project Excellence by comparing budgeted to actual cost and time, as well as other indicators.

FINANCIAL STRENGTH

Financial Strength at OPG means achieving a consistent level of strong financial performance that delivers a profit to the Province of Ontario and positioning the company for future growth.

OPG uses measures such as return on equity and earnings before tax to measure Financial Strength.

SOCIAL LICENCE

Social Licence at OPG means holding the company accountable to the public and its employees, and focusing on maintaining the people's trust. OPG is committed to maintaining high standards of public safety and corporate citizenship, including environmental stewardship, transparency, community engagement, and Indigenous relations.

OPG uses indicators such as workplace injury frequency to measure employee safety, which is part of its Social Licence.

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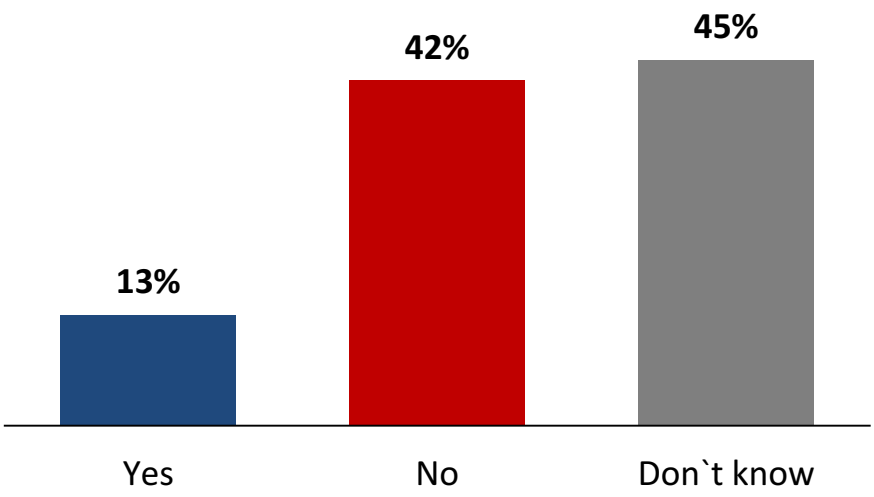
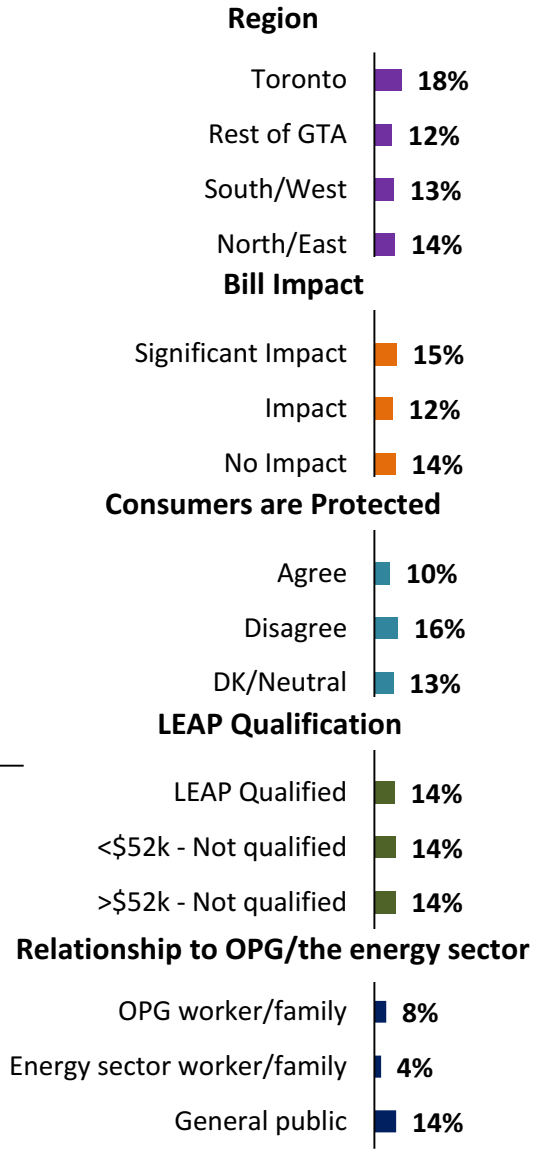
Strategic Imperatives

Q Is there anything missing from this list?
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Yes**":*



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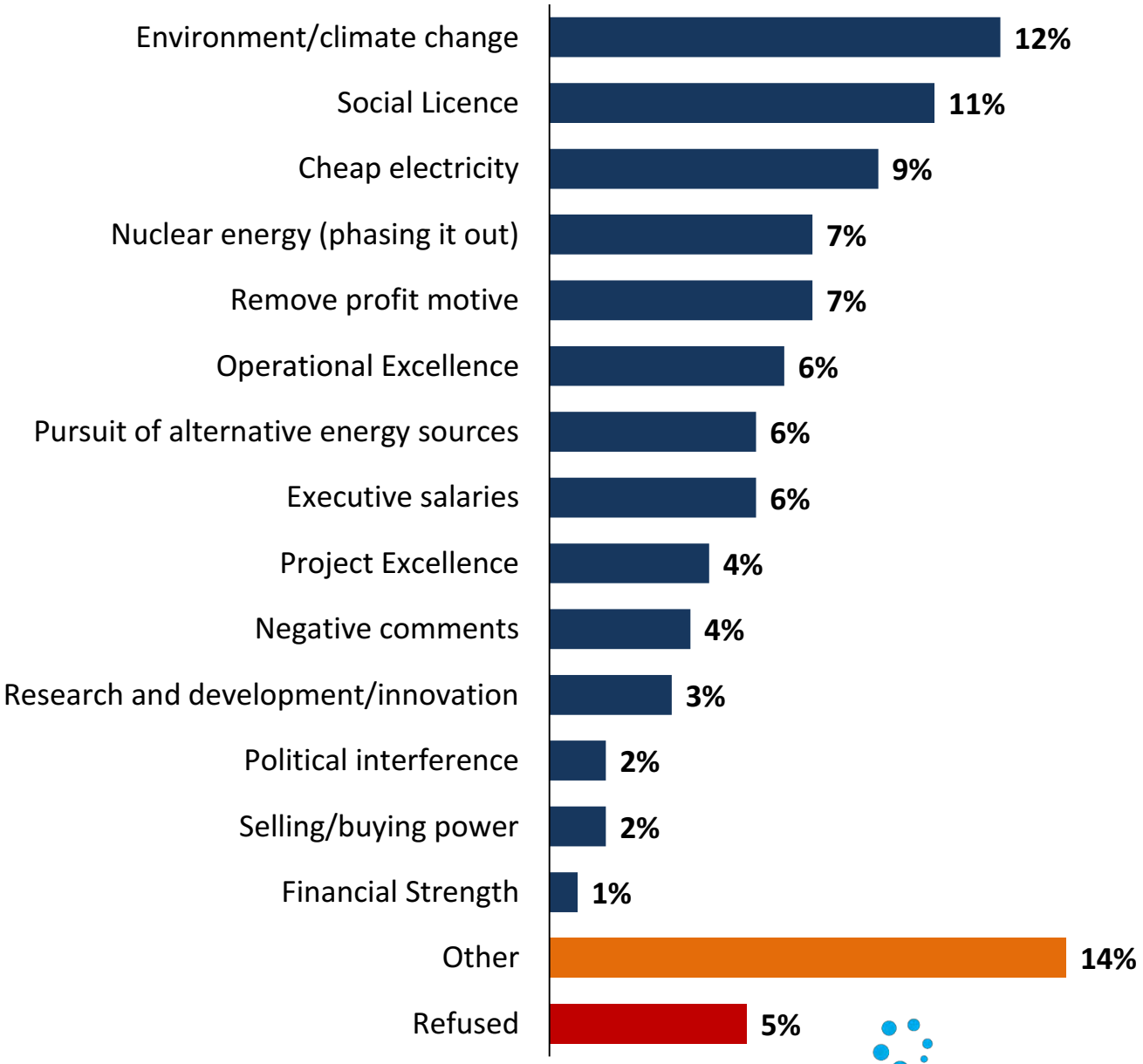
Strategic Imperatives

Q Is there anything missing from this list?
[asked only of respondents who said "yes, there are missing priorities", n=385]

Amongst those who answered: 'Yes' there are missing imperatives (n=385)



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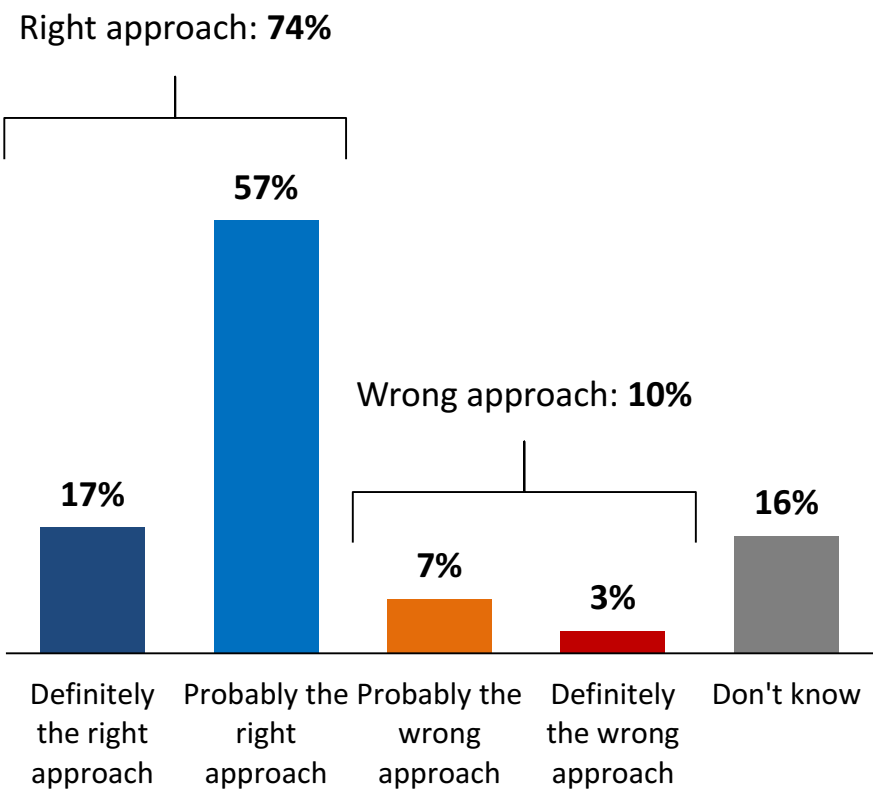
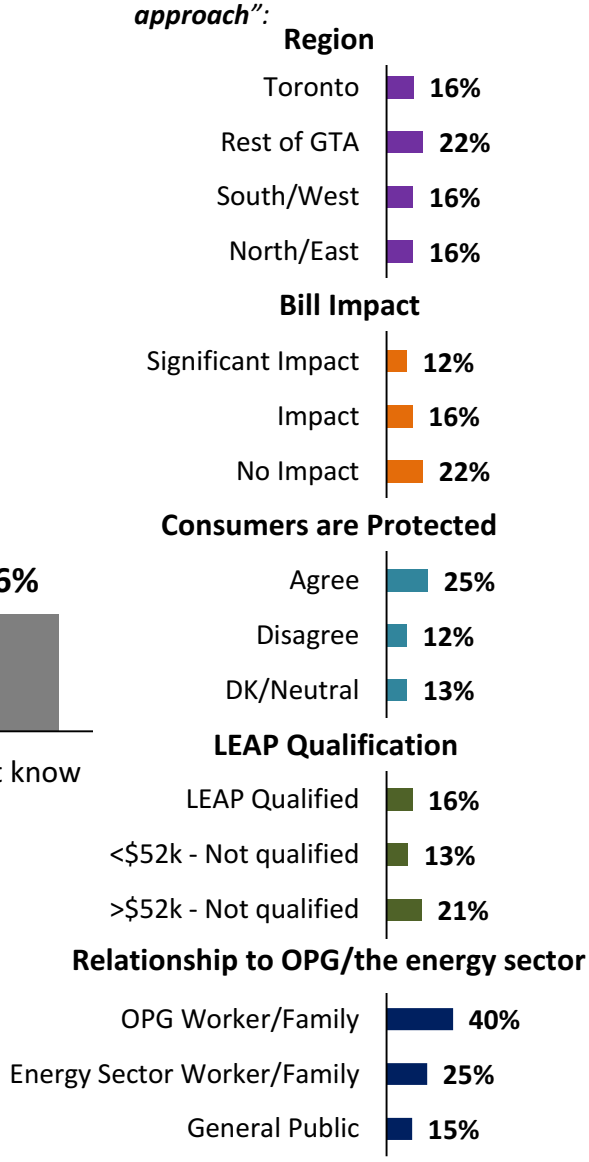
Strategic Imperatives

Q Do you think this is the right or the wrong approach?
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Definitely the right approach**":*



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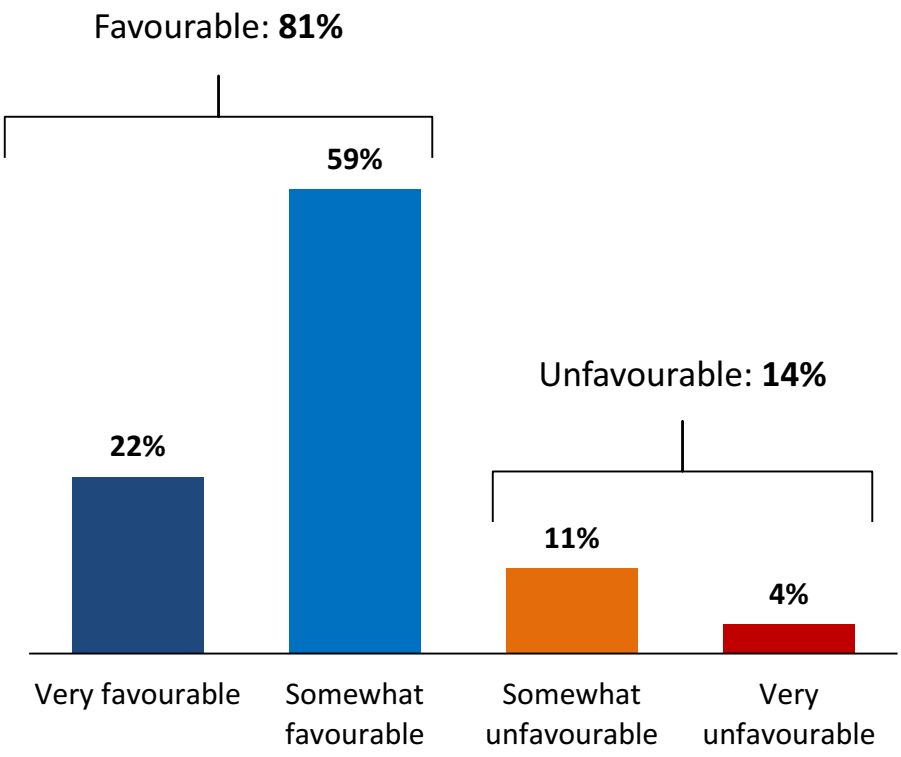
Workbook Diagnostics

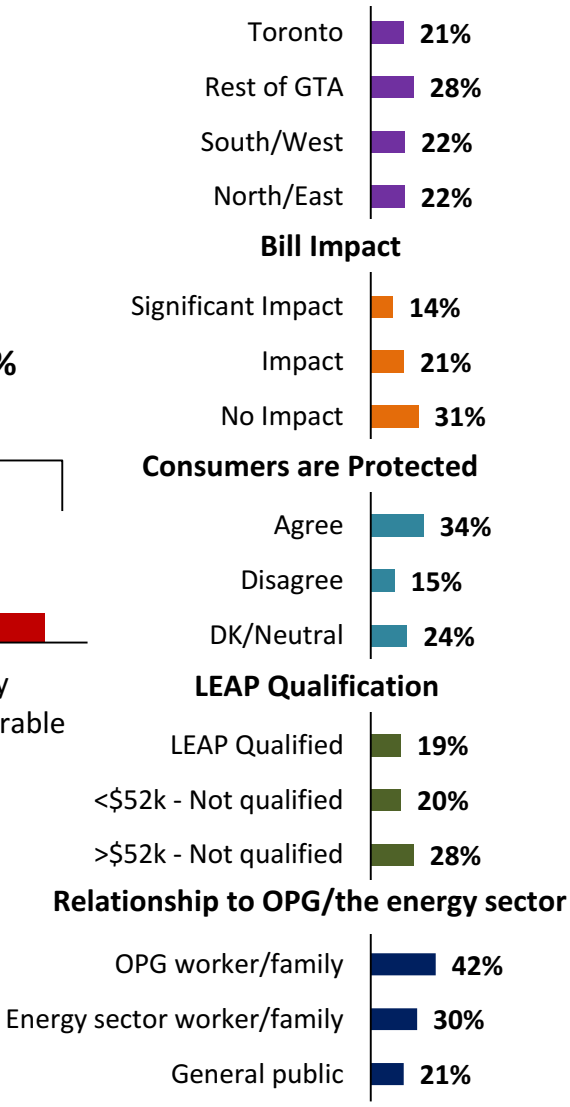
Overall Impression of the Workbook

Q Do you have a favourable or unfavourable impression of the workbook?
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Very favourable**":*

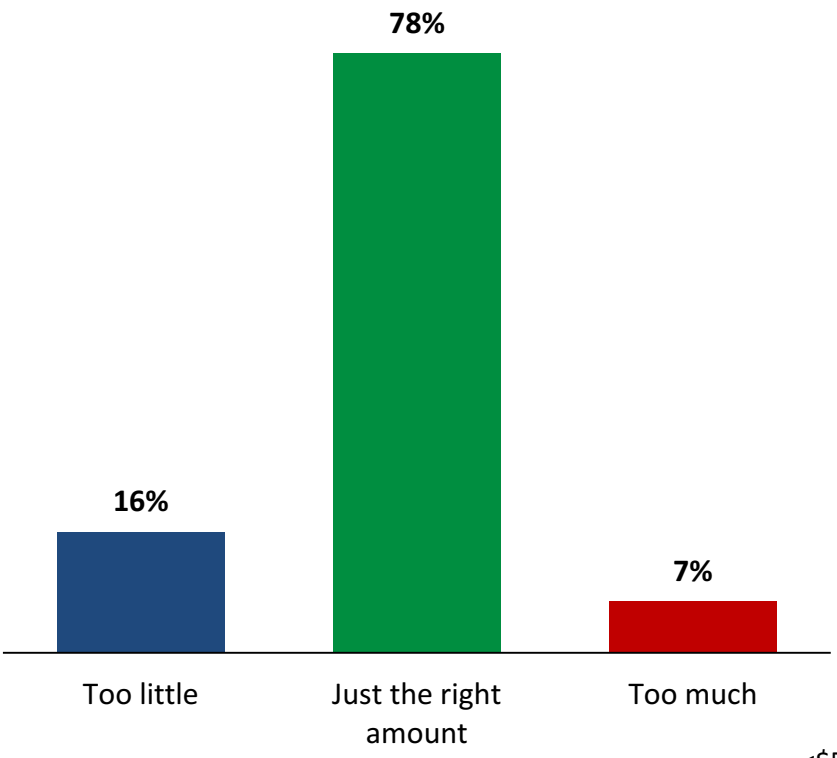


Note: 'Don't know' (5%) not shown.

Volume of Information

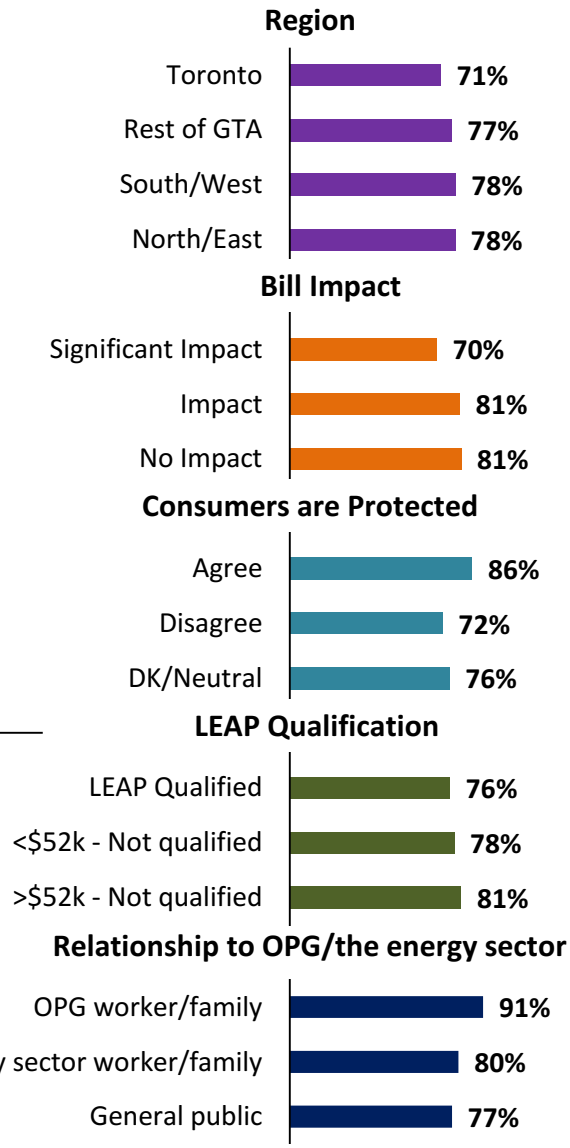
Q

Did OPG provide too much information, not enough, or just the right amount?
[asked of all respondents, n=2,862]



Segmentation

*Those who say "**Just the right amount**":*



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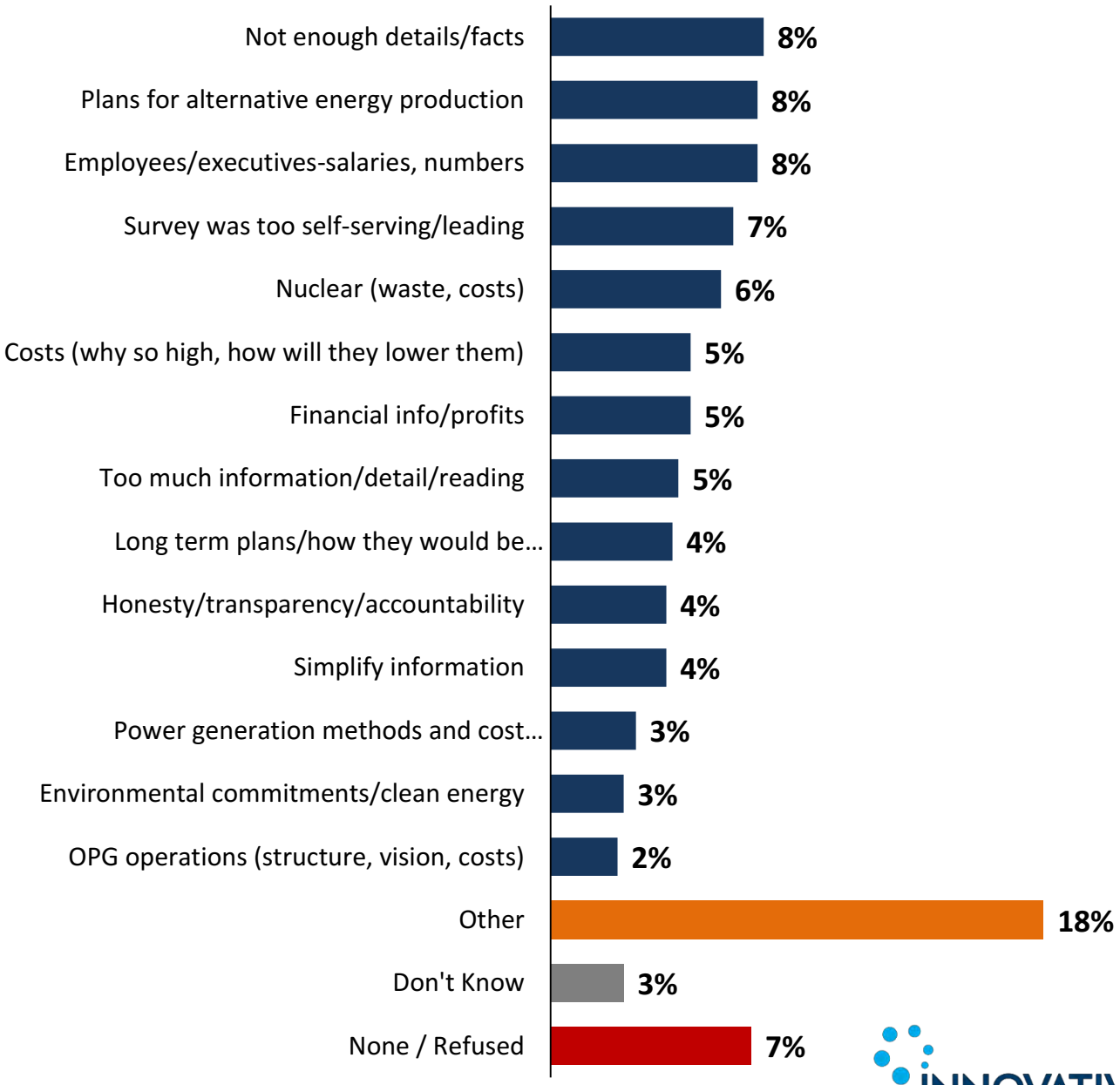
Volume of Information

