



**Partners in Project Green Executive Management Committee Meeting
Agenda**

September 21, 2021

6:30 P.M.

The meeting will be conducted via a video conference

Members of the public may view the livestream at the following link:

<https://video.isilive.ca/trca/live.html>

Members:

Todd Ernst
John Coyne
Erica Brabon
Michelle Brown
Brad Chittick
Chris Fonseca
Jack Heath
Patrick Huynh
Maxx Kochar
John MacKenzie
Scott Pegg
Christine Tu
Paul Vicente
Doug Whillans
Anthony Perruzza

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2. **APPROVAL OF MINUTES OF MEETING HELD ON JUNE 15, 2021**
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	NEXT MEETING OF THE PARTNERS IN PROJECT GREEN EXECUTIVE MANAGEMENT COMMITTEE TO BE HELD ON NOVEMBER 16, 2021 AT 6:30 P.M. VIA VIDEOCONFERENCE.	
	Darryl Gray, Director, Education and Training	
	/dr	

GTAA Environment Program Overview

GTAA Environment Program: Overview



GTAA New Environmental Policy

Net Zero GhG and
Zero Waste by
2050

GTAA Environmental Policy

The Greater Toronto Airports Authority (GTAA) strives to be a leader in environmental management and recognizes the impacts of airport operations and development on the environment. The GTAA embraces our corporate responsibility as a steward of the environment and will manage environmental issues effectively by: ensuring regulatory compliance, employing best management practices, and being innovative in reducing our environmental impact. The GTAA will shape an environmentally responsible future through our commitment to, and achievement of, the GTAA Environmental Strategy as outlined below.

The GTAA's Environmental Strategy focuses on:

- Mitigating our environmental impact through identification and continuous improvement of seven focus areas and their associated significant environmental aspects;
 - 1) Climate Change Resiliency: Taking the appropriate steps to be resilient to the risks of climate change, by assessing how climate change will create new, or alter current, climate-related risks; and mitigating those risks.
 - 2) Carbon Neutrality and Emissions: reducing our emissions footprint, by improvement in operational efficiency and investment in projects for the direct reduction and/or offset of energy consumption and GHG emissions to achieve net zero GHG by 2050.
 - 3) Strategic Energy Use: ensuring the responsible use of energy throughout our business via energy conservation, improving energy efficiency, and giving preference to renewable over non-renewable energy sources.
 - 4) Water Management: managing our water resources through water conservation efforts, water quality management, and addressing flood risk issues thereby protecting the region's water supplies.
 - 5) Natural Environment: minimizing our impact on the natural resources around us by balancing the protection of plants and wildlife with aviation safety, and supporting partnerships with the community to restore greenspaces
 - 6) Waste Management: by reducing or eliminating the use and generation of non-recyclable, or non-compostable, materials that are generated across operations and construction by implementing programs to achieve a Zero Waste certification by 2050.
 - 7) Noise Management: reducing operational impacts on surrounding communities through a best in class Noise Management Program; focusing on the reduction of noise at source, land use planning and management, noise abatement operational procedures and operating restrictions
- Being an environmentally responsible neighbour in the communities where we operate, through
 - Engagement with our employees, regulators, customers, suppliers, communities and other interested stakeholders
 - Transparency in external reporting and in dialogue with stakeholders
 - Expanding partnerships and continued collaboration with industry stakeholders



Deborah Flint
President and CEO

Greater Toronto Airports Authority, 2021



Approach

Aligned to International Standards and Science



Benchmarking



Stakeholder Feedback



PROPOSED LONG-TERM GOALS AND DIRECTION



GHG & Emissions : Net zero GhG airport by 2050.

- Mitigating the Corporation's contribution to greenhouse gas and other air emissions.



Energy : 100 % Clean Energy by 2050.

- Minimizing energy consumption and associated costs



Climate Change Resilience : Full integration of all aspects of climate resilience into operations and asset development processes by 2025.

- Ensuring that the Corporation's infrastructure is resilient to effects of climate change



Waste : Airport-wide zero waste certification by 2050.

- Diversion of waste from landfills and minimizing waste produced.



Water : Long term water conservation target based on water consumption baseline & audits.

- Management of water quality and conservation of water resources.



Natural Resources : Preservation of the creek valley green space, management of invasive species, and continuation of the honeybee apiary.