Too Little Information

Q What was missing?
[asked only of respondents who said "too little information", n=449]

Amongst those who answered: 'Too little information' (n=449)



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Volume of Information

Too Much Information

Q What could have been cut?
[asked only of respondents who said "too much information", n=191]

Amongst those who answered: 'Too much information'
(n=191)

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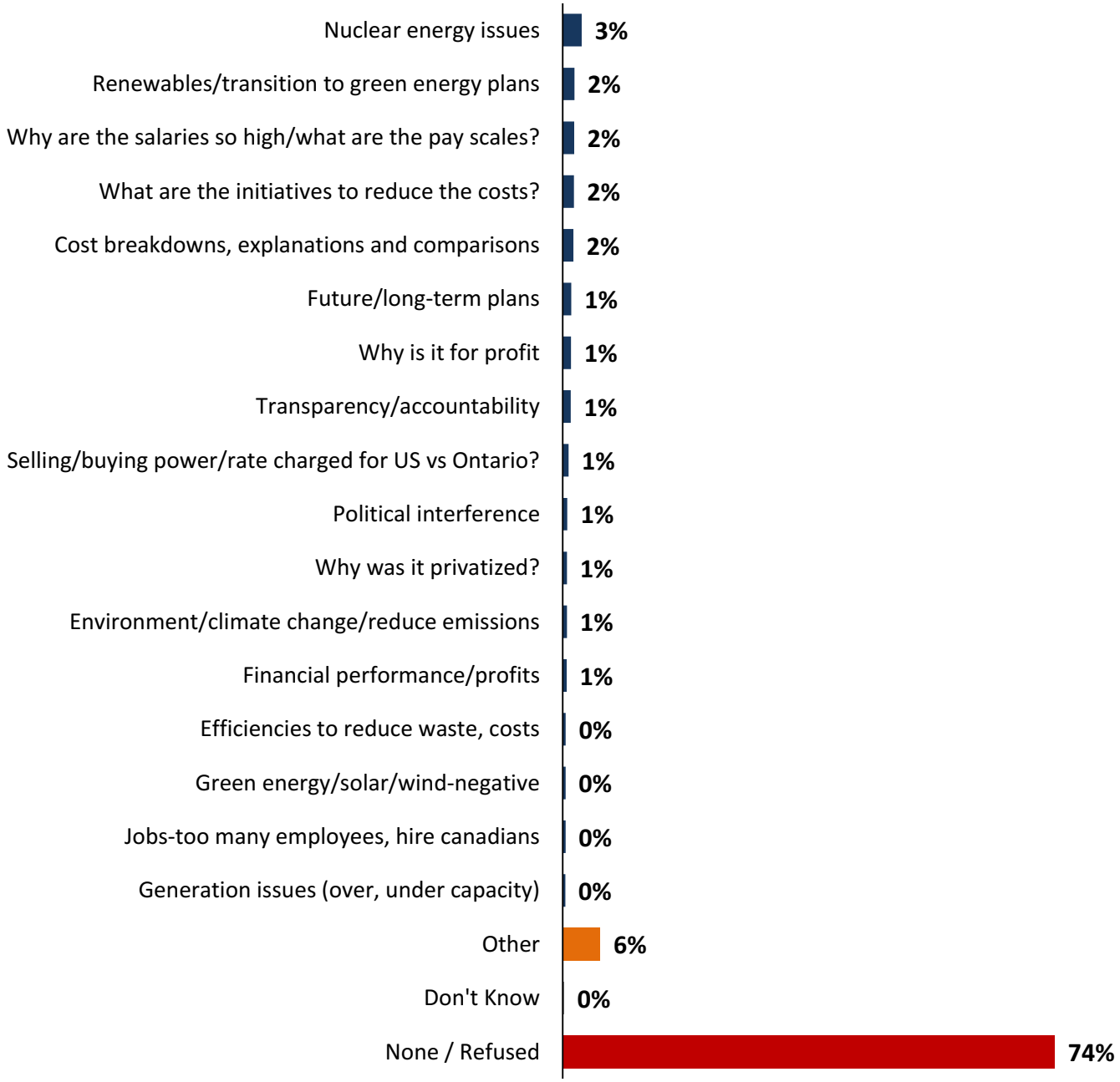
Outstanding Questions

Q

Do you have any questions about OPG you would still like answered?
[asked of all respondents, n=2,862]



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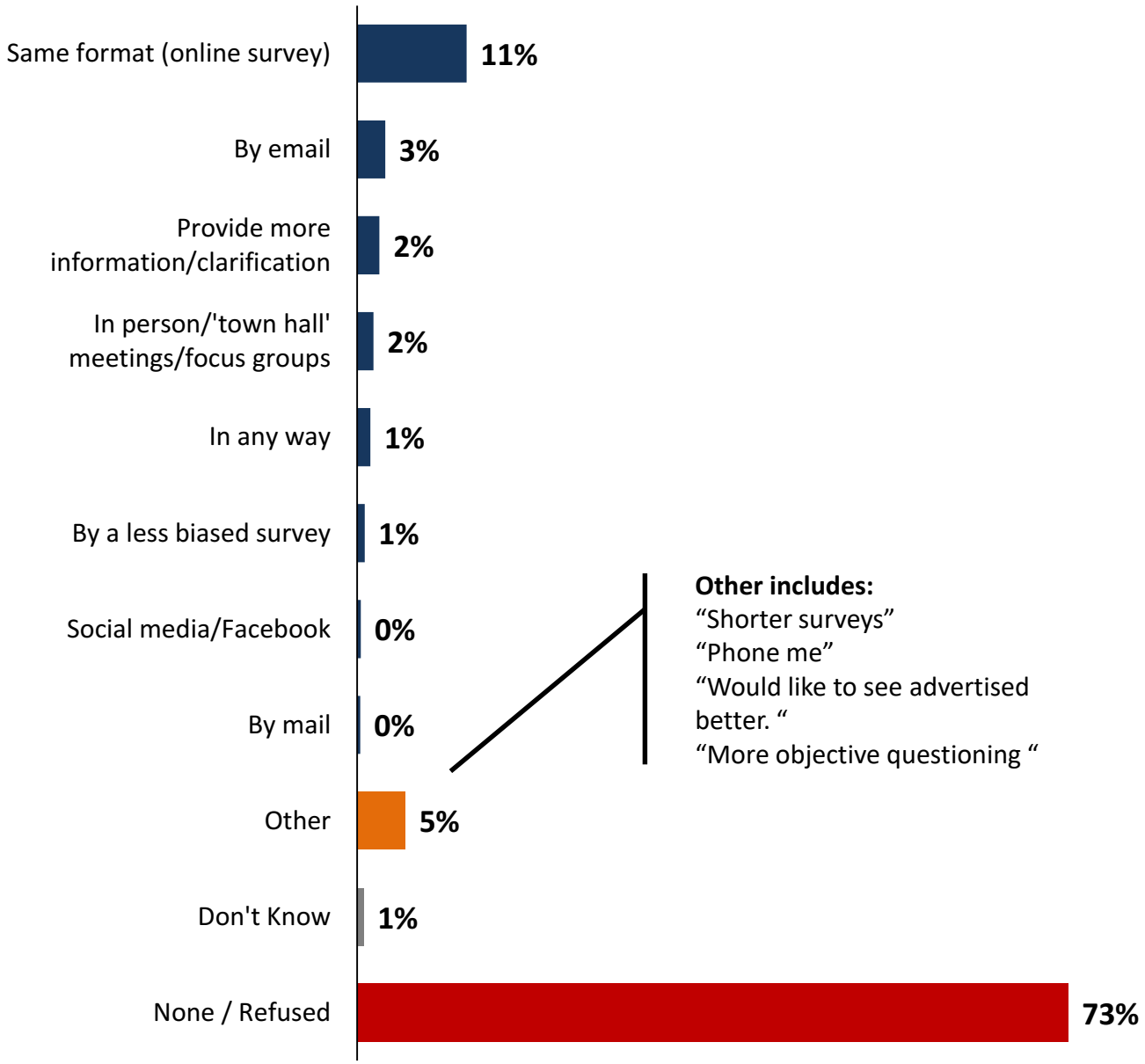
Suggestions for Future Consultations

Q How would you prefer to participate in future consultations?
[asked of all respondents, n=2,862]



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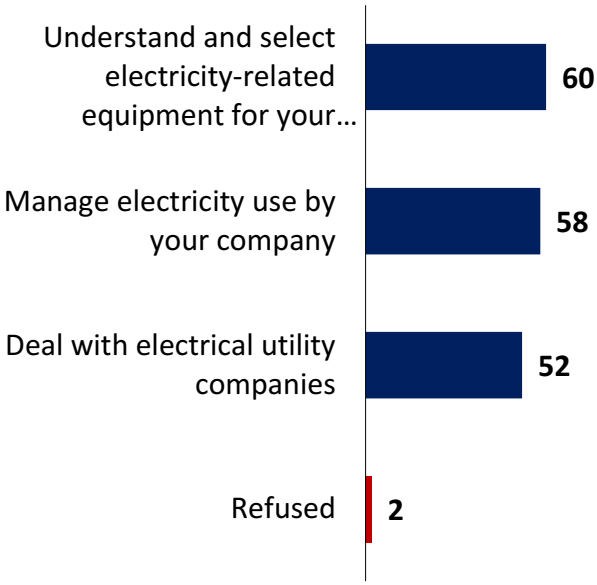
Small Business Workbook

Firmographics & Segmentation

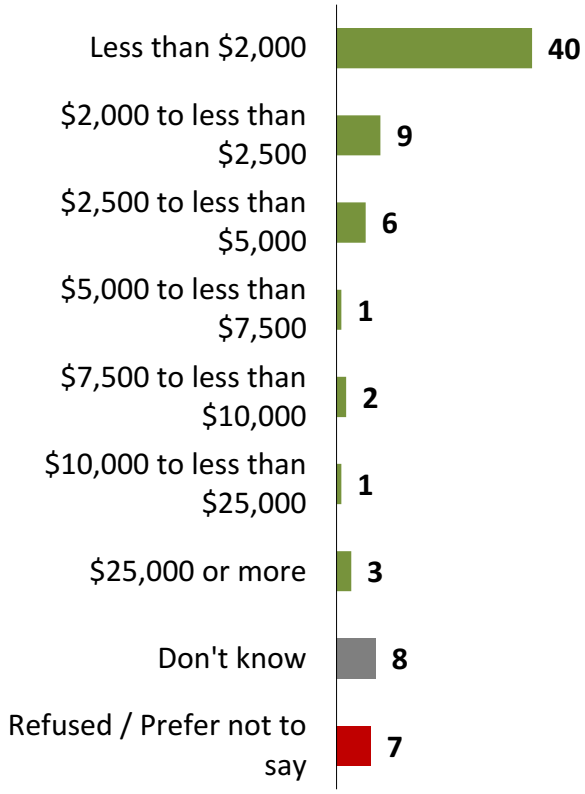
Respondent Profile

Role of Respondent

Q Do you personally do any of the following things in your organization? [Multiple mention]
[asked of all small business respondents, n=75]

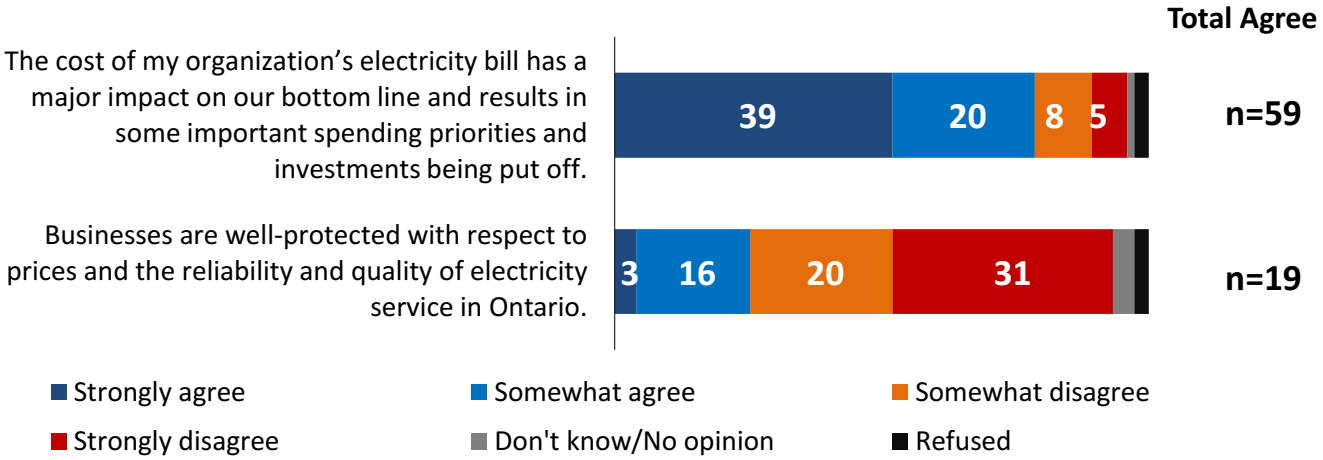


Bill Size



Segmentation

Q To what extent do you agree or disagree with the following statement?
[asked of all respondents, n=75]



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Background Information

Electricity 101

Understanding OPG's Role in Ontario's Electricity System

Ontario's electricity system is owned and operated by provincial, municipal, and private corporations across the province. It is made up of three key components: **generation**, **transmission** and **distribution**.

Generation

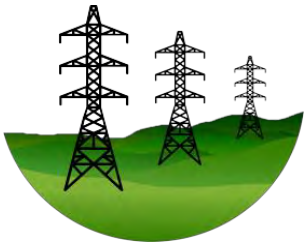
Where electricity comes from.

Ontario gets its electricity from a mix of energy sources. About half of our electricity comes from nuclear power. The remainder comes from a mix of hydroelectric, natural gas, wind and solar.

Most of Ontario's electricity generating stations are located in the southern part of the province close to where the demand for power is greatest. The majority of these power stations are owned and operated by **OPG**, a government owned company that generates about half of Ontario's electricity. The other half comes from multiple generators who have contracts with the grid operator to provide power from a variety of sources.

Transmission

Electricity travels across Ontario.



Once electricity is generated, it must be transported to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. The province has more than 30,000 km of transmission lines.

Local Distribution

Delivering power to homes and businesses in your community.

Your local utility is responsible for the distribution of electricity. This local distribution system includes transformer stations of various sizes and designs that decrease the voltage of the electricity so it can be used in your home or business.

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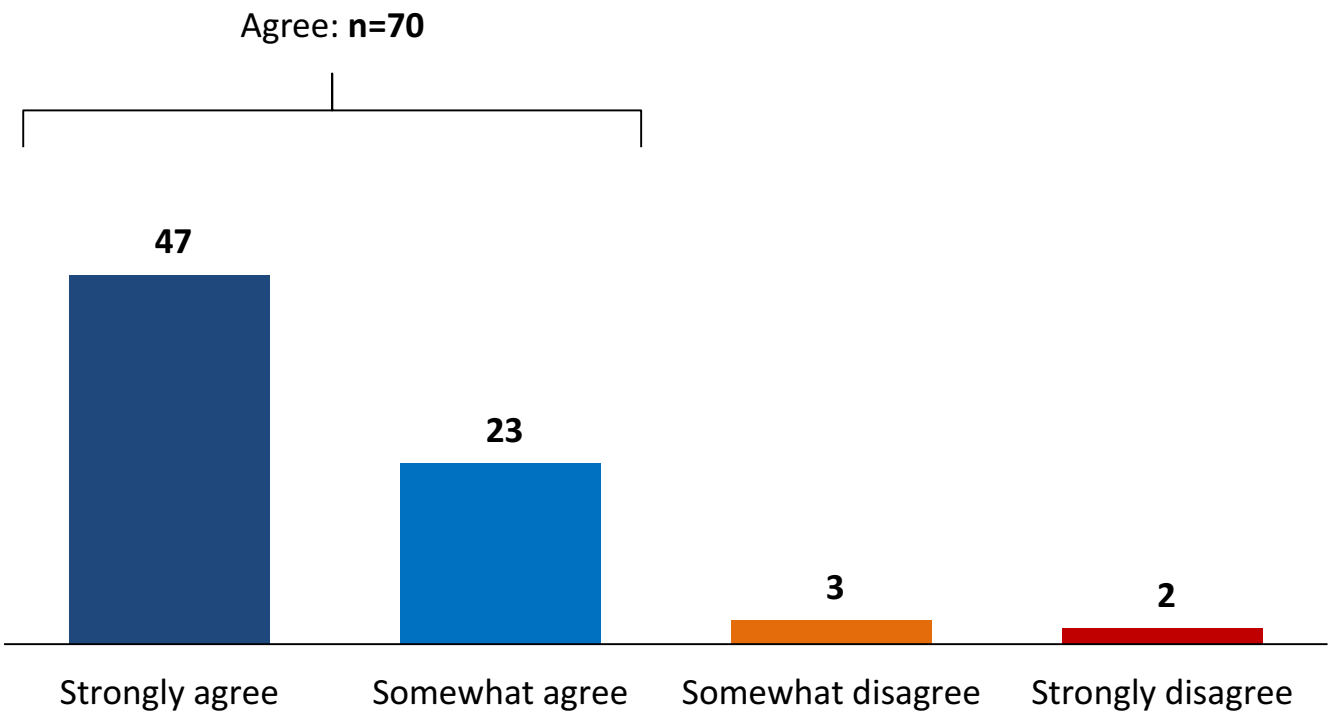
Electricity 101

Understanding OPG's Role in Ontario's Electricity System

Q

To what extent do you agree or disagree with the following statement?
I generally understand how the various parts of the electricity system work together.
[asked of all respondents, n=75]



Note: 'Don't know' (n=0) not shown

Ontario Power Generation (OPG)

Fast Facts

Who is OPG?

- Ontario Power Generation is owned by the province of Ontario.
- It was established in 1999 to operate the electricity generation facilities of the utility that was previously known as Ontario Hydro.
- Today, OPG is one of the largest and most complex generating companies in North America with more than 9,000 employees across the Province.
- The Ontario Energy Board (OEB) sets the rates that OPG can charge its customers for most of the electricity it generates. OPG is the only "regulated" electricity generator in Ontario. For the other generators, electricity prices are set in their contracts.
- **OPG's regulated electricity comes from two sources**:

This consultation is about that "regulated" electricity.

Nuclear

OPG's two nuclear generating stations (GS) play a significant role in Ontario's energy mix. Darlington Nuclear GS and Pickering Nuclear GS operate continuously to meet the minimum level of power demand for the province while emitting virtually no air pollution.

To maintain these stations, OPG began the refurbishment of Darlington Nuclear GS in October 2016. The refurbishment will extend the station's life by another 30 years.

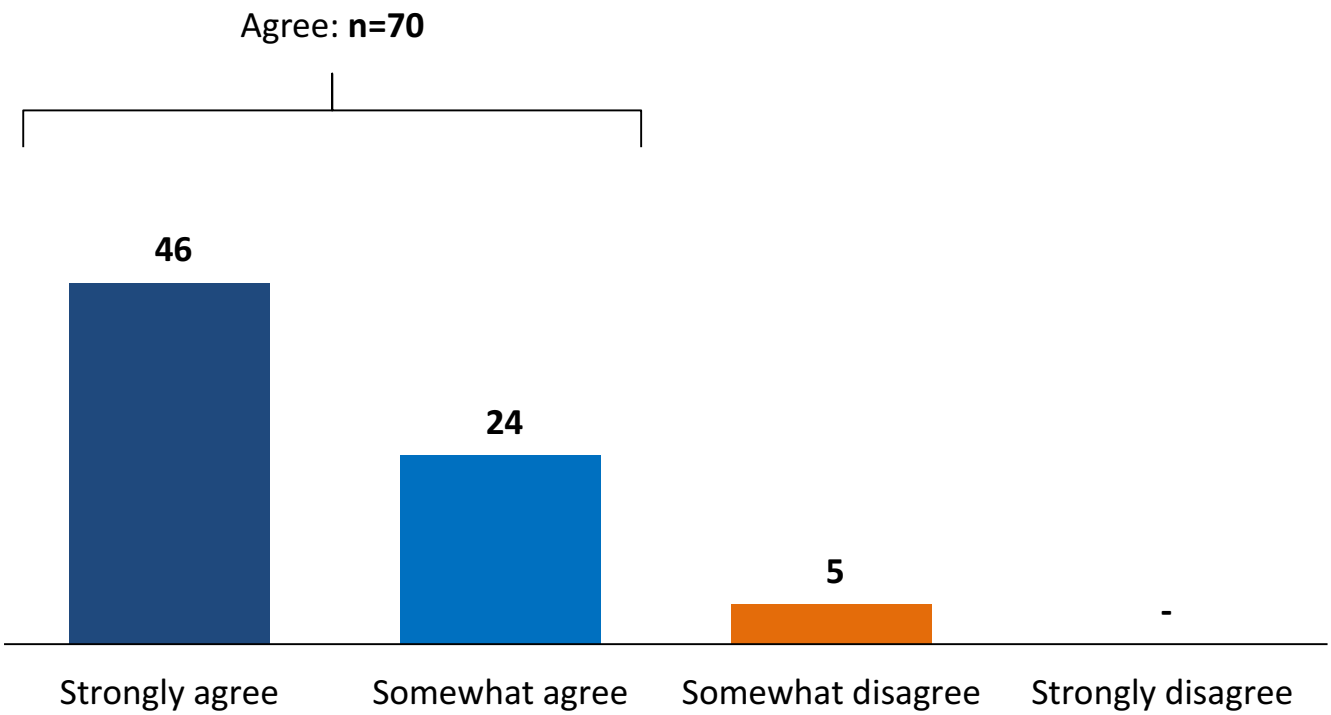
Hydroelectric

More than one third of the electricity that OPG produces comes from hydroelectric facilities. This renewable resource has fueled Ontario's economic growth since the beginning of the 20th century and it remains an important contributor of clean, low-cost power in the province.

Understanding of OPG

Q

To what extent do you agree or disagree with the following statement?
I have a general understanding of who OPG is.
[asked of all respondents, n=75]



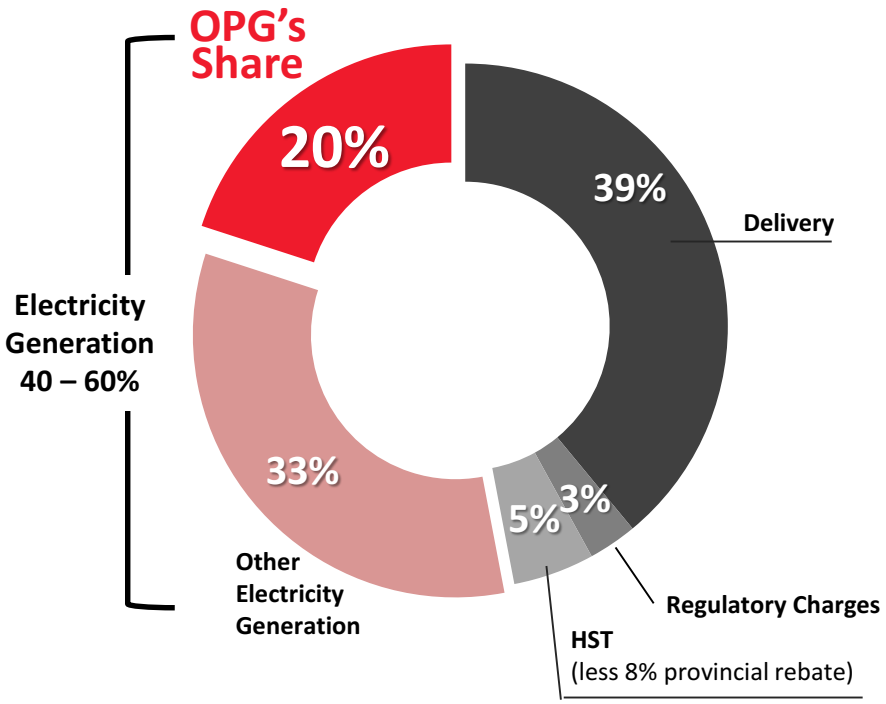
Note: 'Don't know' (n=0) not shown.

How much does OPG's electricity generation cost me?

How much of my bill goes to OPG?

For the typical business/organization customer, between 40% and 60% of the monthly electricity bill goes to pay for power generation, depending on actual consumption.

The cost of OPG's power represents about 20% of a customer's bill. The rest of the bill goes to other generators, transmission companies, and distribution companies, regulatory agencies, and government taxes.

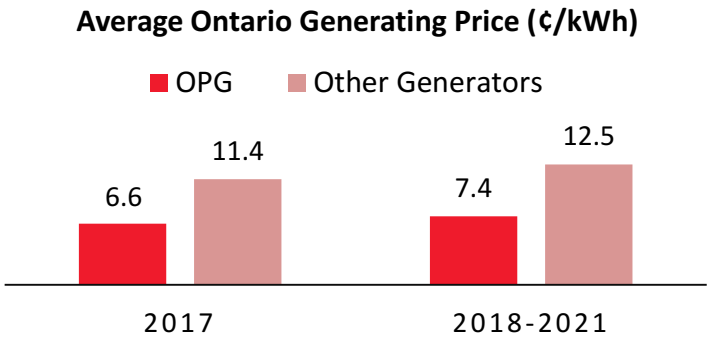


Note: *Graphs may not always total 100% due to rounding.*
This example is based on small business plans with time-of-use pricing.

How much does OPG's energy cost compared to others?

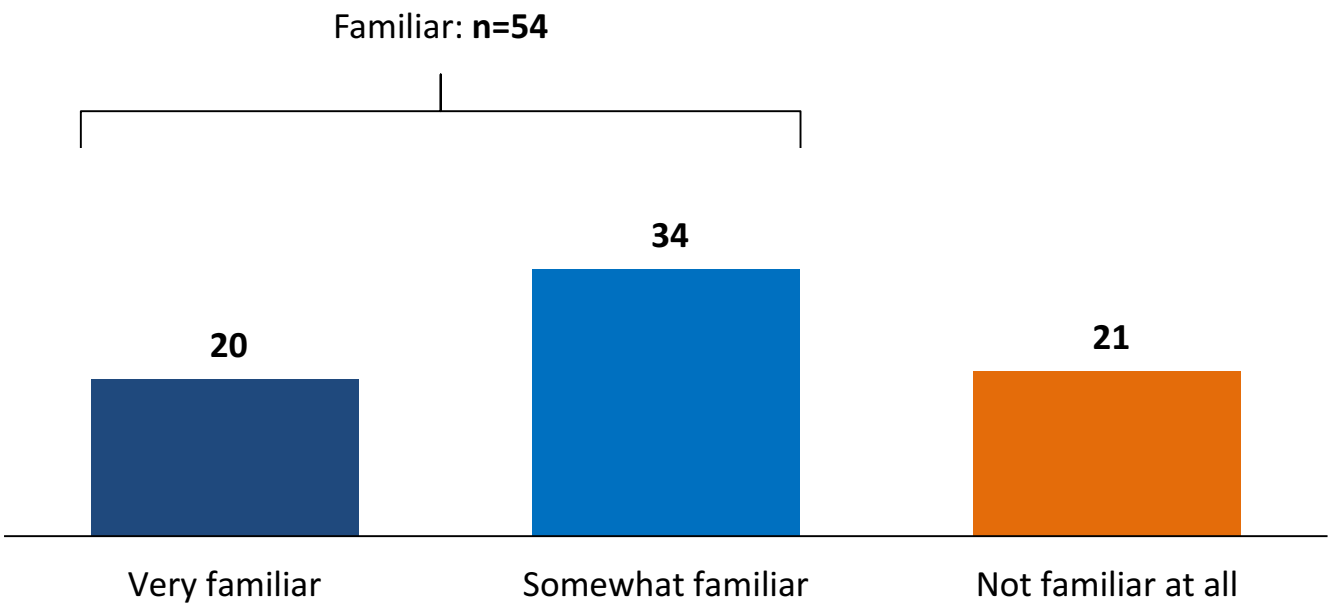
The OEB sets the prices that OPG can charge its customers.

The electricity OPG generates cost you about 40% less than the average price paid to other generators in the province.



Familiarity with OPG's Portion of the Bill

Q Before this workbook, how familiar were you with the percentage of [your/your organization's] electricity bill that goes to OPG?
[asked of all respondents, n=75]



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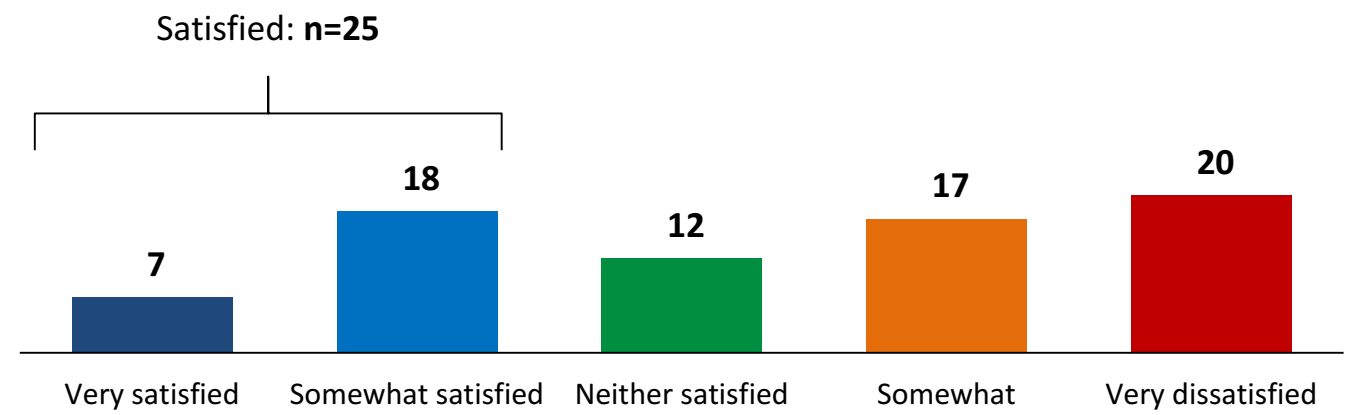
Customer Needs & Preferences

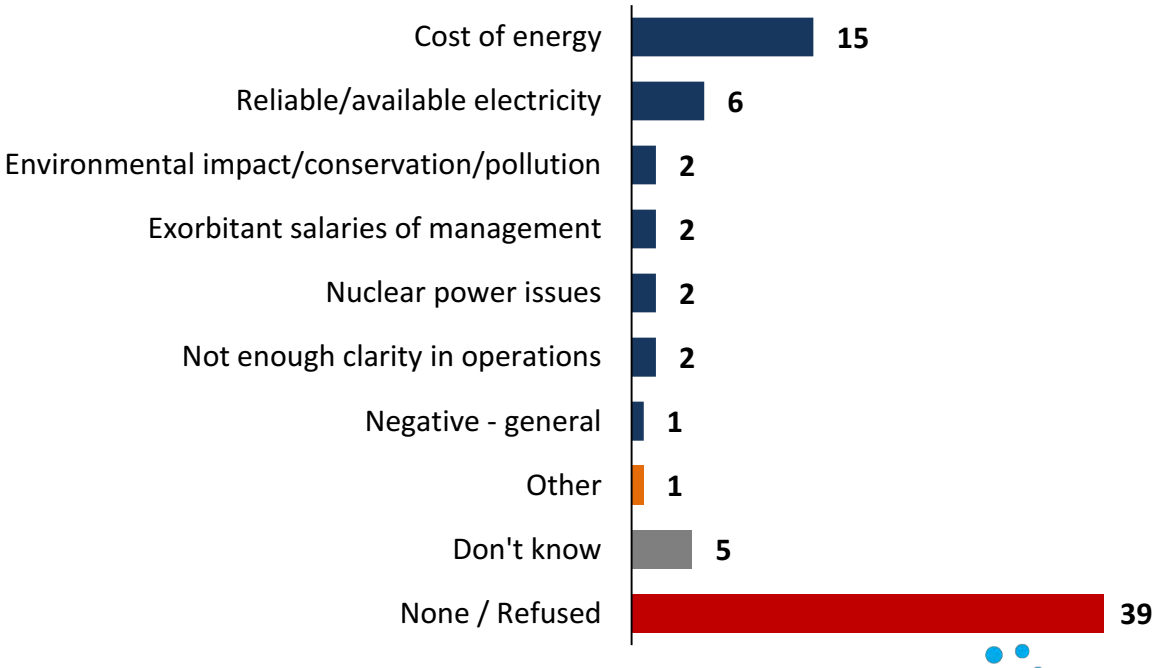
Satisfaction with OPG's Performance

Q Now that you've read a bit more about OPG and how it fits into Ontario's electricity system, how satisfied are you with OPG's performance?
[asked of all respondents, n=75]



Note: 'Don't know' (n=1) not shown.

Q How do you know if OPG is doing a good job for [you/your organization] or not?
[asked of all respondents, n=75]



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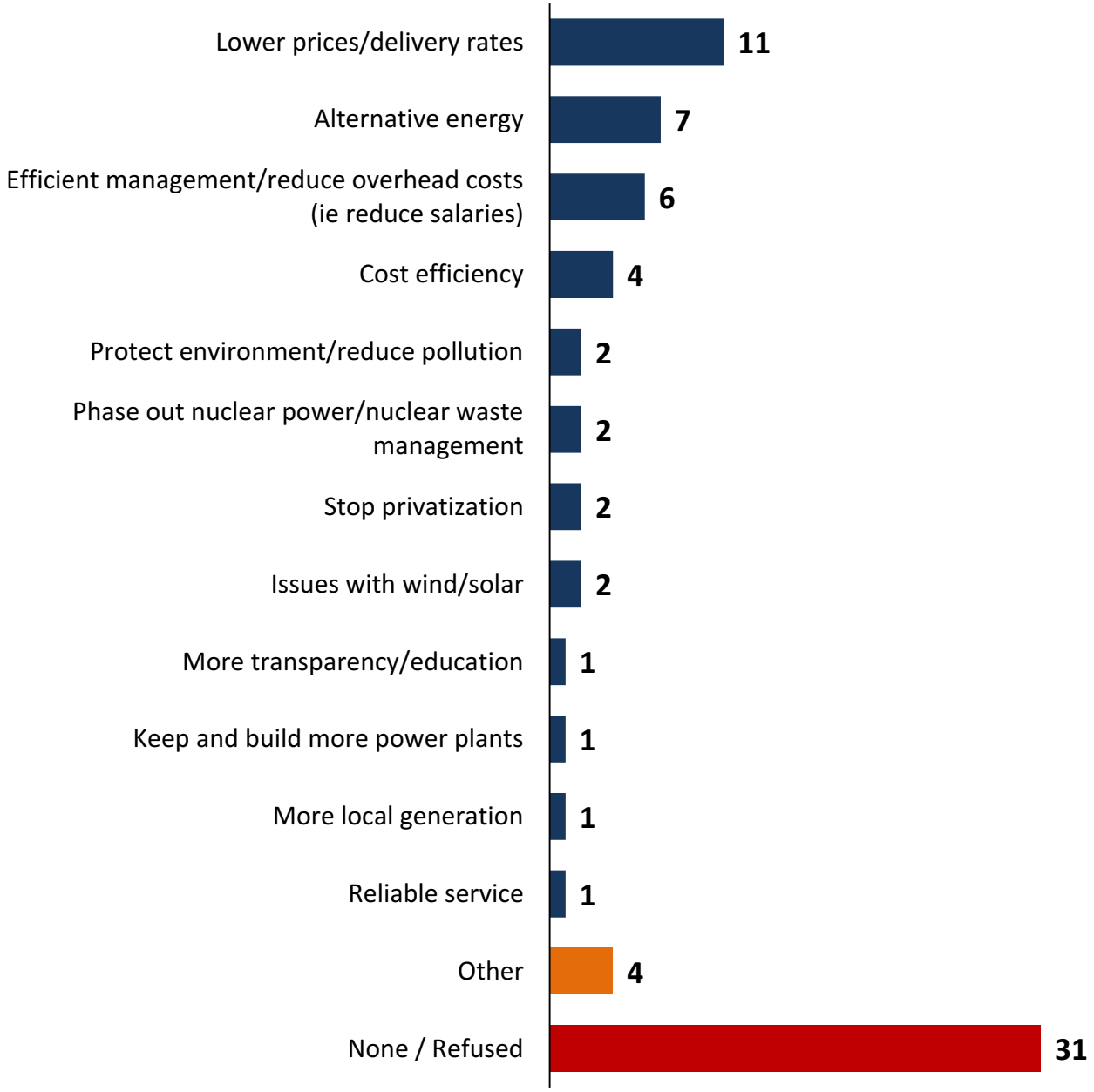
Suggestions for Improvement

Q Is there anything in particular that OPG could do better for [you/your organization]?
[asked of all respondents, n=75]



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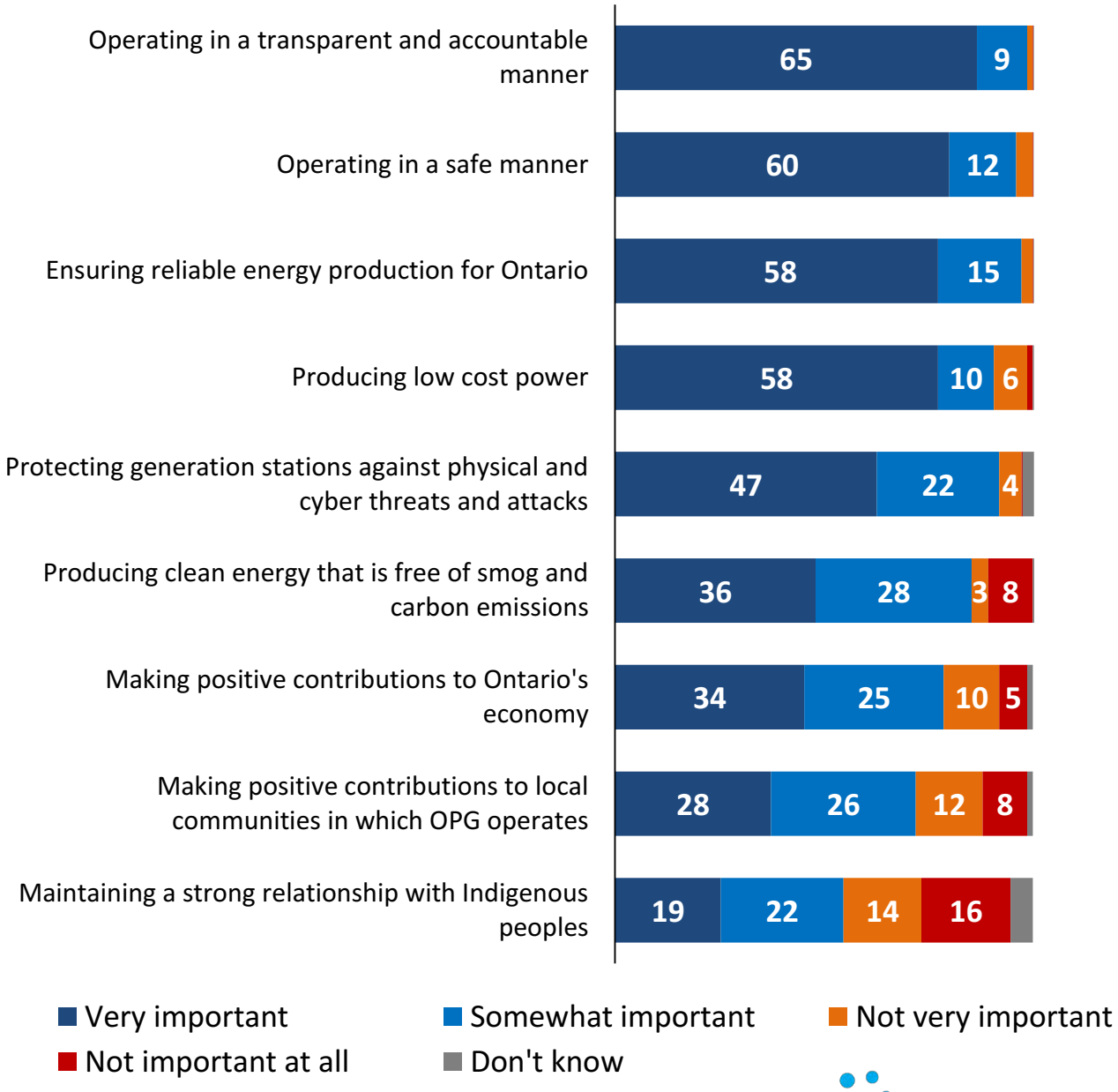
Rating Outcome Priorities

An Overview

Q When the OEB assesses OPG's business plan, it will ask OPG what outcomes matter to customers and how the business plan delivers on those outcomes. Below is a list of outcomes created from earlier customer input. For each of the following, please indicate how important they are to [you/your organization].

[asked of all respondents, n=75]



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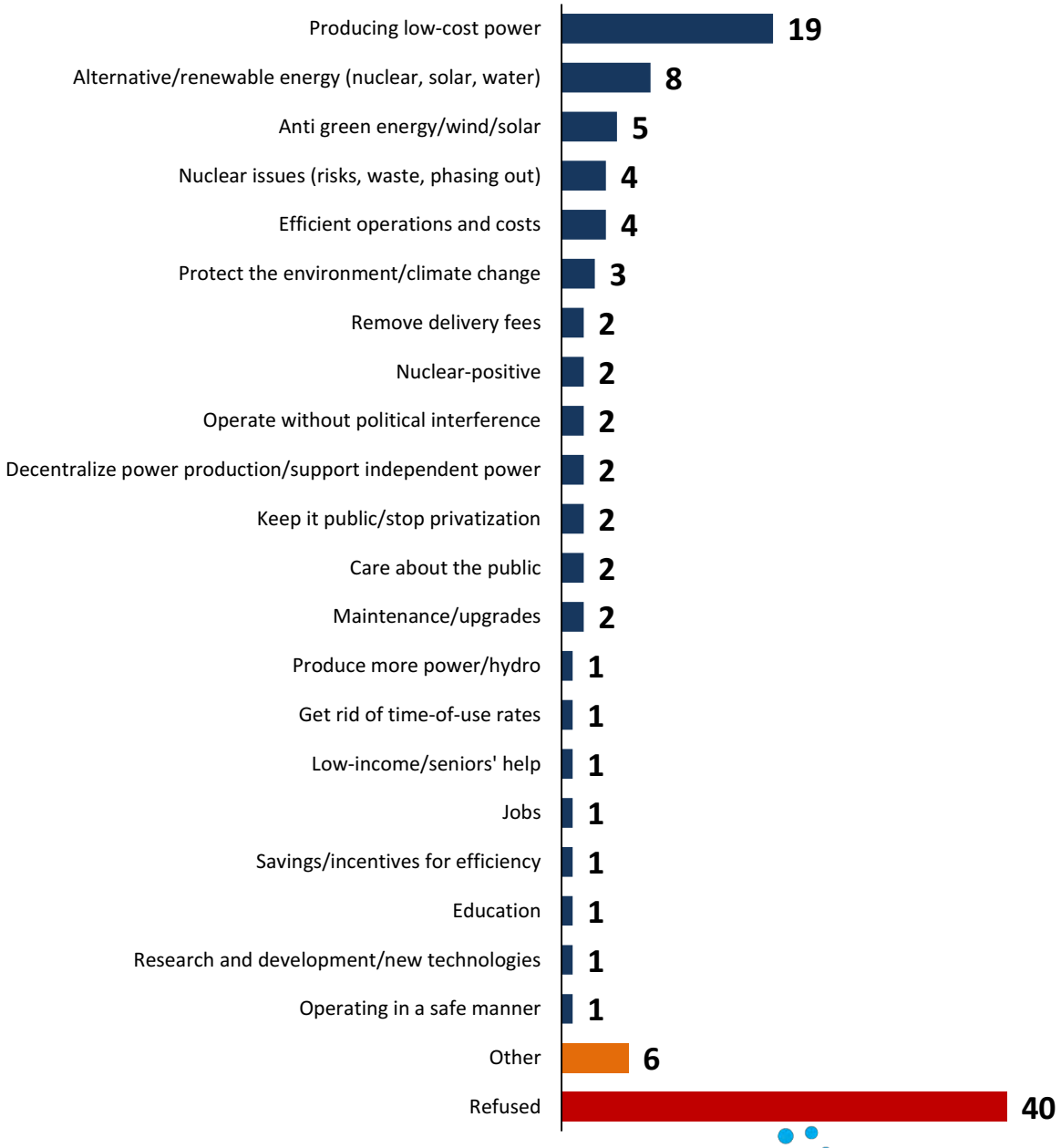
Additional Priorities

Q

The list above may not include all the outcomes that matter to you. Are there any other important priorities that OPG should be focusing on that weren't included in the list above? If so, please list what you think is missing below.

[asked of all respondents, up to 3 answers allowed, n=75]



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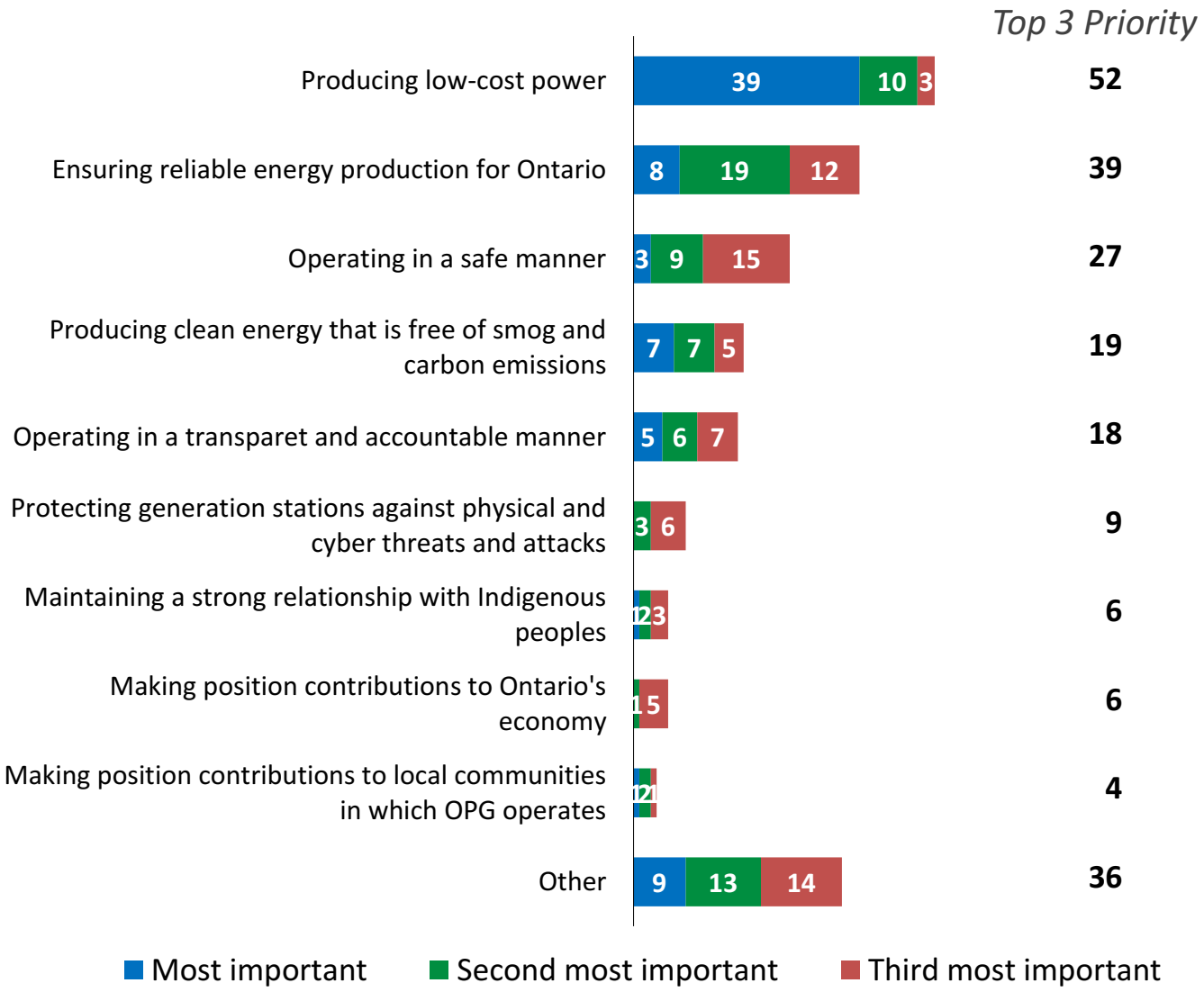
Ranking Outcome Priorities

Q

Thinking again about the things OPG should be focussing on, please rank your/your organization's top 3 priorities—where "1" would be the most important, "2" the second most important, and "3" the third most important.