- Protection of the Corporation's green spaces & wildlife; rehabilitate green spaces in the community

CLIMATE RISK

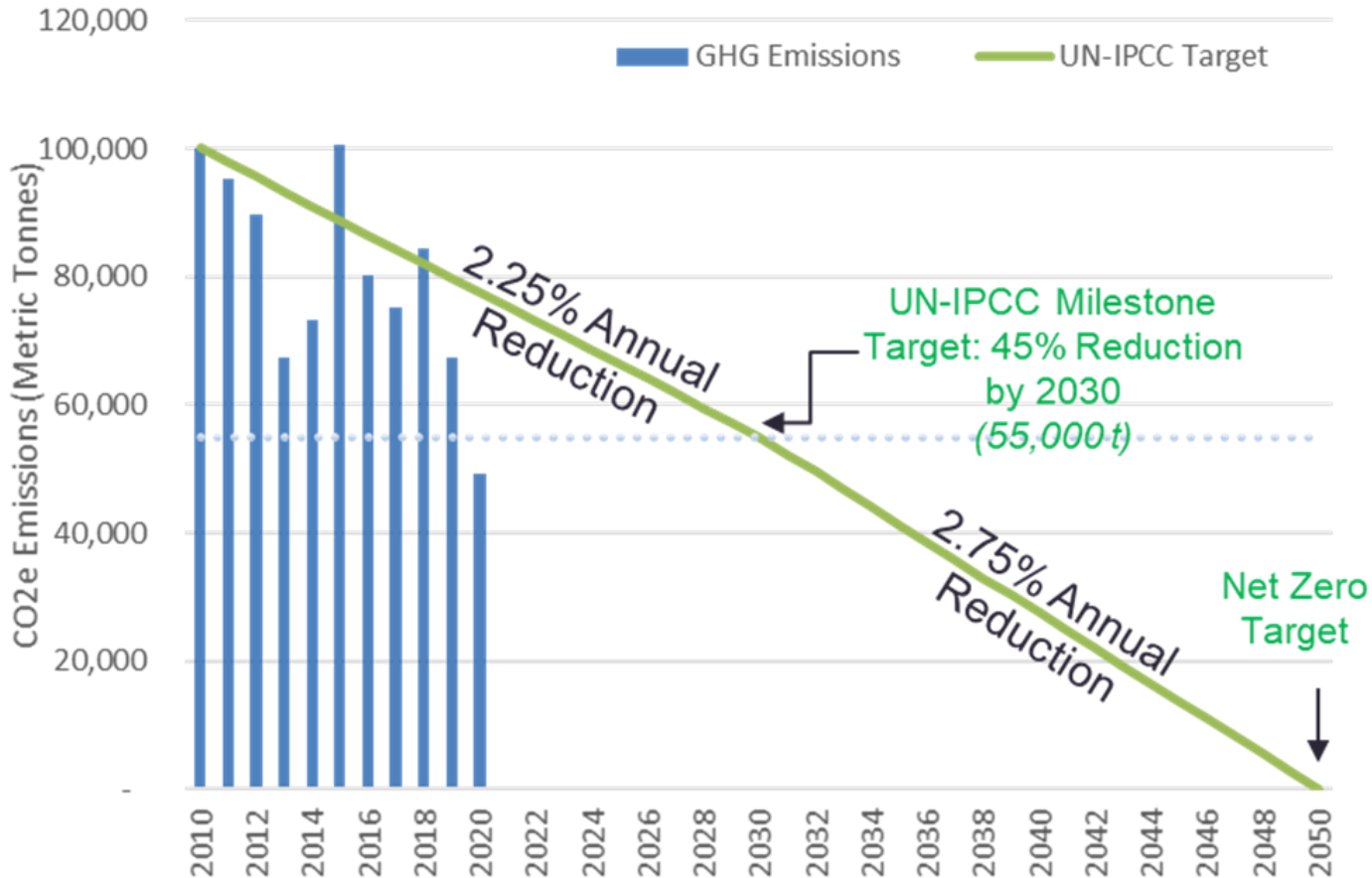
Climate Change Adaptation/ Resilience