[asked of all respondents, showing all small business respondents who answered the question, n=75]



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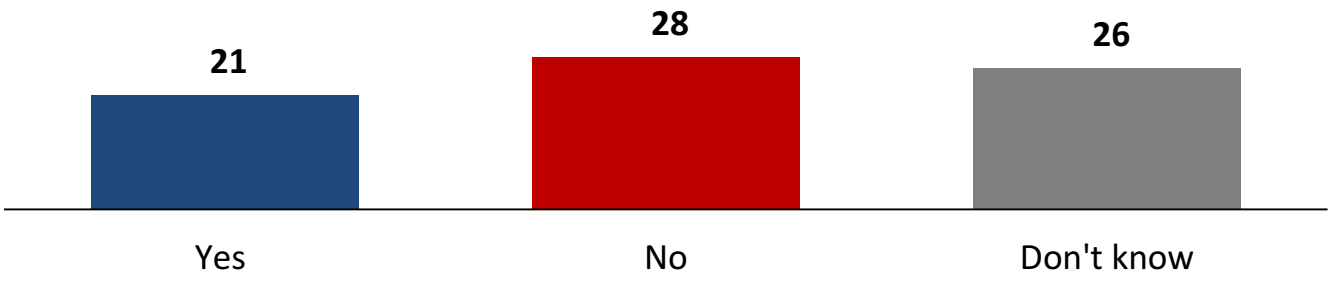
Nuclear Priorities

OPG's nuclear business is in the process of refining its framework for assessing specific investment decisions. OPG is considering using the criteria listed in the table below. However, before implementing this framework, OPG would like to hear what you think about this approach.

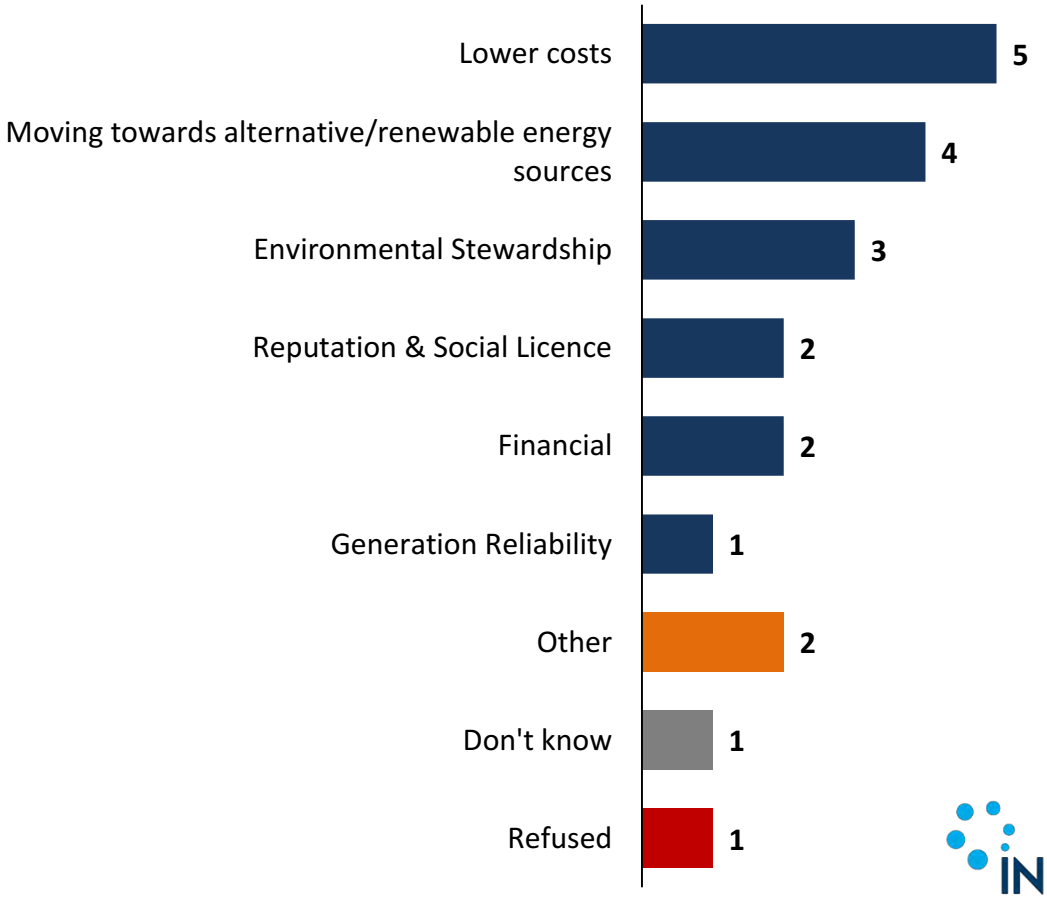
SAFETY	OPG lists the safety of the public, its staff and its contractors as a priority. To achieve its goal for safety, OPG considers the following types of safety risks: • **Conventional safety risk** – the risk of workplace safety hazards and injuries. • **Nuclear safety risk** – risk of unplanned reactor shutdowns or unsafe shutdown conditions. • **Radiological safety risk** – the risk of unplanned radiation exposure or contamination to station personnel and the public.
GENERATION RELIABILITY	For OPG, generation reliability is about getting the most out of a power plant. The less down-time a power plant has, the more "reliable" it is. **Generation reliability** is highest when OPG can: • Maximize the hours that a plant is producing power or • Minimize the hours spent on equipment repairs or unplanned events that reduce its ability to produce that power.
REGULATORY	OPG's operations are subject to extensive laws and regulations that are enforced by various bodies such as the OEB, Canadian Nuclear Safety Commission and the IESO. Collectively, these institutions set out many of the constraints within which OPG is permitted to operate its facilities and manage its business.
REPUTATION & SOCIAL LICENCE	OPG considers input from the public and its employees in operating its generation stations and conducting business. This includes considerations of public safety and corporate citizenship, environmental stewardship, transparency, community engagement, and Indigenous relations.
FINANCIAL	OPG's financial priority is to achieve a consistent level of strong financial performance that allows the company to make investments in its generation facilities to meet operational needs and reduce equipment damage, creating a profit for the Province of Ontario through increasing revenue and reducing costs.
ENVIRONMENTAL STEWARDSHIP	Electricity generation can have an impact on biodiversity. OPG's operations and facilities must work within **environmental requirements** that include protection of land, water, air, living organisms and natural systems.
SECURITY	OPG also considers two types of security risks: • **Cyber security risk** – threats to networks, computers, programs and data from attack, damage or unauthorized access. • **Physical security risk** – threats to generating stations and personnel.

Nuclear Priorities

Q Is there anything missing from this list?
[asked of all respondents, n=75]



Q Is there anything missing from this list?
[asked only of respondents who said "yes, there are missing priorities", n=21]



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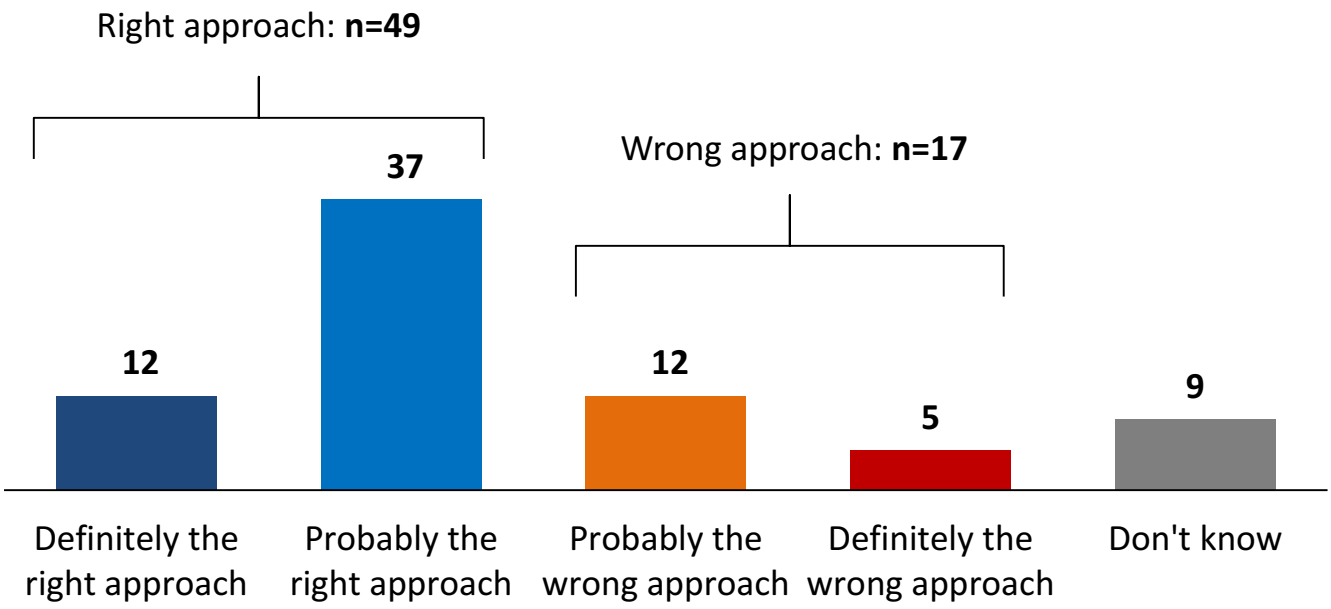
Nuclear Priorities

Q Do you think this is the right or the wrong approach?
[asked of all respondents, n=75]



Strategic Imperatives

OPG uses a company-wide approach to achieve the goals outlined on the previous pages. At the highest level, OPG works to achieve the four core values listed below. OPG calls these values its "**Strategic Imperatives**." These four values guide all of the decisions that OPG makes. Each year, OPG uses targeted initiatives to achieve more specific goals that fall under the four Strategic Imperatives. OPG would like to hear what you think about this approach and the values in it.

OPERATIONAL EXCELLENCE

Operational Excellence at OPG means the safe and environmentally responsible generation of reliable and cost-effective electricity from the company's generating stations through a highly trained and engaged workforce.

OPG uses measures such as how much energy it produces in total, and the amount of electricity generated by a nuclear plan relative to the maximum potential to assess Operational Excellence.

PROJECT EXCELLENCE

Project Excellence at OPG means being an industry leader in project management capability and performance. As part of the commitment to project excellence, OPG continues to enhance and streamline its approach to project planning and execution, with the goal of delivering all projects safely, on time, on budget, and with high quality.

OPG measures Project Excellence by comparing budgeted to actual cost and time, as well as other indicators.

FINANCIAL STRENGTH

Financial Strength at OPG means achieving a consistent level of strong financial performance that delivers a profit to the Province of Ontario and positioning the company for future growth.

OPG uses measures such as return on equity and earnings before tax to measure Financial Strength.

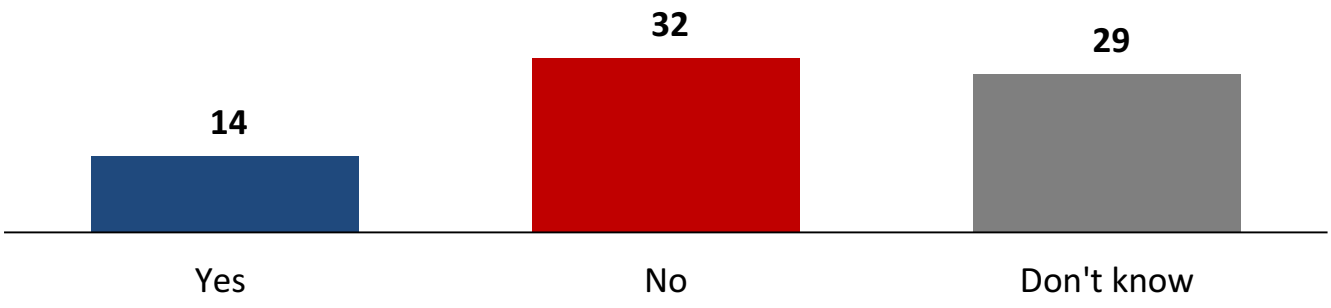
SOCIAL LICENCE

Social Licence at OPG means holding the company accountable to the public and its employees, and focusing on maintaining the people's trust. OPG is committed to maintaining high standards of public safety and corporate citizenship, including environmental stewardship, transparency, community engagement, and Indigenous relations.

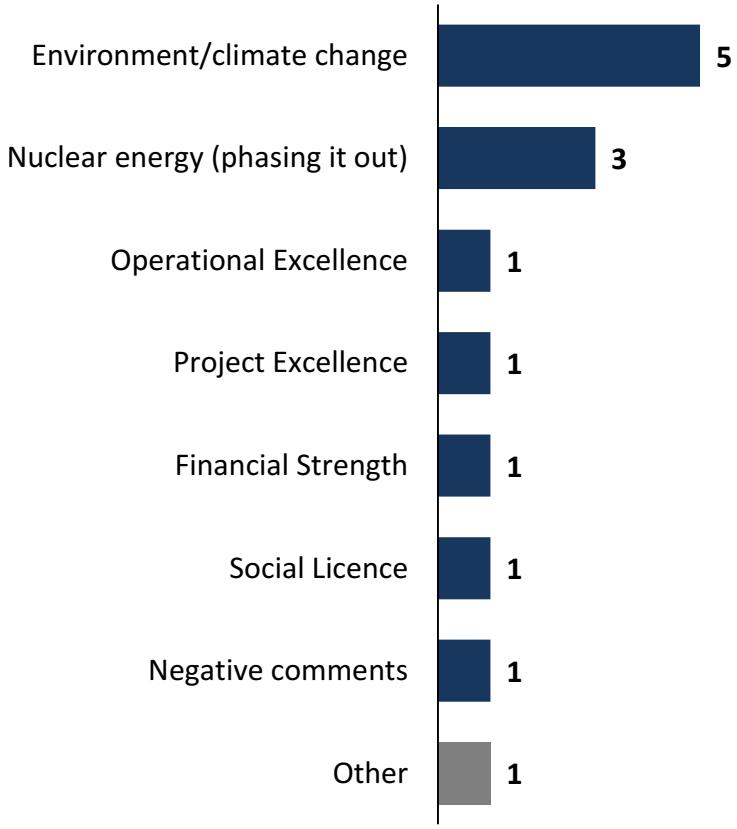
OPG uses indicators such as workplace injury frequency to measure employee safety, which is part of its Social Licence.

Strategic Imperatives

Q Is there anything missing from this list?
[asked of all respondents, n=75]



Q Is there anything missing from this list?
[asked only of respondents who said "yes, there are missing priorities", n=14]



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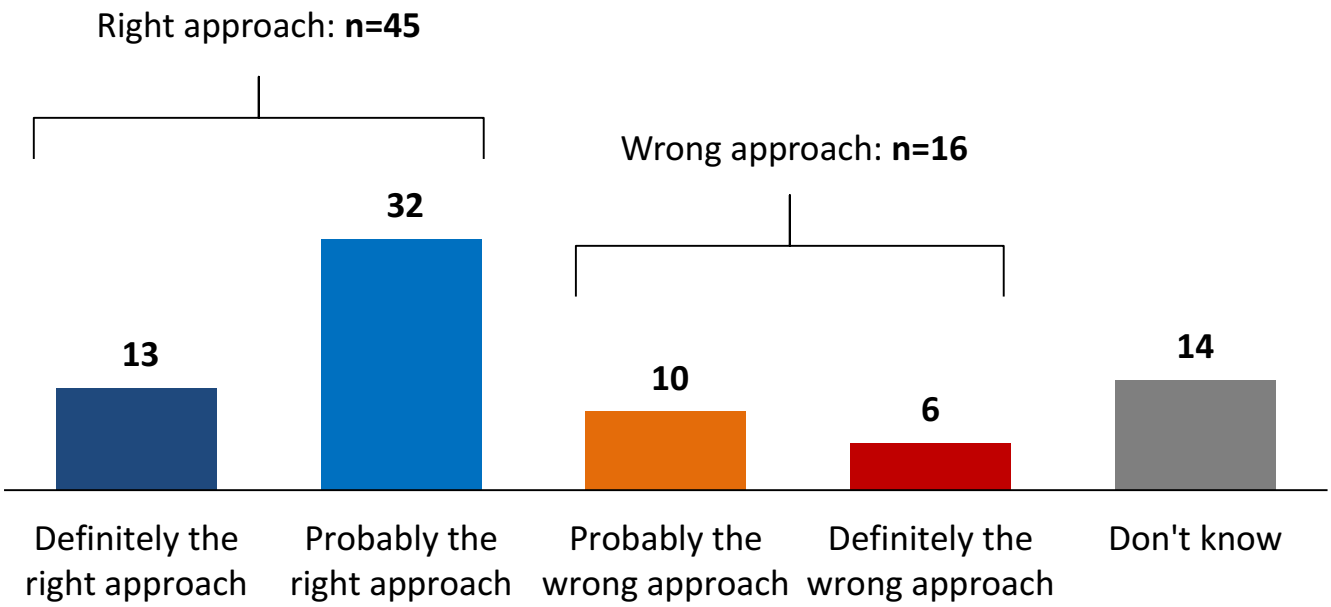
Strategic Imperatives

Q

Do you think this is the right or the wrong approach?
[asked of all respondents, n=75]



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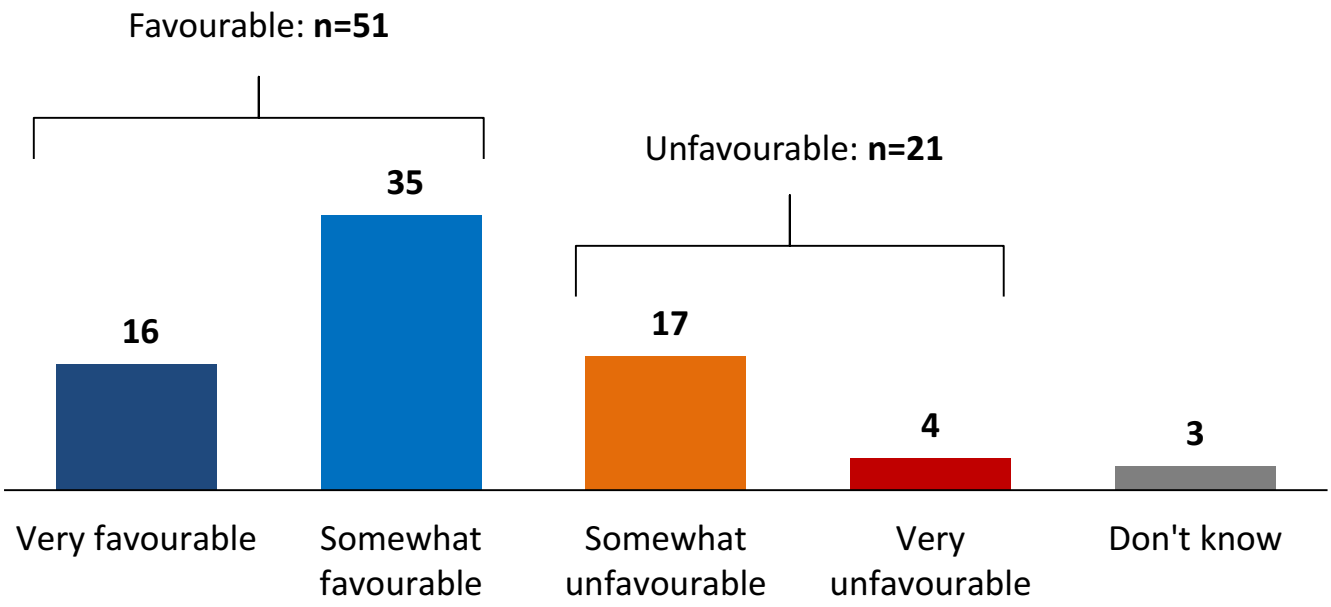
Workbook Diagnostics

Overall Impression of the Workbook

Q Do you have a favourable or unfavourable impression of the workbook?
[asked of all respondents, n=75]



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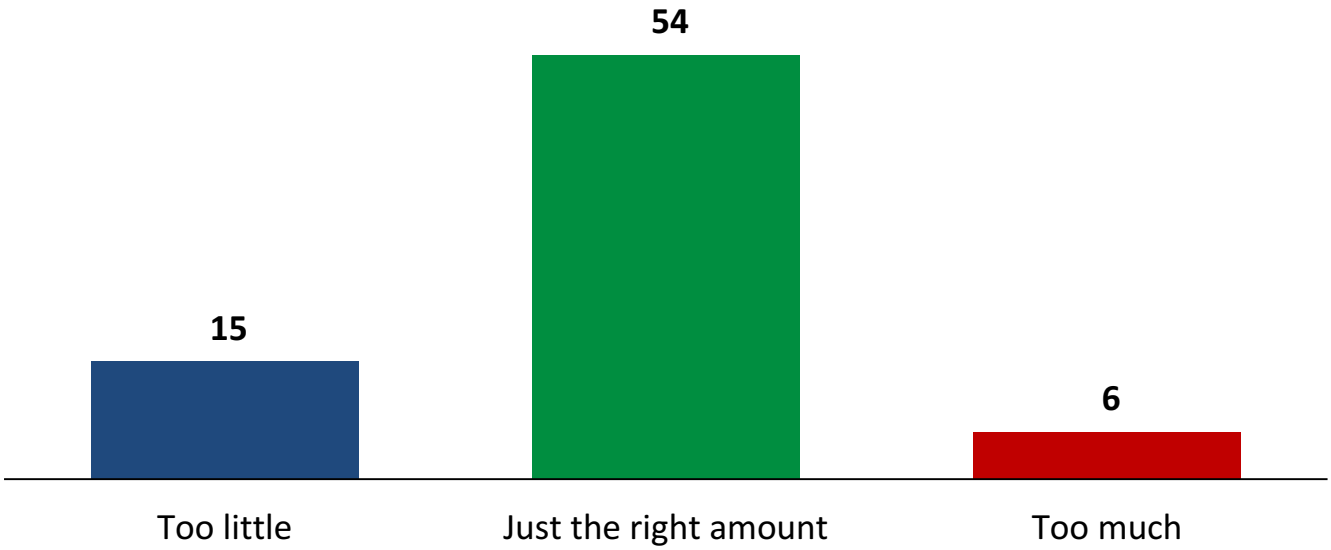
Volume of Information

Q

Did OPG provide too much information, not enough, or just the right amount?
[asked of all respondents, n=75]



Volume of Information

Too Little Information

Q What was missing?
[asked only of respondents who said "too little information", n=14]

Amongst those who answered: 'Too little information'
(n=15)

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Volume of Information

Too Much Information

Q What could have been cut?
[asked only of respondents who said "too much information", n=6]

Amongst those who answered: 'Too much information'
(n=6)

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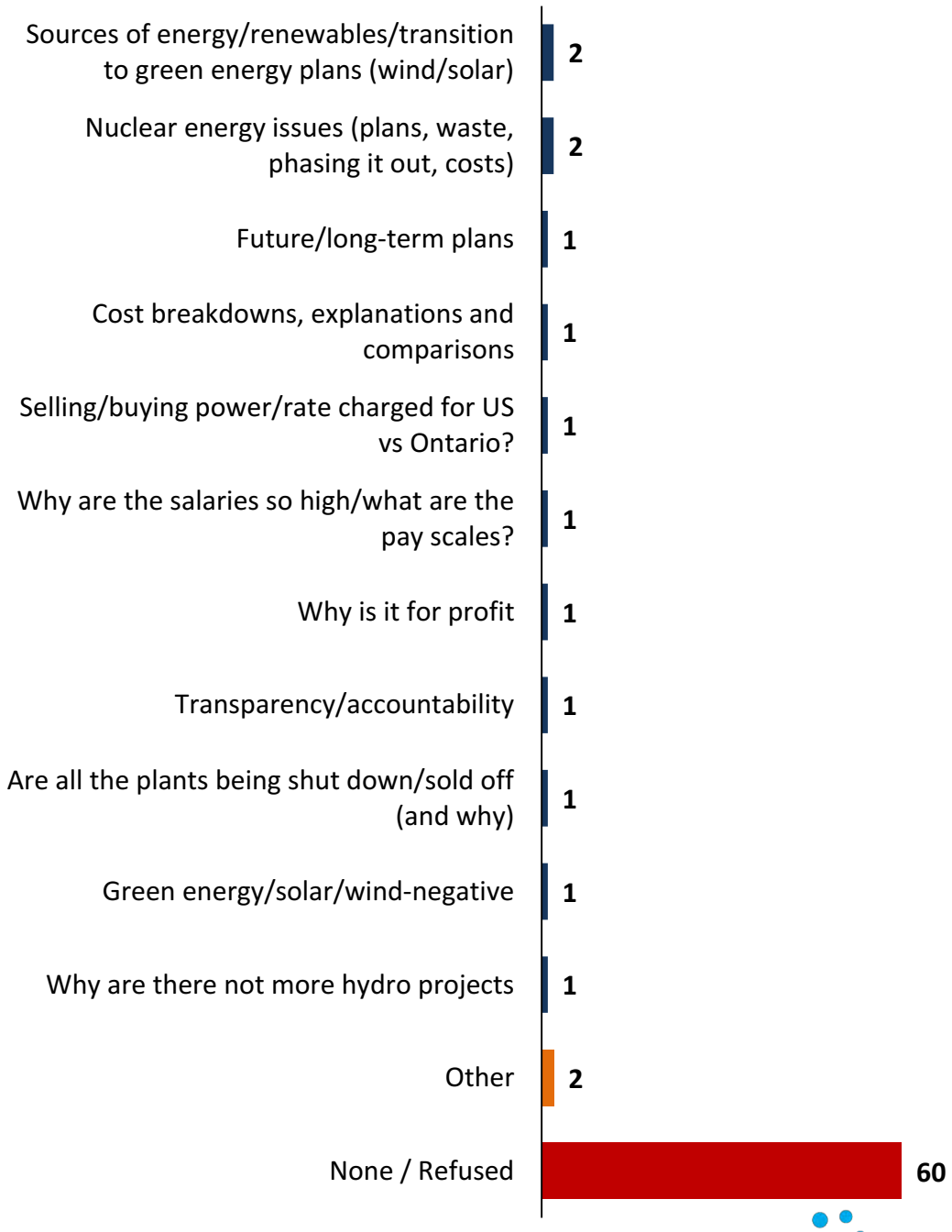
Outstanding Questions

Q

Do you have any questions about OPG you would still like answered?
[asked of all respondents, n=75]



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Suggestions for Future Consultations

Q How would you prefer to participate in future consultations?
[asked of all respondents, n=75]

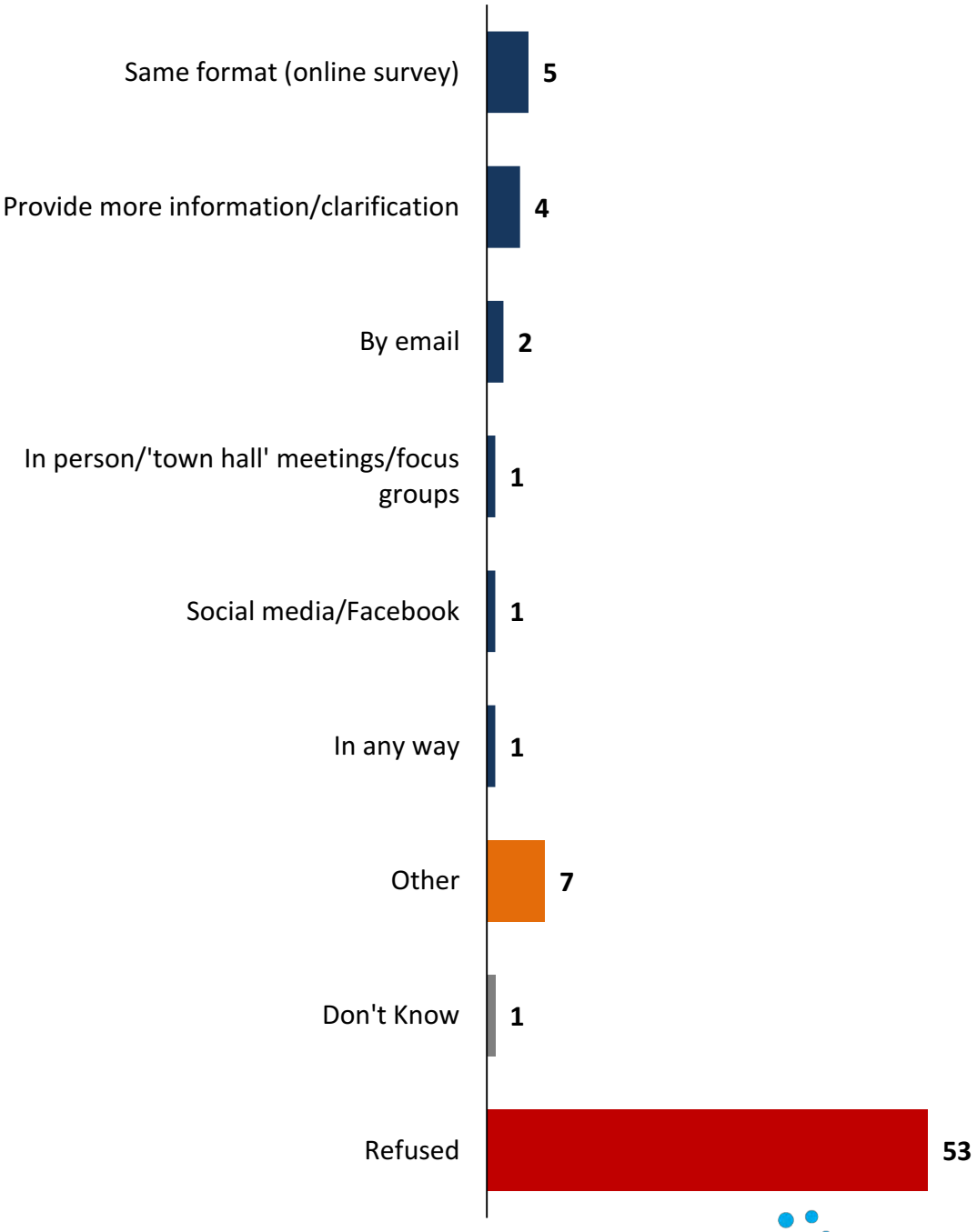

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Exhibit A2-2-1
Attachment 4
Page 386 of 421

INNOVATIVE RESEARCH GROUP

OPG
Customer Engagement

Engagement Focus Groups – Report

November 2018

Ottawa, North York, Thunder Bay, London, Mississauga

Prepared for:

Torys LLP

79 Wellington Street W.

Toronto, ON M5K 1N2

TORYS LLP

Customer Engagement Report

November, 2018

Confidentiality

This report and all of the information and data contained within it may not be released, shared or otherwise disclosed to any other party, without the prior, written consent of Torys LLP (Torys).

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Torys on behalf of its client Ontario Power Generation Inc. (Ontario Power Generation or OPG). The conclusions drawn, and opinions expressed are those of the authors.

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Methodology

A series of focus groups were held in November 2018 in different locations throughout Ontario (see table below for details). The primary goal of the groups was to explore customer needs and the outcomes that matter to them, with regards to energy generation. Customers were also asked to review a proposed Nuclear values framework and a set of Strategic Imperatives currently used by OPG. Finally, customers were asked to provide feedback on the customer engagement process and to discuss how they would like to be consulted in the future.

Two groups per night were held in each of the five locations below. The first group each night was comprised of small business customers, while the second group was comprised of residential customers. Participants were recruited randomly over the phone and screened to ensure that participants were OPG customers (residing in Ontario and responsible for paying their electricity bill). In addition, residential individuals were screened based on age, gender and employment status to ensure a good mix of participants.

Date	Location	Focus Group Times	Number of Participants	Customer Type
November 15, 2018	Ottawa	5:30pm-7:30pm	6 participants	Small business
		7:30pm-9:30pm	9 participants	Residential
November 16, 2018	North York	5:30pm-7:30pm	8 participants	Small business
		7:30pm-9:30pm	8 participants	Residential
November 19, 2018	Thunder Bay	5:30pm-7:30pm	9 participants	Small business
		8:00pm-10:00pm	7 participants	Residential
November 21, 2018	London	5:30pm-7:30pm	8 participants	Small business
		8:00pm-10:00pm	8 participants	Residential
November 22, 2018	Mississauga	5:30pm-7:30pm	6 participants	Small business
		7:30pm-9:30pm	10 participants	Residential

Each group started with a broad discussion of energy and the different parts of the energy system. In response to a question about what it takes to make a light come on when a switch is turned, participants identified the key aspects of the electricity system and identified the companies that generate electricity in Ontario. Once OPG was identified, the moderator then proceeded to hand out workbooks containing information about the energy system, OPG in particular, and some of its current planning considerations. Participants worked through the workbooks individually, providing an opportunity to capture individual opinions before any group dynamic could affect views (digital versions of the workbooks used can be found in the Appendix).

Once participants completed the workbooks, the groups went through the workbook page by page discussing the content and format of each page.

Finally, after reviewing the material the groups discussed how effective the consultation was and potential changes or alternative formats that could allow them to provide input in a more effective way.

Executive Summary

The workbook worked.

Overall impressions of the workbook were favourable. Most participants agreed that the workbook had the right amount of information in it. When asked how they would like to be consulted in the future, most residential and many business participants said that they would like to participate in the same format in the future.

There is a steep learning curve for participants with no background knowledge.

These groups reaffirmed the existing belief that knowledge of OPG and the broader energy system is limited. While a few participants did have a deep understanding of the sector, most only had surface level awareness and could not provide any details. This means that most participants need a substantial amount of background information provided to them before they can effectively participate.

Participants wanted to be having a different conversation.

Conversation often drifted towards issues outside the scope of the consultation and towards issues related to the *Long-Term Energy Plan*. Participants were eager to discuss transitioning towards renewable energy and away from nuclear and used open ended questions within the workbook to make this point. While in some groups a greater effort was made to differentiate between the topic of the consultation and the *Long-Term Energy Plan*, it required a substantial amount of time.

Reliability is the top unaided expectation of OPG.

When asked how they would know if OPG is doing a good job, many said that they judge it by whether or not the lights come on when they flick a switch. Several participants emphasized that it was best if they could forget about OPG because that would mean they have reliable power.

Cost, reliability, and the environment were the clear top three priorities when ranked.

While participants were most likely to say they valued reliability in unaided discussion, their preferences were more complex when given a set of options to choose from. Participants were asked both to rate (indicate how important each item is on its own) a list of outcomes developed from earlier research and a review of internal strategy documents, as well as to rank that same list (choose the most important among those items). Most participants rated every item as at least somewhat important and most items were rated as very important. However, when they had to rank their top three priorities, low cost and producing power free of smog and carbon emissions joined reliability at the top. In both business and residential groups, these three emerged as the most prominent choices.

General Awareness

At the outset, participants did not know a lot about Ontario Power Generation. While in most groups at least one participant was able to come up with its name as a company that generates energy in Ontario unassisted, the majority of participants were not aware of it. Participants who had heard of OPG before only had general knowledge about it, including some participants who thought they knew something but were incorrect.

Has anyone ever heard anything about OPG?

"Possibly if it's related to solar generation in Ontario." (Male, Ottawa, Business)

"I didn't really know much about them before I arrived." (Female, Ottawa, Business)

"They sponsor ads for dams." (Male, London, Residential)

"I can't believe how totally ignorant I am about these things." (Male, London, Residential)

"I know that they have a facility on Mission Island" (Male, Thunder Bay, Business)

"Pretty much OPG is the major producer of energy in Ontario." (Male, Thunder bay, Business)

"I've heard of them but I don't know anything." (Female, North York, Business)

Participants were asked how familiar they were with how much of their electricity bill goes to OPG before reading about it in the workbook. Only one participant across all the groups said they were very familiar, and the vast majority of participants were not at all familiar with how much they were paying OPG.

However, after reading through the information in the workbook, participants indicated that they now had a general understanding of who OPG is. The intensity of this response was stronger among business participants than residential participants. This is perhaps because of a higher baseline understanding of OPG in the business groups going into the workbook exercise.

Having read the workbooks, the majority of participants in both residential and business groups were satisfied with OPG. However, residential participants were more satisfied than business participants, with the plurality of residential participants saying "somewhat satisfied", while most business participants said "neither satisfied nor dissatisfied".

Customer Needs

Unaided Outcomes

Participants generally judged OPG's performance by its ability to satisfy a few core needs: reliable energy, affordable energy, and environmentally friendly energy. These three emerged as the most common responses when asked an open-ended question of how they know OPG is doing a good job or not.

Most participants who said reliability was key said some variation of *"As long as my lights turn on, I'm happy"* [Workbook response] because to them, electricity generation was not something they wanted to think about.

Participants who were concerned with price felt that *"If the company is keeping prices down, they're doing a good job"* [Workbook response].

Although transparency was only listed as a criterion by two participants when going through the workbook, the discussion suggested that transparency was key to credibly achieving the outcomes. One participant said *"We kept going back to transparency that whole time. The cost, how do you decide how much we are paying?"* [Workbook response]

There were also several participants in each group who said that they would not know if OPG was doing a good job for them or not. They generally felt that they did not have enough information to make an informed decision and do not hear about OPG in their regular lives.

Unfulfilled Needs

When asked what OPG could do to better serve them, participants most frequently identified lower prices as their main concern, while reliability—the most important unaided outcome—was only mentioned by a few. This suggests that OPG is already doing an acceptable job at delivering their most central outcome.

The greatest unmet need among residential participants was increased transparency and information, more so than business participants. Conversely, business participants were specifically interested in cost efficiency and improving service for existing prices.

Rating Outcome Importance

INNOVATIVE and Ontario Power Generation developed an initial list of outcomes to spur participant discussion following the initial open-ended discussion. The list included:

- Producing low-cost power
- Ensuring reliable energy production for Ontario
- Producing clean energy that is free of smog and carbon emissions
- Operating in a safe manner
- Maintaining a strong relationship with Indigenous peoples
- Making positive contributions to Ontario's economy
- Making positive contributions to local communities in which OPG operates

- Protecting generation stations against physical and cyber threats and attacks
- Operating in a transparent and accountable manner

Nearly every priority was viewed as important by most participants. Only three outcomes consistently received lower ratings: making positive contributions to the local communities in which OPG operates, maintaining a strong relationship with Indigenous peoples, as well as - in the residential groups only - making positive contributions to Ontario's economy. While most participants said these were at least somewhat important, the intensity was much lower.

At the other end of the spectrum, the remaining priorities were almost unanimously viewed as at least somewhat important. In fact, the clear majority of participants said each of the other outcomes was *very* important. At most, only two participants said any one of these was not important.

Reliability

Reliability was the most common theme among participant responses when asked how they would know if OPG was doing a good job for them. Participants felt that as long as their lights would go on, they would know that OPG is doing a good job.

This is reflected in the fact that nearly every participant said reliability was a 'very important' priority. Only one participant in any of the groups said that reliability was 'not important at all.'

> *"If we come in in the morning and the lights are on, I know that will be a good day." (Female, Ottawa, Business)*
>
> *"Does it go down? Because if it's down for more than three hours I have to start throwing stuff out and that's a lot of money." (Male, London, Business)*
>
> *"I look at the fact that power is consistent. I can't remember the last time we had a ten minute one." (Female, London, Business)*
>
> *"That's job one – ensuring there is reliable electricity." (Male, London, Business)*
>
> *"I have power when I hit the light switch." (Male, London, Residential)*
>
> *"Whether or not I am having power surges, or brown outs, or black outs." (Male, London, Residential)*
>
> *"Turn the light switch and it works." (Male, London, Residential)*
>
> *"We all treat safety as a high priority, but if we don't have enough power, we don't have a choice to run the nuclear power plant over capacity." (Male, London, Residential)*
>
> *"Ensuring reliable energy. That's their job. That is their only job." (Male, London, Residential)*
>
> *"If I get in in the morning and turn on the lights and everything is working, they've done a good job for that day. If I go in there and have no power, I can't do a thing." (Male, Mississauga, Business)*
>
> *"If my lights stay on." (Male, Mississauga, Residential)*
>
> *"It's always available so they are doing a good job." (Male, North York, Residential)*
>
> *"For average guy, if there is no news it is good news." (Male, North York, Residential)*
>
> *"When I need it, it's there. I don't think about it." (Male, North York, Residential)*
>
> *"It's always there, there is never an issue." (Female, North York, Residential)*

"The reliability of it and how often the power goes out." (Female, Thunder Bay, Business)

"As long as I have reliable power." (Female, Thunder Bay, Residential)

"Whether you pay more or whether the service is not as good, so long as you can count on having that service then you can plan your life." (Female, Thunder Bay, Residential)

(These were unaided responses that were provided early in the workbook and discussion. The workbook informed participants that generation reliability is defined differently. "For OPG, generation reliability is about getting the most out of a power plant. The less down-time a power plant has, the more 'reliable' it is.")

Cost

The next most common outcome participants cited when asked how they would judge if OPG was doing a good job or not was the cost of electricity. To them, a lower electricity bill means the system is working while a higher bill means it is not.

"Is it still going to be 20% or is it going to deviate from that and go up?" (Male, London, Business)

"My cost of power and fluctuation. Depending on usage and time of year..." (Male, London, Business)

"I guess if I am not objecting to the price too much, that would be okay." (Female, London, Business)

"Producing low cost power was my number one. I am assuming that they are safe." (Female, London, Business)

"Producing low cost power because that hits me in the wallet." (Male, London, Residential)

"Most importantly to us would be how much we're paying at the end of the day. If our bill goes down, we can assess that they are doing a good job." (Female, Mississauga, Business)

"Bottom line is that if they can maintain the electricity rates to me, or even lower it that will make a difference." (Male, Mississauga, Business)

"At the end of the day that is what we see – the bill." (Male, Mississauga, Residential)

"What matters is if they keep the price lower than wind and solar. That is what is going to ultimately win my vote." (Male, North York, Business)

"It's how large my bill is. And the second sentence is that it probably isn't OPG's fault how high my bill is." (Male, Thunder Bay, Business)

"Ultimately the bottom line comes down to our individual bills." (Female, Thunder Bay, Business)

"There was a stat in there that OPG produces its power cheaper than other producers – obviously cost is something I am interested in." (Male, Thunder Bay, Residential)

"As a student my first priority is low cost power." (Female, Thunder Bay, Residential)

A few participants, mostly in business groups, mentioned cost efficiency as a priority they would like OPG to focus on. When probed on what they believed the difference between efficiency and low costs was, they say that efficiency was about maintaining quality while not being wasteful. Comparatively, low costs could mean cutting corners or doing things improperly.

"I just put try to improve their efficiency. I don't know what they do to do that or if efficiency really crops up. I don't know how they determine what money they get or if efficiency crops up." (Male, London, Business)

"You've got producing low cost power but not cost efficient. You talk about operation, you talk about capital, you talk about maintenance. Whether it's low cost power that is cheaply done or unsafely done as opposed to something that is efficient." (Female, Thunder Bay, Business)

"Just overall cost efficiency. Producing low cost power is cost efficiency but it's not only cost efficiency. Making sure we are using their resources to the best of their abilities." (Female, Thunder Bay, Residential)

Overall participants expressed the desire to forget about OPG. They want the system to function so that there is power when they need it and they do not need to worry about the price. While there were some differences in which priority ranked first or second across customer types, both business and residential customers generally ranked cost and reliability as very important.

Environment

The environment emerged as a very important area that participants wanted to see addressed. While not *the* most intensely supported priority, the vast majority of participants in both groups did say it was 'very important.'

"Myself personally I think it's worth it. If people don't start changing there won't be a planet." (Male, Ottawa, Business)

"I just see the future as important and if you jeopardize that, nothing else matters." (Female, London, Business)

"Make sure they are not destroying the planet. As long as the energy is coming clean, they are doing a good job for me. The moment you start hurting the planet is when you tick me off." (Male, London, Residential)

"They can produce lots of great clean energy but if they are destroying ecosystems locally, I wouldn't want them to proceed." (Female, North York, Residential)

Some participants expressed concern that the environmental priority describe in the workbook was not broad enough. They wanted to see a priority that included other impacts, including concerns of nuclear waste, wildlife habitat destruction, and other issues.

"Are they doing a good job? Well are they making sure they are not doing anything to the environment that could jeopardize future generations? My big question is where is all this nuclear waste going and how do they deal with transport? Are they polluting lakes, rivers? What's the cost to our lakes, rivers, and animals?" (Male, Ottawa, Business)

"Yes, we have power now, but are future generations to have power but no nature? It's nothing. We need plants to live. If we are going to continue to destroy things with stuff like nuclear waste… And where is the nuclear waste going? That would definitely be one of the things that I would be interested in knowing." (Male, Ottawa, Business)

"They produce a lot of nuclear waste and I want to know where it goes." (Male, Ottawa, Business)

"The thing about nuclear plans is that I don't think they have a handle on waste yet." (Male, London, Business)

"Nuclear still produces waste – radioactive waste. You see it a lot on TV – the detrimental effects of nuclear." (Male, North York, Business)

"Nuclear generator stations use the water from the lake then put it back in the lake – it causes thermal pollution that destroys habitats. Then the cost of storage – you're storing nuclear waste." (Female, Thunder Bay, Business)

"Nuclear energy is so cheap but to store the nuclear waste for hundreds of years?" (Male, Thunder Bay, Residential)

Safety

Most groups had at least one participant who was skeptical about nuclear power because they didn't believe it was safe. Once the idea of nuclear power as an unsafe energy source was placed on the table, many participants agreed and expressed their own concerns about the energy source.

"Let's get out of nuclear. The issues with nuclear – millions of years if one of those things goes bad, we can't live there." (Male, Ottawa, Residential)

"When you're messing around with nuclear – that is a big priority. If you don't have that it jeopardizes all the other priorities." (Male, London, Business)

How do you know if OPG is doing a good job?

"We didn't have a major accident in the last ten years." (Male, London, Residential)

"If we look in terms of potential catastrophic events – if we have an issue with the nuclear plant London would be 10% potential death toll. That's potentially massive." (Male, London, Residential)

"As far as I am concerned, we don't have Three Mile Island and we don't have Chernobyl. I picked safety as the number one thing over cost because they can radiate us all and do it cheaply. I would prefer they do it safely and then cost comes after that." (Male, Mississauga, Residential)

"Everybody under 30 is anti-nuclear." (Male, North York, Business)

"You don't want to have a Chernobyl incident or like what they had in Japan. We are very fortunate in Canada." (Male, North York, Residential)

"Nuclear is obviously cheaper but you don't want another Chernobyl to go off." (Male, Thunder Bay, Residential)

A few participants looked at safety more generally and felt that businesses need to be safe more generally and that this was a core element of successful operation.

"I looked at it as my business and I want my employees to be safe. If I don't have employees, I don't have a business." (Female, London, Business)

"There is no commercial value if you don't have safety." (Male, London, Business)

Security

Like safety, security was at least 'somewhat important' to all participants. Security was, however, considered table stakes by most. While they agreed it was important, it was rarely a top priority and the assumption was that it would be dealt with to a sufficient standard regardless of the outcome of the consultation.

"I liked that it included cyber threats and attacks. That's modern thinking." (Male, London, Business)

"If the power grid is shut down, then business doesn't operate" (Male, London, Business)

Accountability and Transparency

Accountability and transparency were widely supported, with a large majority of participants saying that they were very important. In the discussion, many participants expressed desire for more transparency, and in particular that transparency should be achieved through additional public education.

Participants had concerns about financial transparency and wanted to see more information available online, however once the moderator informed them that the information was already online and published regularly, participants instead asked for more public education.

"They need to have some way of informing people when those peaks are so people can work to reduce those peaks because we don't know." (Male, Ottawa, Business)

"Be more informative about what exactly goes into the cost of electricity. It would be interesting to know why electricity costs what it does." (Male, London, Business)

"I'd like to see their books available online." They are. *"But it's not advertised." (Male, Mississauga, Residential)*

"We don't get anything right now. We don't get it in our bill. We don't get where it's coming from. How much is coming from hydro? How much is coming from nuclear? Maybe from our bill, maybe general education." (Female, Mississauga, Residential)

"I'd like to know where the $300 is going." (Female, North York, Residential)

"Better relationship in terms of educating their customers on an ongoing basis – particularly with their billing and updating us on what they are investing in." (Female, Mississauga, Residential)

"If OPG is the lowest cost producer, they should be putting out more of an education campaign, saying our prices are a lot lower than people from the FIT program." (Male, North York, Business)

"OPG could do more to make electricity safe by teaching. There are all kinds of different people who need to learn." (Male, North York, Business)

A few participants discussed education and public information more generally and linked it directly to transparency and accountability. They felt that the public needed to be better educated about the energy system in Ontario and the information provided in the workbook should be readily available to all.

"The only time I hear a lot about electricity is from politicians and that is not always the best place to get it." (Female, Mississauga, Residential)

"Education is part and parcel with transparency." (Female, Mississauga, Residential)

"I don't think there is enough public education" (Male, North York, Business)

"The information that is provided isn't as transparent as it should be." (Male, Thunder Bay, Business)

"Operating in a transparent and accountable manner means they'll give me any information I need to know about the company." (Female, Thunder Bay, Residential)

Contributing to the Local Community

Contributions to the local community was the least supported priority. While most participants still felt it was somewhat important, few ranked it in their top priorities. Additionally, those who commented on it in the discussion sometimes expressed the view that communities in which OPG operates already received jobs and so did not need any additional support. This is supported by the relatively large group of participants who said it was 'not very important,' which was higher for this priority than any other.

> *"They are already doing something for the community by creating jobs in it." (Male, Mississauga, Business)*
>
> *"We should spend less and donate less to the local areas. Just because Darlington happens to be in Darlington they spent money contributing to softball teams, but they are already contributing to Darlington by being there with jobs and such." (Male, North York, Residential)*

Contributing to Ontario

The importance of contributions to Ontario's economy was divided across the business and residential groups. Small business participants were far more likely to say it is 'very important', while support from residential participants was less intense with a majority saying 'somewhat important.' One participant was concerned with maintaining "a strong made-in-Ontario supply chain" while others were more concerned with OPG being a strong employer and continuing to employ many Ontarians.

> *"Part of the feed in tariffs, was there not a mandate that most of the components were supposed to be manufactured from source to final components in Ontario? When in fact some of these guys brought in solar panels almost complete into Ontario then just did final assembly." (Male, North York, Business)*
>
> **Are there any missing priorities?**
>
> *"Maintain a strong made-in-Ontario supply chain." (Male, North York, Business)*
>
> *"The quality of a workplace relies on how employees are treated. More satisfied employees stay longer and do better." (Male, London, Business)*
>
> *"Provide meaningful careers to its employees." (Male, North York, Residential)*
>
> *"They're a big employer of Ontarians. They are keeping people employed. To me if you are keeping people employed you are doing a good job somewhere." (Female, Thunder Bay, Residential)*

Indigenous Peoples

Maintaining a strong relationship with Indigenous peoples almost never came up in discussion. Only two participants brought it up and both were confused as to the relevance in the areas where the major nuclear plants are. Despite this lack of discussion, most participants agreed that it was either 'somewhat important' or 'very important', consistent across business and residential groups. This suggests that participants viewed it as table stakes: still important, but also required and so it would necessarily be dealt with.

"What I didn't understand, and I clicked don't know for Indigenous peoples. The two plants are in Pickering and Darlington. Are there Indigenous peoples around those facilities that they need to maintain relations with?" (Male, Mississauga, Business)

"Do we have a lot of power plants near indigenous communities? I'm just wondering why it's being brought up." (Male, North York, Residential)

Additional Priorities

Participants also mentioned several other priorities they would like OPG to focus on. While participants did not always list these priorities when completing the workbook, they did come out in the follow-up discussions and were often picked up as themes that continued to resurface throughout the remainder of the discussion.

Research and Development

Many participants felt that the existing list of priorities missed research and development (R&D). The moderator pressed some participants and asked if it was important enough to increase bills for consumers, citing the example of a senior living on a fixed income. While this consideration reduced the number of participants who want to see increased investment in R&D, others felt that rate increases could be limited to those who could afford them with rebates in place for those who couldn't. For these participants, they would be willing to see their own bills increase to invest in R&D.

"Do they put any money into research?" (Male, Thunder Bay, Residential)

"I put research and development. Is anybody doing that sort of thing? I think somebody should be doing it. What is the best alternative?" (Male, London, Business)

"I'd rather pay a little bit more and know innovation is happening than not pay. I'm not 99 years old and ready to die next year. I've got a long way to go." (Male, London, Business)

"Maybe a portion of whatever profits are earned – what portion is put into research and development about the outcomes of the power sources." (Female, London, Residential)

"I do think they should be including research in the rates. Maybe there can be an allowance for an age group or an income level. I wouldn't mind paying a small portion knowing it was going into research and development." (Female, London, Residential)

"I'm a big believer in research and development. You can't sit on your laurels." (Male, London, Residential)

"One thing they didn't mention is spending on R&D." (Male, Mississauga, Business)

Is it worth it if it means increasing bills?

"In the end it affects the quality and pricing when they don't do that. If they don't spend on technology now, they will be behind for 100 years." (Male, Mississauga, Business)

"We don't know if they are doing any research into alternative energy methods." (Male, Mississauga, Residential)

"Even within nuclear there should be investments into basic research and development. We are assuming nuclear is static but nuclear itself could advance." (Male, North York, Business)

Maintaining Infrastructure

A few participants also expressed a desire for OPG to prioritize the maintenance of existing infrastructure. While this could be taken as a necessary condition for reliability, participants felt the need to list it separately.

> *"Solid infrastructure. I want to know they are working on their infrastructure, they are maintaining it." (Female, London, Residential)*
>
> *"Maintaining the infrastructure so that we always have a good system and it is online and on time." (Female, London, Residential)*
>
> *"Infrastructure integrity. It's a financial priority." (Male, North York, Business)*
>
> *"I think now that I am exposed to this, I would like to know the state of the infrastructure in this province." (Male, North York, Business)*

Thinking of the Future

Overall, many participants wanted OPG's priorities to be more explicitly about the future and planning ahead. This came out throughout the discussions in concerns about the environment, the desire for research and design, and the need to maintain infrastructure. These priorities all reflect participants' willingness to pay a premium in the present to ensure that they have more reliable and cheaper energy in the future.

These priorities also suggest that participants want OPG to be a larger part of the electricity generation system in Ontario – even larger than it is now. The low cost per kWh that they pay to OPG gave them confidence that OPG expanding would be better for them.

> *"I definitely want to see where they are investing and where they are going in the future." (Male, Ottawa, Business)*
>
> *"The status quo is not the way of the future." (Male, Ottawa, Residential)*
>
> *"I'll tell you what's confusing. They are telling me that their electricity only costs 6.6c per kWh, well I will go with you. Why would I go with a third party? Take them out of my bill." (Male, Ottawa, Residential)*
>
> *"30, 40 years from now I imagine that the need for power is going to be higher and they don't seem to be addressing that here. It's very grounded in the present." (Female, North York, Residential)*
>
> *"Are they talking of that $300 we are paying a year and saying this $25 is going towards the power plant we will need in a few years rather than going to the government and saying we need 300 million because suddenly we have this gap where we could build another nuclear plant. We could see that coming for years." (Female, North York, Residential)*

Customer Priorities

Balancing Priorities

Low cost and ensuring reliable energy production were the two priorities most commonly chosen as most important.

However, the relative priority between reliability and affordability varied by type of customer. The business groups generally were more likely to select cost as the most important followed by reliability. Conversely, residential customers were more likely to say reliability of supply was the most important priority and to rank cost second.

> *"Reliable power. Because if you don't have reliable power it won't matter what you paid for it." (Male, Ottawa, Business)*
>
> *"It's like 1 and 1a. I am just assuming that they are able to produce low cost power that is reliable for me." (Male, Mississauga, Business)*
>
> *"Low cost power followed by ensuring reliable energy production." (Male, Mississauga, Business)*
>
> *"I think all that matters is if my lights stay on and my bill stays low." (Male, Mississauga, Residential)*

While cost and reliability generally emerged as top priorities, the environment was consistently in the top three for participants. This suggests that while the intensity is lower than it is for cost and reliability, there is still a strong undercurrent of support for prioritizing the environment.

These rankings do not mean that any of the other priorities are unimportant. The rating exercise and discussion clearly demonstrated that participants value each priority described in the workbook. As noted above, the majority of participants across both rate types said that all priorities were either 'somewhat' or 'very' important.

Nuclear Priorities

The workbook presented participants with a summary of the ideas underpinning OPG's Nuclear Draft Value Framework. The vast majority of participants felt the Value Framework was the right approach.

Participants expressed more uncertainty about this question than others in the workbook. Some suggested that these should be left to experts. This is reflected by the individual responses to the priorities, which were positive but not intensely so. Comments about this uncertainty included:

> *"I don't know enough about nuclear to know if this is complete or not." (Male, London, Business)*
>
> *"I don't know if anything is missing. I can't think of anything but what if there is something not in front of me now that I need to know about." (Male, London, Residential)*
>
> *"My question was what other approaches are there? They're only showing me this and I don't know any other options." (Male, Mississauga, Business)*
>
> *"I'm not arrogant enough to say that I know what a giant company should do." (Male, Thunder Bay, Business)*

A few participants wanted the priorities to focus more heavily on safety, noting that nuclear sites are large security risks.

> *"Really what is the security risks? How high on the list... Where would that be?" (Male, Ottawa, Business)*
>
> *"Nuclear presents an unpredictable risk that you could be devastated. There should be a movement towards eliminating nuclear entirely." (Male, North York, Business)*
>
> *"The physical security risk. That is getting serious these days. You think of the impact of a generating station. I just feel that it is more important." (Female, Thunder Bay, Business)*
>
> *"It tells you what threat they are considering but not what they are doing about them." (Female, Thunder Bay, Residential)*

Although the intention of the priorities was to focus on nuclear power generation, several participants listed "alterative sources of power generation" [Workbook response] as a missing priority they felt should be included.

Strategic Imperatives

The workbook also sought customer feedback on the four Strategic Imperatives that exist in various OPG strategic documents. As with the nuclear priorities, the vast majority of participants felt these imperatives were the right approach.

> *"I've got this as a definitely the right approach." (Male, Ottawa, Business)*
>
> *"These are the four cornerstones. There is nothing else." (Male, Ottawa, Residential)*

That said, there were some concerns and suggestions for improvement. Several participants felt that the imperatives were not specific enough and needed to be better quantified.

> *"This is kinda vague. You need to quantify it." (Male, London, Residential)*
>
> *"It was too vague and wishy washy" (Male, Mississauga, Residential)*
>
> *"Further explanation of quantifiers are needed. There are key performance indicators." (Female, London, Residential)*

A couple of participants felt that the priorities were framed in such a way that they could not understand why they mattered.

> *"This stuff is completely esoteric. It makes no difference to my world." (Male, London, Residential)*
>
> *"These don't do much for me." (Male, Mississauga, Residential)*

Two participants both noted the environment, but one felt that the existing imperatives addressed it sufficiently while the other thought they "didn't really see that in social license."

> *"I wrote down try to eliminate factors that would have a negative effect on the climate and climate change, and I didn't really see that in social license." (Female, London, Business)*
>
> *"I like the social license because you're talking about environmental stewardship and transparency." (Female, North York, Residential)*

When asked what was missing from the Imperatives, the most common response in the workbook was a desire for more "forward thinking" [Workbook response] and "technological development" [Workbook response]. As was noted earlier, participants have a desire to see OPG thinking about and preparing for the future.

Workbook Diagnostics

Overall

Participants had a favourable impression of the workbook and said that they learned a lot from it.

"I learned a lot, so I put very favourable. I thought it was just right." (Female, London, Business)

"I learned a lot. I had no idea." (Female, London, Business)

"I think we got a really good handle on it really." (Male, London, Residential)

"Overall I definitely learned a lot from it." (Female, Thunder Bay, Residential)

While most participants liked the workbook, some participants had specific concerns or ideas for improvement.

Different Conversation

Most participants seemed to want to discuss the *Long-Term Energy Plan*. For customers, talking about generation begged the big questions about supply mix and the discussion gravitated towards that topic.

In particular, a significant number of participants wanted to discuss transitions to alternative energy sources and the promotion of renewable energy like wind and solar. In later groups, more of an effort was made to explain the different areas where consultation occurs and to differentiate this consultation from consultations on the *Long-Term Energy Plan*.

"That's the biggest flaw in all of this – that OPG can't look at alternatives. What about alternative sources of energy? What about moving away from nuclear?" (Male, Ottawa, Residential)

"Consumers don't make that clear-cut break. They're an operational company and they are given something, and they've got to do the best they can with what they have they can't be visionary and look at alternative uses? As consumers when I read this I went 'where is the vision for alternative ways of producing energy?'" (Male, Ottawa, Residential)

"I'd like to see what they're thinking about the future. Are they thinking nuclear power? Can we make more dams? Are they better?" (Male, London, Business)

"What's the status of rural wind sites?" (Female, London, Business)

"Maybe a priority should be to ask themselves 'should we exist at all?' Because maybe we don't need nuclear." (Male, London, Business)

"There could be a big revolution towards generating your own electricity and I don't see that here." (Male, London, Business)

"I mentioned moving toward renewable energy but it's probably not this." (Male, London, Residential)

"As much as it's not about future planning, to me that is very important. Nuclear power plants have 30 year lives. That's worrying. I want to know where we are headed in the future. Are we going to use different forms of energy?" (Female, Mississauga, Residential)

"It's relative to competitors. I attend a lot of tech conferences and I keep hearing the future is solar. If OPG keeps investing in nuclear and hydro and solar drives the cost down to near zero they are going to become obsolete. I would want to know what they are doing relative to these tech companies." (Male, North York, Business)

"I think OPG has access to a lot more water driven energy and for whatever reason I think they are not using that, and we need it. There is also this water going by and it needs to be put in a pipe." (Male, North York, Business)

"Is there anything in here that indicates whether they use any wind or solar?" (Male, Ottawa, Business)

"I said they should encourage off-grid electricity." (Male, London, Business)

Biased Material

While most participants liked the workbook, several expressed concern that the material was trying to make OPG look good, rather than be impartial. Participants felt that the goal of the consultation was to "come out of it with good optics" or to "force the government to go a certain way."

"If they can get more of our opinions, maybe they can force the government to go a certain way." (Female, Ottawa, Business)

"They want to come out of it with good optics. When it comes out that they are doing what they are doing, they want to be able to say we've done our consultation, we've met with focus groups and this is the reason we are doing what we are doing." (Male, Ottawa, Business)

"I think they are trying to gather positive opinions so they can make their pitch to the board. It's very coloured. They are looking for positive impact." (Female, Ottawa, Residential)

"This seems to be very favourable to OPG." (Male, Mississauga, Residential)

Among the participants concerned about bias, the main specific issue participants had was the cost per kWh that was listed in the workbook for OPG. A few participants felt that it was not credible, and they felt that because OPG is wholly-owned by the Province of Ontario, the reported numbers could be actively subsidized.

"When we see this number – is OPG subsidized at all to make it only 6.6 cents. The government's not kicking in money, so it looks better?" (Male, Ottawa, Residential)

"I don't know who originally paid for these plants, what subsidies, where these debts come from." (Male, Mississauga, Residential)

"How are they subsidized?" They aren't subsidized at all. *"Really? They aren't subsidized?" (Male, Mississauga, Residential)*

"They've got millions in the past from the government and all of us." (Male, North York, Residential)

"How much really does the nuclear power cost?" (Male, Thunder Bay, Business)

"Is this 6.6 cents, how much of this is subsidized?" (Male, Thunder Bay, Business)

A few people suggested that information from outside OPG would be beneficial.

"If you are trying to establish what the public wants, wouldn't you use a more neutral process instead of them giving us the rosiest picture they can?" (Female, Ottawa, Residential)

"Information from outside OPG. This is all OPG generated, OPG regulated, OPG information. I want some information from somebody else." (Male, North York, Residential)

The moderator probed further to understand any underlying reasons for perceiving bias among those who felt that way. In discussion, much of the concern about bias appears to be sparked by a missing topic – nuclear waste. Once people are introduced to OPG, the most common question or concern is what is happening with the nuclear waste. Not raising the issue suggests to some people OPG has something to hide.

Content

While the majority of participants felt that the right amount of information was provided, a large fraction of both groups (but particularly of residential participants) felt that there was too little information.

Participants generally offered a variety of potential additional information that they would have liked. Most commonly raised were questions of what OPG's costs are and information about alterative energy production and plans to convert to it. However, it is important to note these suggestions came from just a handful of participants. Making the workbook longer is likely to have a negative impact on the majority that were happy with the length. OPG may wish to consider adding links to additional information to provide more information for those who want it without adding length for those who are not seeking more information.

Context

There are two areas where information may have been helpful. The first is on the question of what this consultation is about. Although there is a small section dedicated to this question, participants still left the workbook with only a vague understanding. Few participants understood where this consultation fit within the broader plan or why OPG was consulting them in the first place.

"They're doing a new business plan to rework things, just like everyone else does to accommodate all the price changes and everything these days." (Male, Ottawa, Business)

"It does tell you why we are here and what their intention is with the survey – the focus group. They've got to justify their next changes and see where the priorities should be put." (Male, Ottawa, Business)

What more information would you have liked?

"A better understanding of why we are here." (Male, Ottawa, Business)

"I didn't get it until the end that it was about investment decisions. Now I see that here but I just assumed it as more general." (Female, Ottawa, Residential)

"They generally want to make some good investments in the future and they want some help making those decisions." (Female, London, Business)

"They're trying to get us to understand what they are working towards." (Male, London, Residential)

Why are they asking it now?

"Probably because they are under scrutiny." (Female, Mississauga, Business)

"I think it's about providing awareness of what OPG does and who they are." (Male, Mississauga, Residential)

"OPG could invest in electric car batteries to help us move off the grid." (Male, North York, Business)

"It's about OPG – our input on their system." (Female, North York, Residential)

"They want to know if they are doing a good job." (Female, Thunder Bay, Residential)

Providing more context on this issue would help consumers when going through the workbook and potentially reduce the number of participants who try to use the workbook to have a conversation about the *Long-Term Energy Plan*. In the groups, during discussion, participants were provided additional information on the background and agreed that it would have been useful in helping them complete the workbook.

After the moderator gave background on the consultation:

"This is extremely general compared to what you just talked about. If they want our opinion we should know that. For us to make an educated opinion we should have that background." (Male, Ottawa, Business)

"If I had just looked at this book without you explaining any of the history to me about the OEB, I don't think any of it would have stuck." (Male, North York, Business)

History

The other area where additional information could have been beneficial is on the history of OPG. Many participants held beliefs about OPG that were likely the result of confusion between OPG and Hydro One. Clarifying how the two organizations are distinct may help to reduce the confusion.

The main impact of the confusion with Hydro One was to cause concern about executive compensation and privatization, which both gave participants more negative impressions of OPG.

"It used to be Ontario Hydro, now it's 50% privatized." (Male, Ottawa, Business)

"CEOs got big payouts" Are you confusing OPG for Hydro One? *"That could be it, yeah." (Male, London, Residential)*

"Who owns the transmission?" (Male, Mississauga, Business)

"I think [OPG] would own it if they were delivering…" (Male, Mississauga, Business)

"How much is the CEO of OPG paid? It's what? Six million dollars?" (Male, Mississauga, Residential

"I've also heard of Hydro One. Is that the same company?" (Male, North York, Business)

Comparisons

Many participants also expressed a desire for comparisons across jurisdictions. For some, comparisons to other jurisdictions could allow them to make judgements about OPG without being experts in the field. However, participants had a harder time naming specific comparators they felt would be appropriate.

"If you're not an expert you won't know without a comparison." (Female, London, Residential)

"You have to have a benchmark of comparison. You have to find commonality." (Male, North York, Business)

"Right now, there is no comparison – there is nothing to compare it to." (Male, Thunder Bay, Business)

"There has got to be a statistic somewhere, or cross comparison with other utilities." (Male, Thunder Bay, Business)

"A comparison with other similar organizations if I could find them." (Female, Thunder Bay, Business)

Some participants felt that the key comparison would be with other generators either within Ontario or elsewhere.

"I would like to know who other electricity generators are." (Female, Ottawa, Business)

"You mentioned Bruce – you could compare how they are doing compared to how these guys are doing." (Male, London, Business)

"It should be apples to apples. Industry related number one, and there should be an adjustment for for-profit." (Male, Mississauga, Residential)

"Comparisons with other areas, especially private companies." (Male, North York, Residential)

Other participants wanted the comparison to be between Ontario and other jurisdictions both within Canada and abroad.

"They could compare to other countries. I guess you would have to go outside North America." (Male, London, Business)

"If there is a really good comparable country anywhere in the world that has the same or really close employees, assets, production – analyzing why they are more efficient than what we are currently doing. Having advisors to really pinpoint who is closest." (Male, London, Business)

"You have to get numbers from a same size of place to know if they are doing a good job." (Male, London, Residential)

"Other places have nuclear plants too. How much does it cost them to operate?" (Male, North York, Residential)

"We'd have to compare with other provinces to see if we are within a level of acceptability." (Female, Thunder Bay, Residential)

Format

Participants were generally favourable towards the format of the workbook. Most expressed the view that focus groups were a good way to get their input. There was some concern that the workbook format was too static, and a multimedia approach would be more effective for some who had different learning styles. Some participants also felt that having the information in advance would have allowed them to go through it at their own pace and would have given them enough time to understand it better.

Focus Groups Worked

Participants generally liked the format of the groups, but a large portion of participants – particularly in the business groups – would in the future prefer online consultations including online surveys.

In the discussion, participants specified that they liked the group format because it forces concentration and allows for conversation, which many participants felt was productive.

> *"A lot got discussed today and it opened up my eyes to a lot of things. I would definitely say this was a good way. There were a lot of things brought up that they could take into consideration." (Male, Ottawa, Business)*
>
> *"Now that we've had the table discussion, it's a lot better than it initially was just reading though the survey." (Male, London, Business)*
>
> *"This is stimulating – especially the discussion portion. One idea can spawn ten more and increase understanding." (Male, London, Residential)*
>
> *"Some people like myself do like to do this in person. Sit down, talk about it, share ideas." (Female, Mississauga, Business)*
>
> *"My mind was opened more by things you guys all said. This educated me more." (Female, Mississauga, Residential)*
>
> *"I enjoy just being here and talking to people." (Female, Thunder Bay, Business)*

Several participants felt a more multimedia approach including video would be more engaging and a better way to educate themselves about the process.

> *" If there was a video of somebody speaking and showing me, I would remember it. Being myself, I can read a question four or five times and still answer it the wrong way." (Male, London, Residential)*
>
> *"It would be great to have a video of this." (Female, Mississauga, Residential)*
>
> *"A visual resonates with some people as well." (Male, Mississauga, Residential)*
>
> *"As a visual learner, to have some video support to pair with some of the literature. Sometimes I think just having multimodalities to introduce a topic, especially if you know nothing about it." (Female, North York, Residential)*

When asked how they'd like to participate in future discussions, some participants said they liked the format of these groups, while others thought that participating online at home would be better. One participant noted that if he had participated at home, he would have been distracted through all the content and so would not have read it as closely as he did.

> *"Online is almost too easy. I am used to having this app and this app open. If I am going to answer questions, I am going to have Netflix open." (Male, London, Residential)*
>
> *"Online is better for me. I am online until 11, 12 at night." (Male, Mississauga, Business)*

Some participants said they would have wanted to know more in advance so that they could arrive to the sessions better prepared. OPG would need to consider the impact of having participants with different levels of preparation on the discussion before embracing this approach because not all participants will have read or researched the material in advance.

"I wish I had done more research so I would have known more." (Female, Ottawa, Business)

"Online portion beforehand so that we don't come in here blank." (Male, London, Business)

"I would have liked to get a glance of what it was before so I could have done some research to get a feel for it." (Male, Mississauga, Residential)

"I would like to receive that info two days ago, so I could digest it and we could have a more complicated conversation about it." (Male, North York, Residential)

Specific Concerns

There were some more specific concerns that participants had about the format of the workbook. These were generally small issues that could be clarified by wording or formatting changes without major changes to the design of the consultation.

A couple participants felt that the early questions in the workbook were unclear. They weren't sure if the questions were meant to refer to what they knew before reading the workbook or what they knew after reading it. This could be eliminated by simply prefacing questions to add clarity.

"I didn't find it too vague, but I found it a little vague." (Male, London, Business)

Many participants felt the nuclear priorities were presented in a ranked order. A different visualization or an explanation of how the priorities would be used (i.e. that a computer program would try to maximize each of them) may improve understanding of the page.

"Is this in order of priority?" (Male, Ottawa, Business)

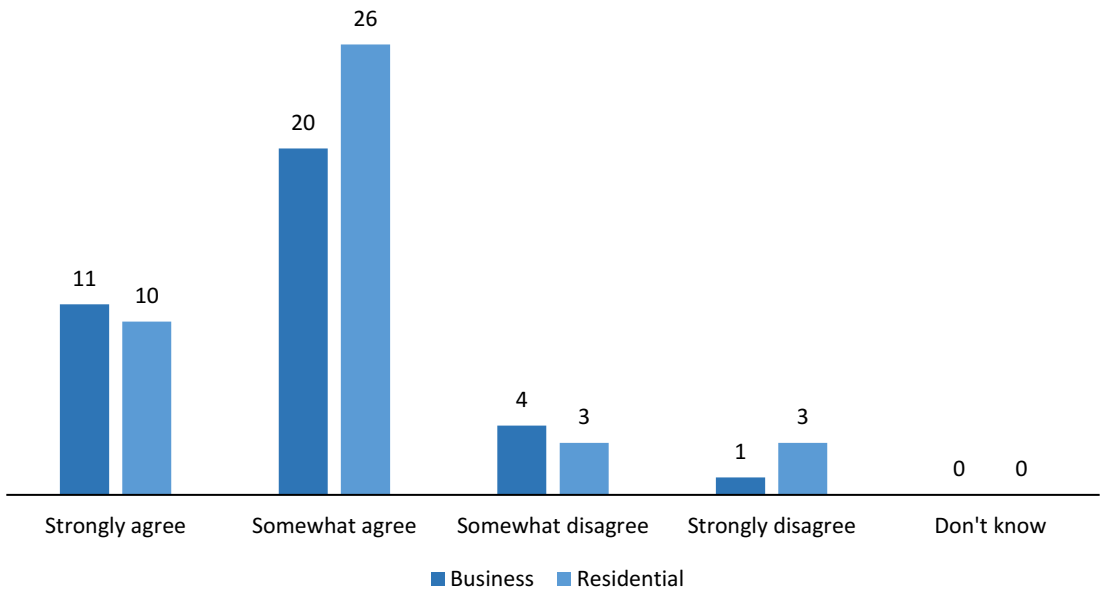
"I read it as though this was the listed priorities." (Female, Ottawa, Business)

"I looked at it more as their order of importance." (Female, North York, Residential)

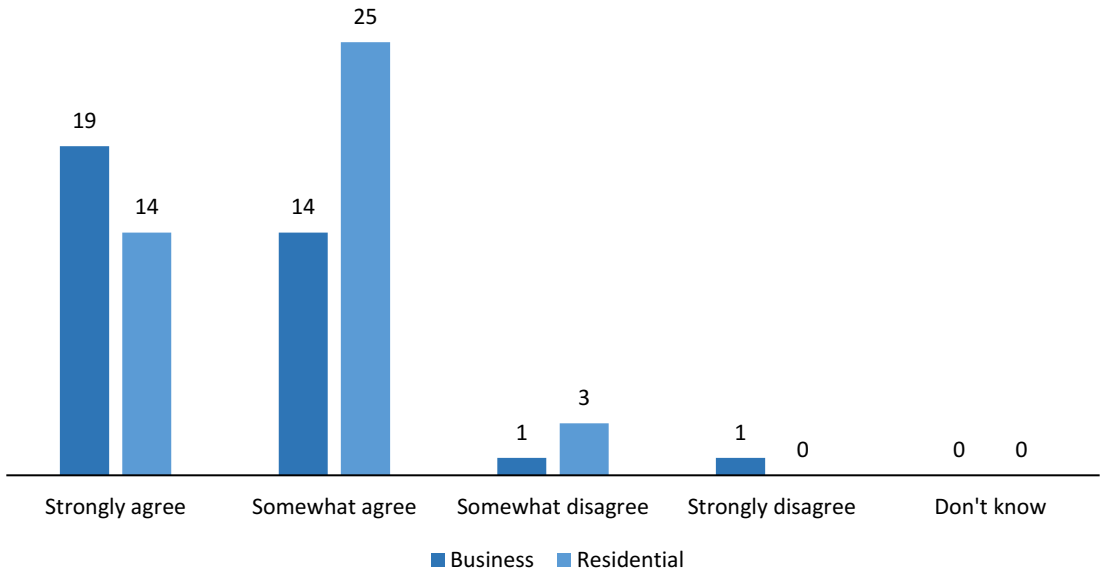
"Are these ranked?" (Male, Thunder Bay, Business)

Appendix: Detailed Results

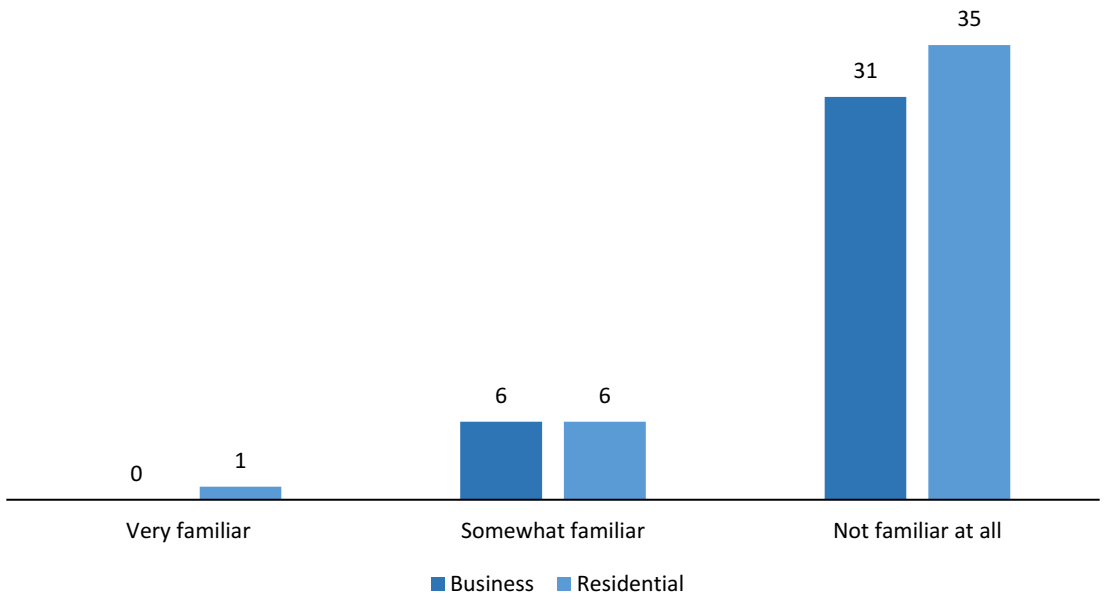
Q1. To what extent do you agree or disagree with the following statement? I generally understand how the various parts of the electricity system work together



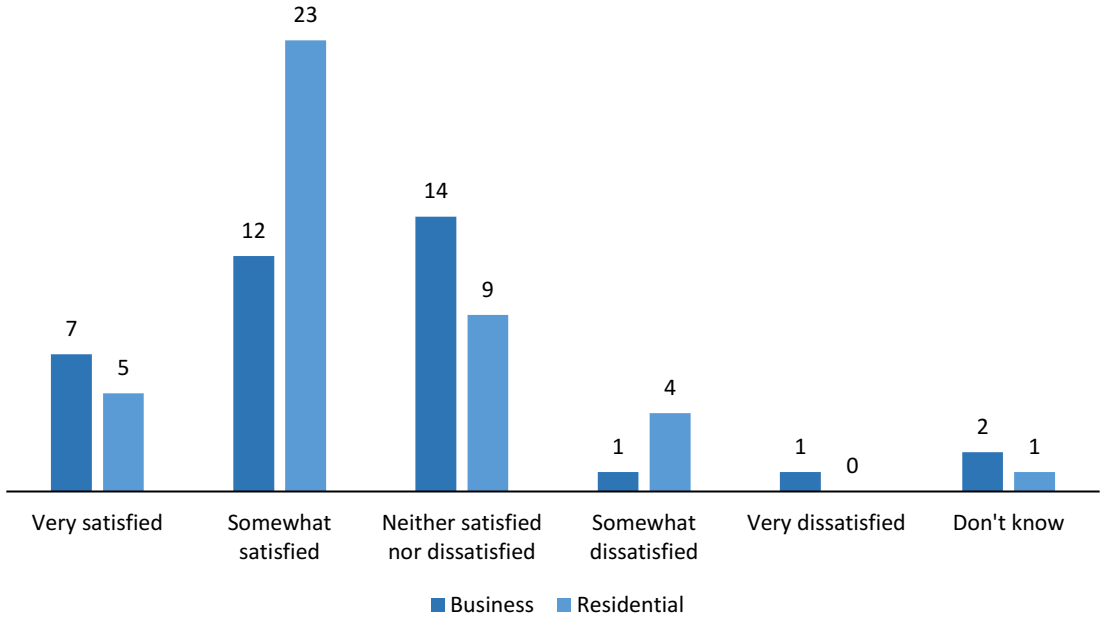
Q2. To what extent do you agree or disagree with the following statement? I have a general understanding of who OPG is.



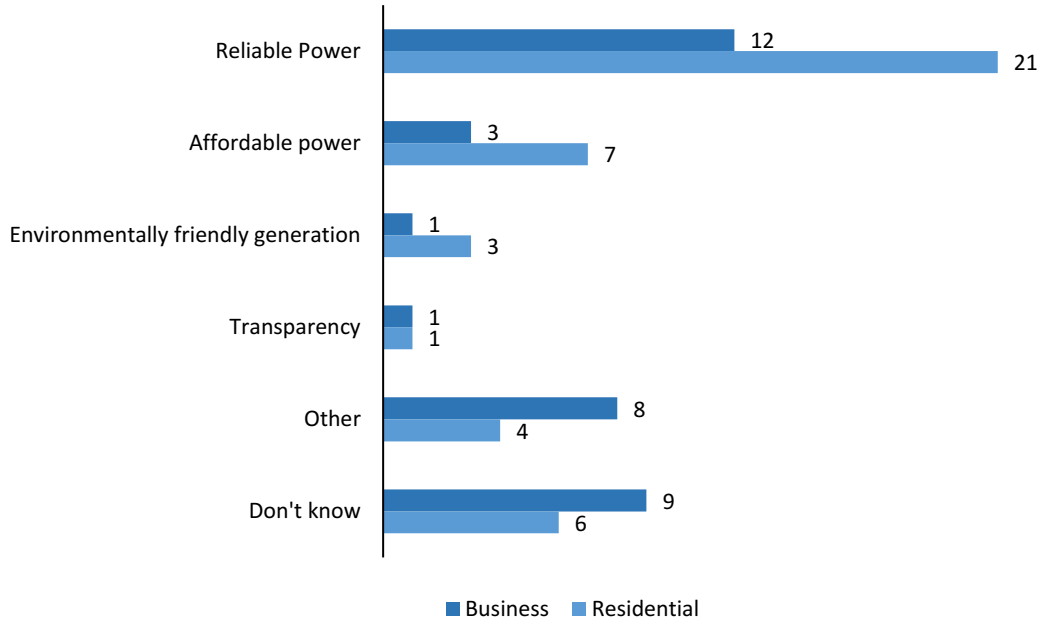
Q3. Before this workbook, how familiar were you with the percentage of your [organization's] electricity bill that goes to OPG?



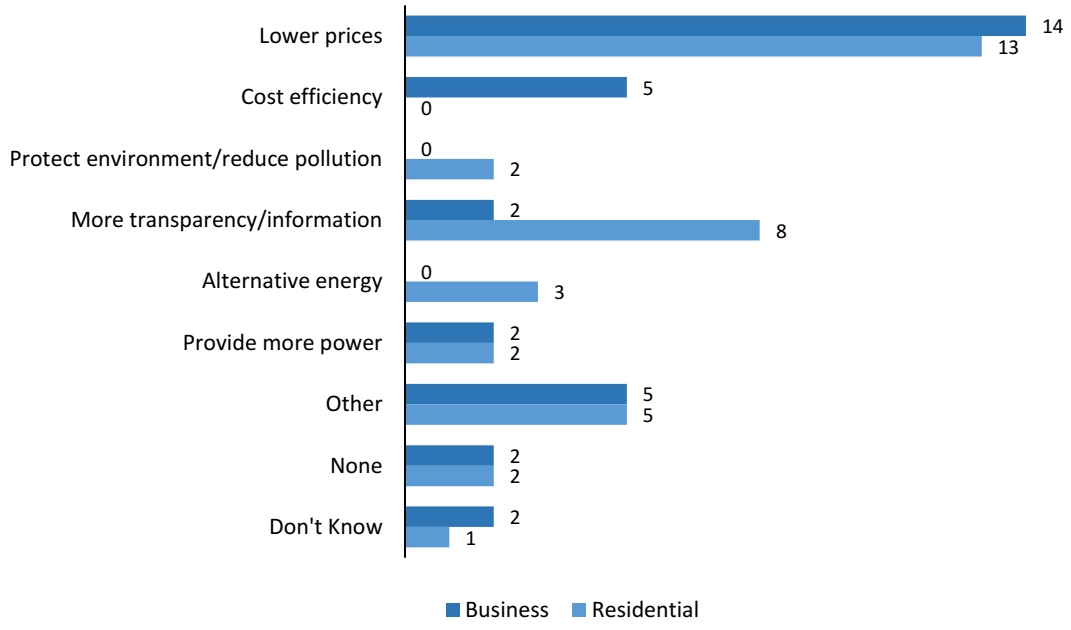
Q4. Now that you've read a bit more about OPG and how it fits into Ontario's electricity system, how satisfied are you with OPG's performance?



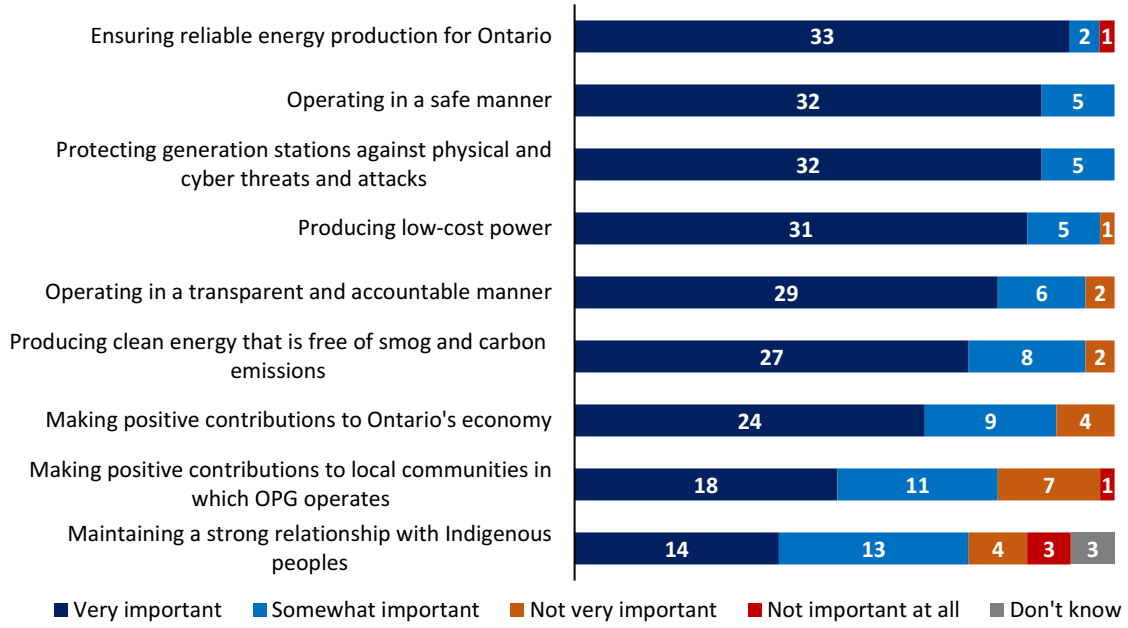
Q5. How do you know if OPG is doing a good job for your organization or not?



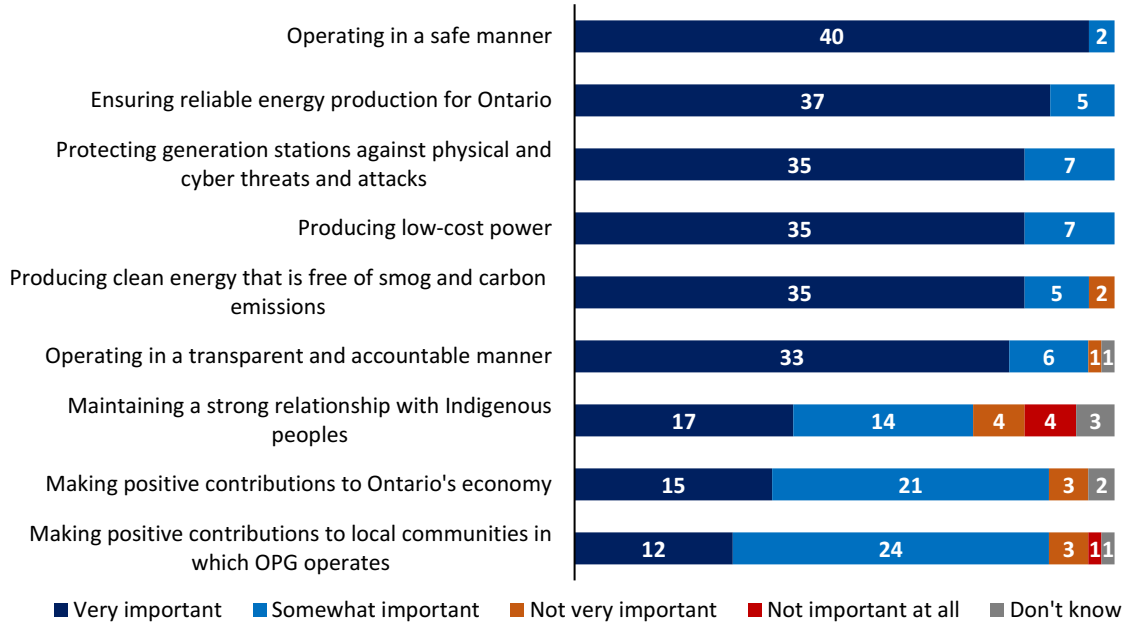
Q6. Is there anything in particular that OPG could do better for your organization?



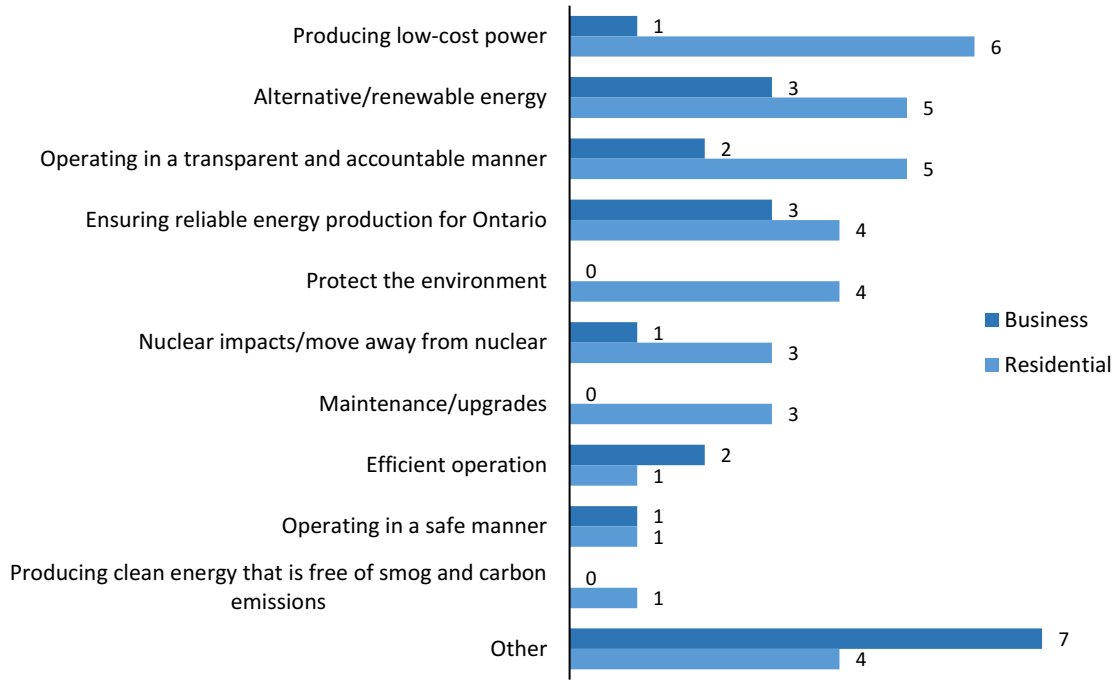
Q7. For each of the following, please indicate how important they are to your organization. [Business only]



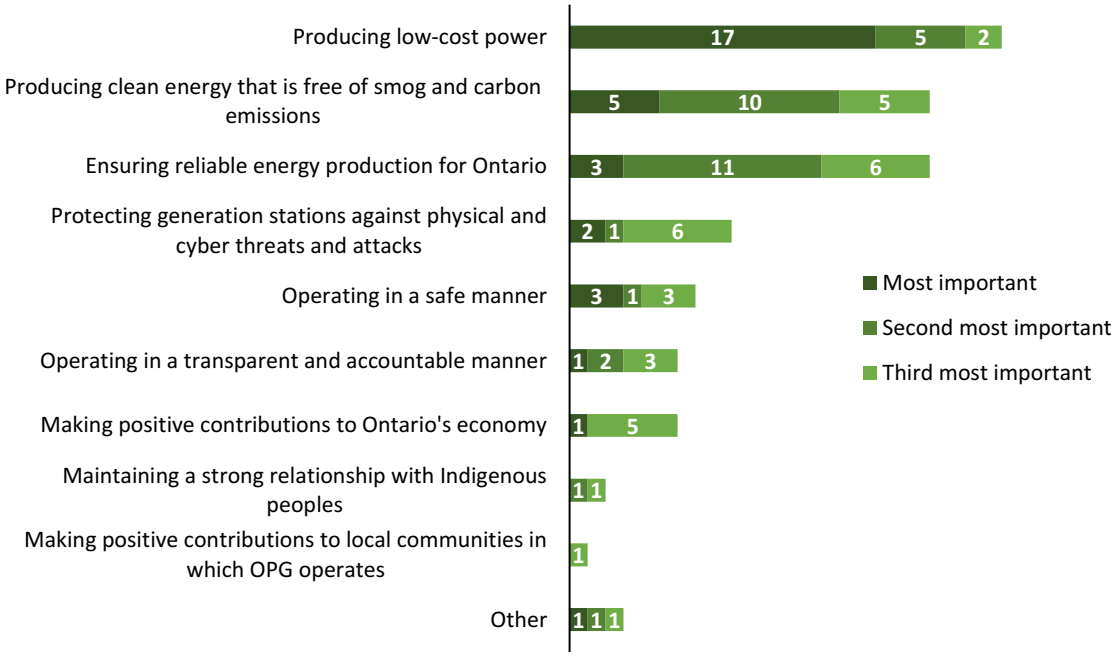
Q7. For each of the following, please indicate how important they are to you. [Residential only]



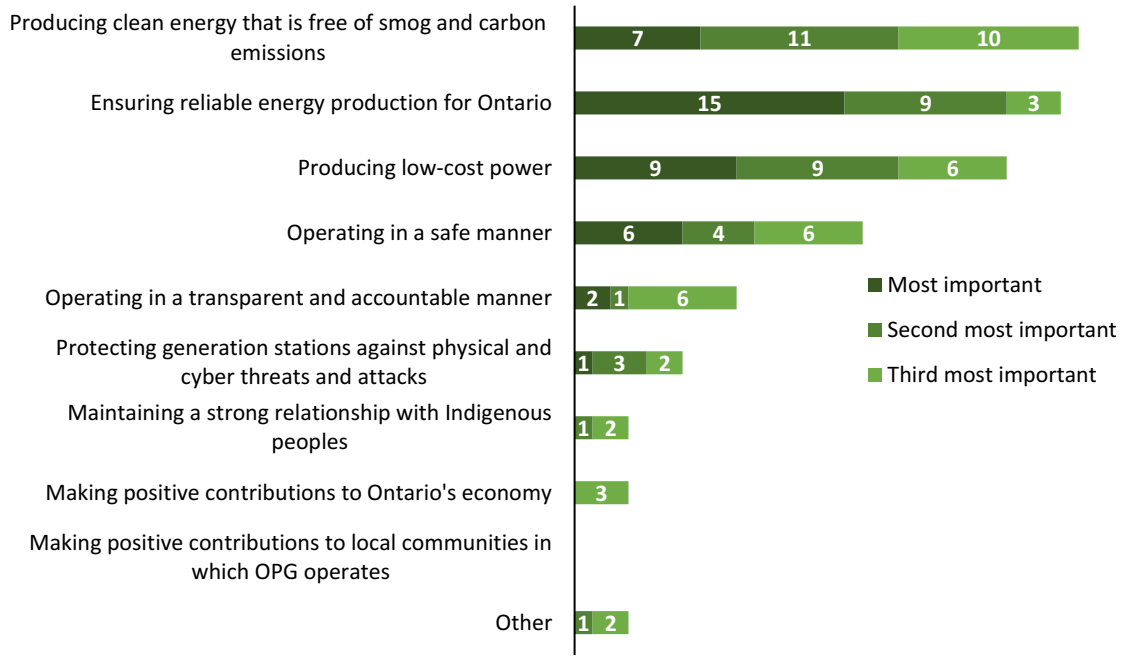
Q8. Are there any other important priorities that OPG should be focusing on that weren't included in the list above? (Up to 3 allowed)



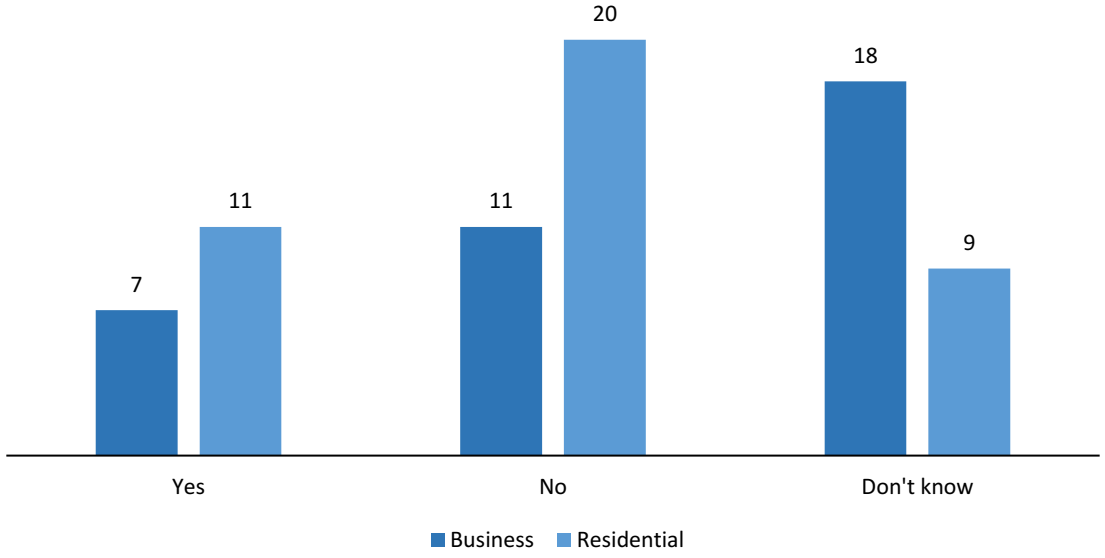
Q9. Thinking again about the things OPG should be focusing on, please rank your top 3 priorities. (BUSINESS PARTICIPANTS ONLY)



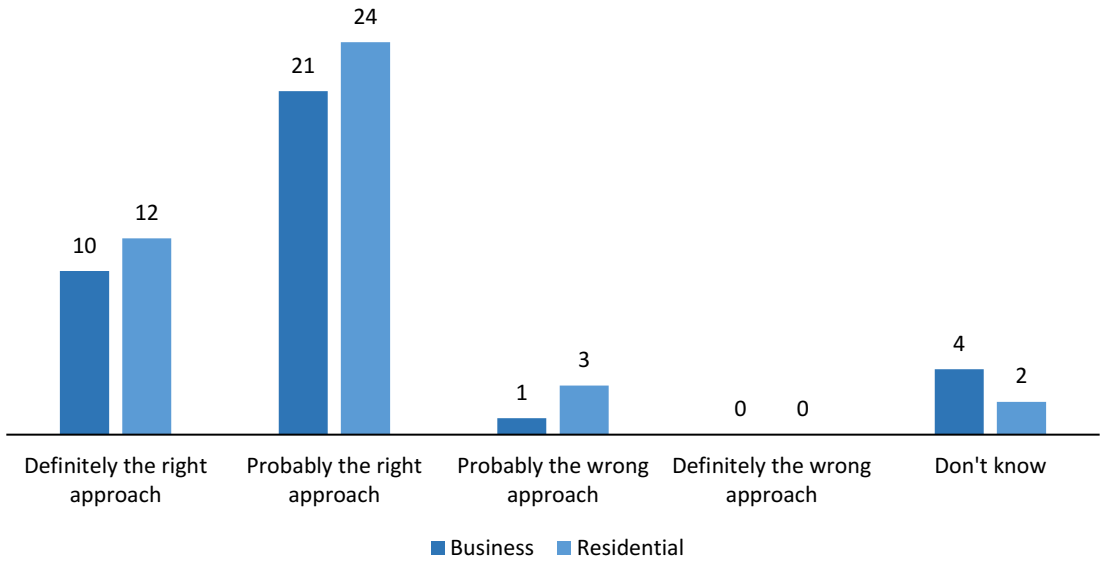
Q9. Thinking again about the things OPG should be focusing on, please rank your top 3 priorities. (RESIDENTIAL PARTICIPANTS ONLY)



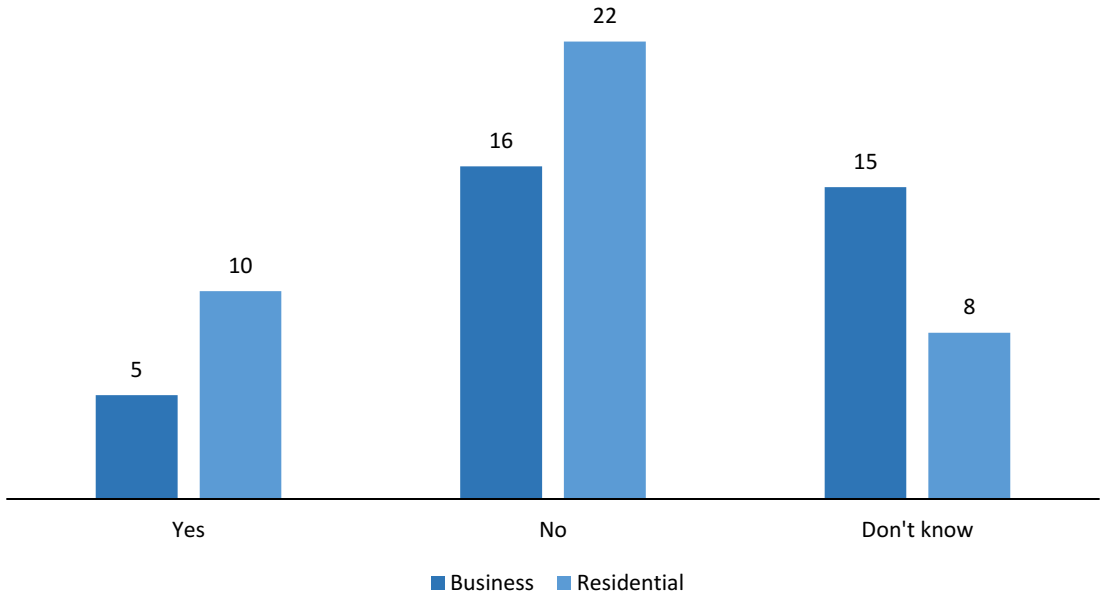
Q10. [Nuclear priorities] Is there anything missing from this list?



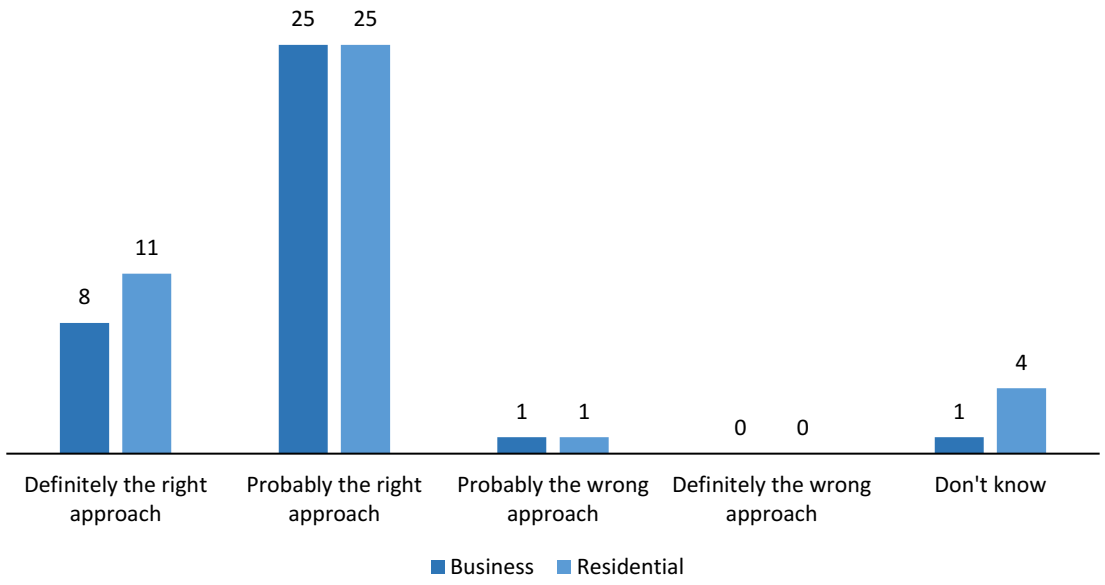
Q11. [Nuclear priorities] Do you think this is the right approach or the wrong approach?



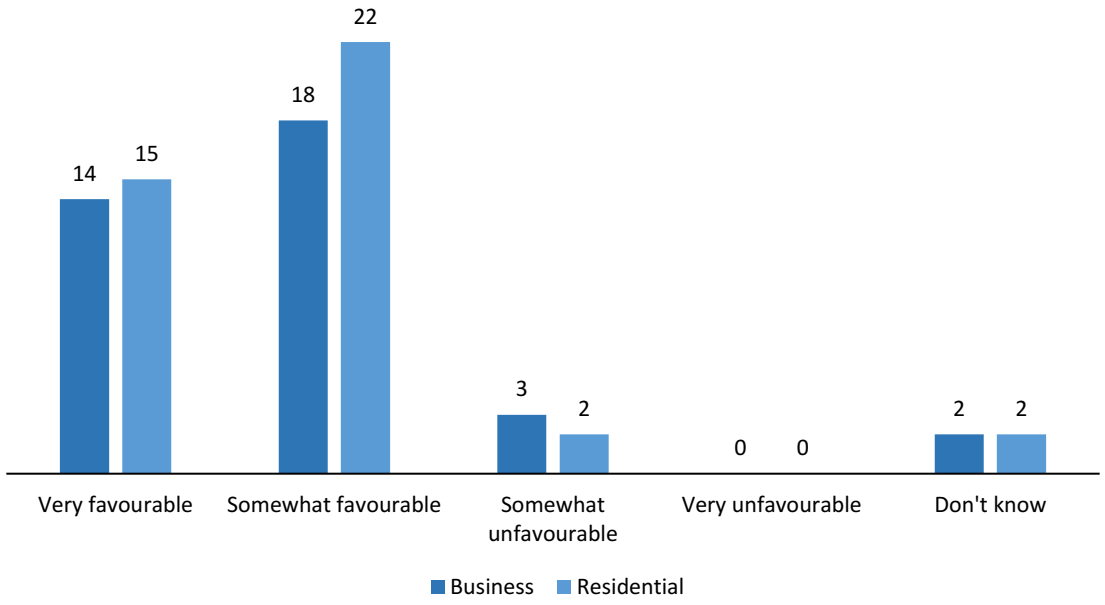
Q12.[Strategic imperatives] Is there anything missing from this list?



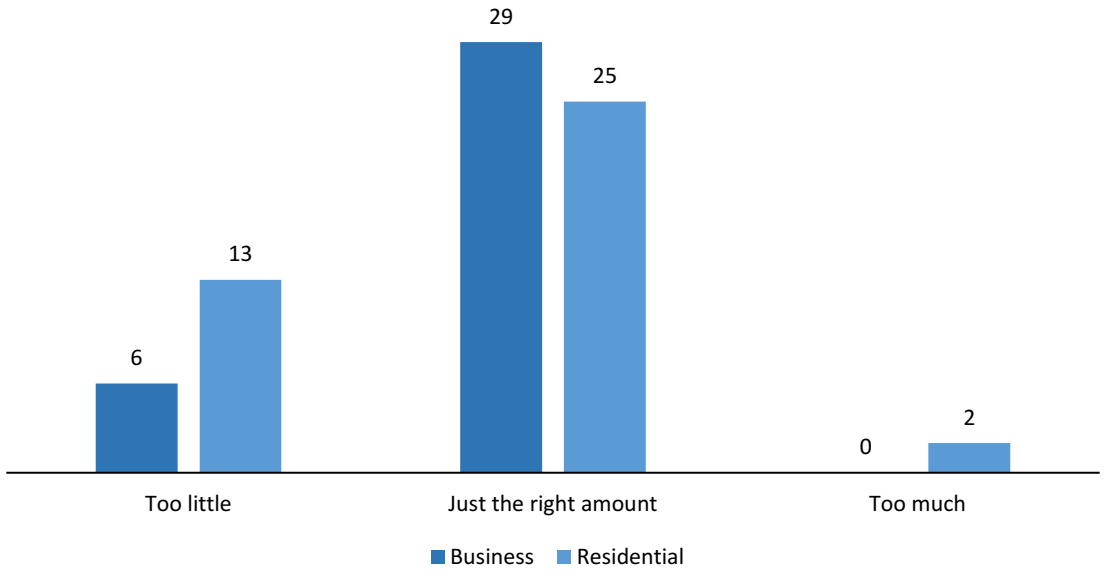
Q13. [Strategic imperatives] Do you think this is the right approach or the wrong approach?



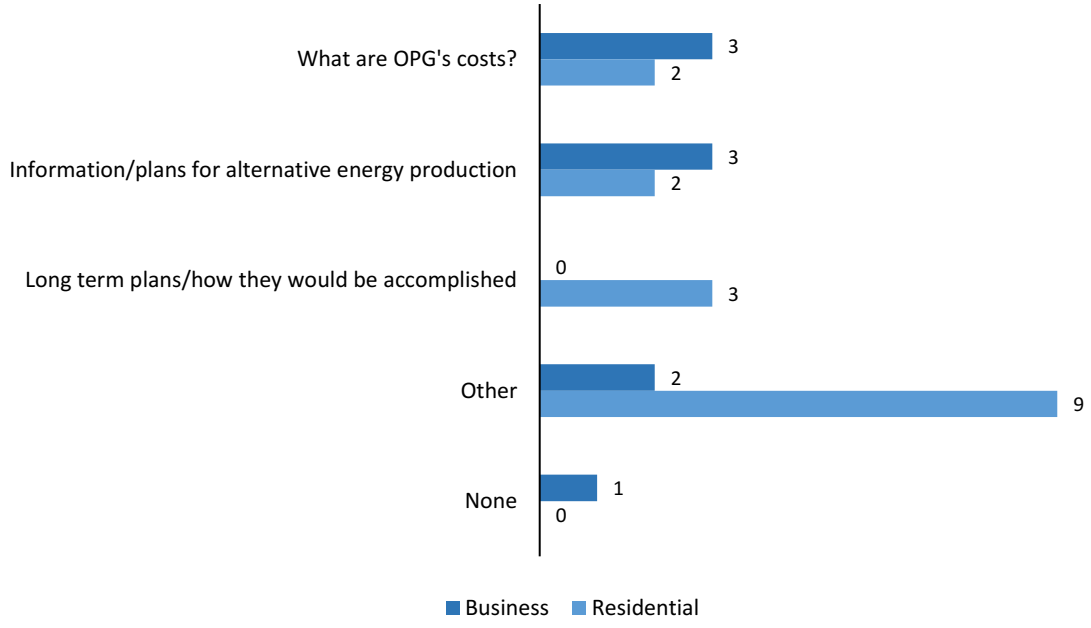
Q14. Overall Impression: Do you have a favourable or unfavourable impression of the workbook?



Q15. Volume of Information: Did OPG provide too much information, not enough, or just the right amount?



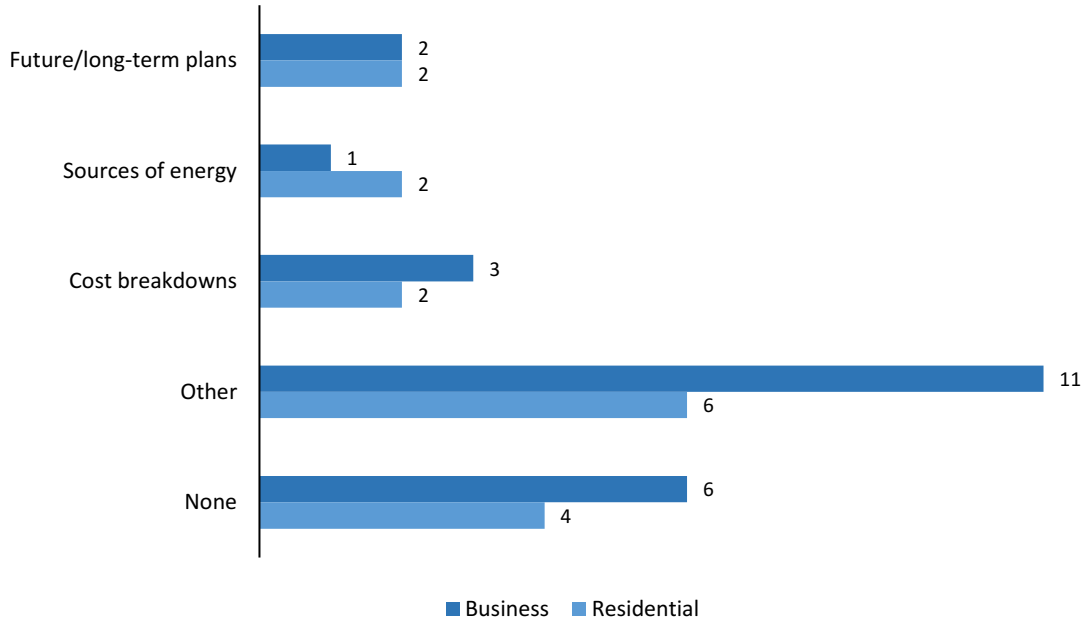
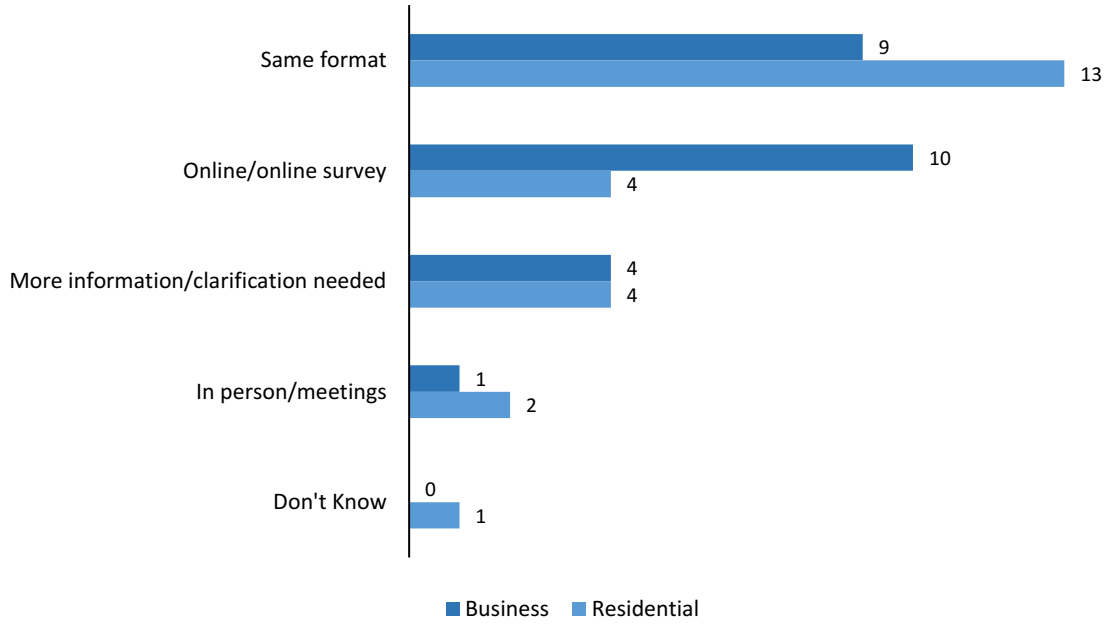
Q15a. What was missing?



Q15b. What was missing? [Verbatims shown due to small sample size]

"easier understanding of why this is being reviewed"
"It sounds like a TV ad – commercial"
"More details on %'s, KW's ownership, original investments"
"More finances, more financial information, safety costs"
"more information about nuclear waste treatment, transport of nuclear waste and risks and safety in regards to storage over time"
"not enough about impacts on environment for long-term, overly rosy portrayal of positive benefits without acknowledging negative impacts, no strong focus on conservation to reduce usage"
"probably just enough don't know much so can't comment much other than that now I kind of get where my electricity comes from"
"Renovations on nuclear plant only generates 50 years of activity? Doesn't seem like very much. Concerning. Underground powerlines are very good - safer and not ugly"
"Who is OPG section was kind of redundant. I'd keep the 2 main energy sources parts, but the facts are lengthy and not critical. Survey doesn't really indicate a point. Does not imply feedback goes towards 'investment plan' as listed above. More transparency in this section would be nice."

Q16. Do you have any questions about OPG you would still like answered?



Q.17 How would you prefer to participate in future consultations?