Climate Change Mitigation

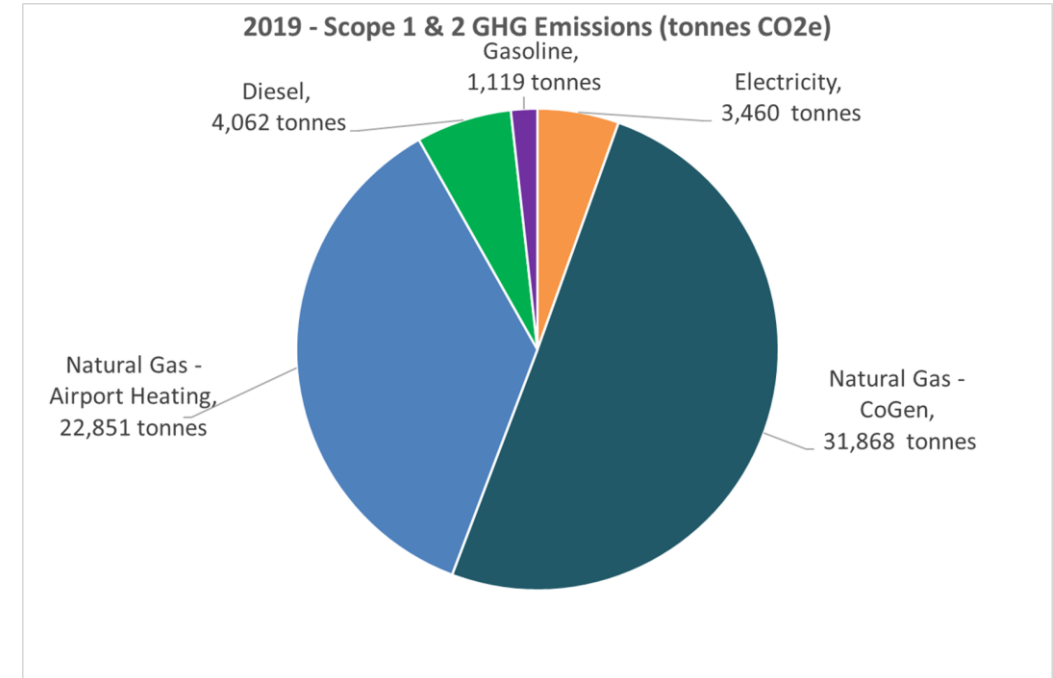


GTAA-Controlled GhG: Path to Net Zero by 2050 Item 5.1



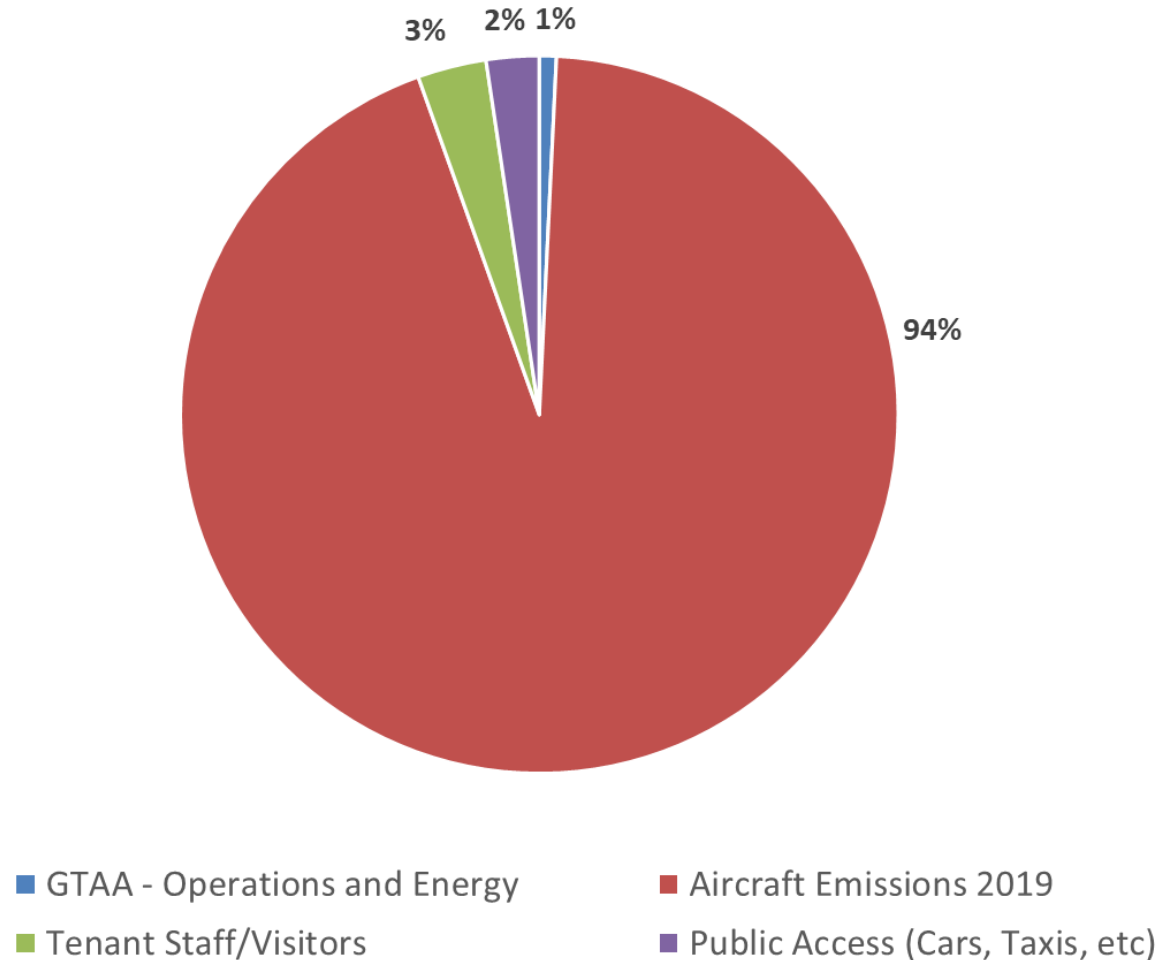
Key Levers to reach net-zero:

- Energy Efficiency (use less)
- On-site clean energy (heat, electricity)
- Electrification/ Fuel switching (e.g. EVs)
- Purchase off-site clean power



Total GTAA GhG (Controlled and Influenced)

Carbon Emissions at YYZ 2019



Policy considerations to influence GhG reductions:

- SAF supply chain
- Cleaner aircraft engine technologies
- More efficient movement of aircraft (RNP, ACDM)
- Mandate electric GSE
- Public Transit
- Carbon Offsets

Aviation Industry GhG targets:

IATA: reduce GhG to half of 2005 levels by 2050
ICAO: carbon-neutral growth from 2020 onward

4 key actions to reduce aviation GhG (per IATA):

1. Cleaner engine technologies
2. Operational (weight saving opportunities)
3. Infrastructure (e.g. RNP, ACDM)
4. SAF deployment

APPROACH TO NEXT STEPS



Prioritize highest benefit, lowest lifecycle cost solutions.



Pursue innovative business models to fund initiatives.



Embed circular economic principles in projects and operations.



Engage Stakeholders.



Heat and hot water generated from sewage in Straubing, Germany.

Questions?

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Items for the Action of the Partners in Project Green Executive Management Committee

TO: Chair and Members of the Partners in Project Green Executive Management Committee
September 21, 2021 Meeting

FROM: Darryl Gray, Director, Education and Training

RE: **PROPOSED UPDATES TO THE PARTNERS IN PROJECT GREEN EXECUTIVE MANAGEMENT COMMITTEE TERMS OF REFERENCE**

KEY ISSUE

To update Executive Management Committee (EMC) Terms of Reference and membership composition in order to maximize committee benefit to the PPG community.

RECOMMENDATION

WHEREAS the current Partners in Project Green Executive Management Committee (PPG EMC) Terms of Reference were adopted at Meeting #1/18 on April 3, 2018;

AND WHEREAS at Meeting #2/20, held on September 22, 2020, the PPG EMC approved the creation of a position on the Executive Management Committee for a participant or alumnus of TRCA's NYGEP or PAIE programs in principle (RES.#PPG8/20);

AND WHEREAS TRCA staff identified opportunities to enhance oversight, governance and impact of the PPG EMC by revising the current membership structure, including removal of the non-voting membership classification and expanding sector representation;

THEREFORE, LET IT BE RESOLVED THAT the revisions to the PPG EMC Terms of Reference be approved with the effective date of November 1, 2021;

AND FURTHER THAT all current non-voting members be transitioned to the members at large category for the remainder of the current term.

BACKGROUND

As outlined in the 2019-2023 Terms of Reference (ToR), the objectives of the PPG EMC include:

- assisting businesses in the Pearson Eco-Business Zone and beyond to help improve their environmental performance while at the same time as reducing costs;
- retaining and attracting clean and more environmentally friendly investments in the Pearson Eco-Business Zone and beyond; and,
- acting as a catalyst for new ideas, innovation, excellence, and improvement in the employment lands, with a focus on reducing environmental impacts, encompassed by the Pearson Eco-Business Zone and beyond.

These objectives have been in place since 2008 and while still reflective of the role of this committee, there is a desire to reevaluate and reenergize the objectives of the committee to drive action towards the green economy while improving overall representation in the governance structure of Partners in Project Green.

The PPG EMC Terms of Reference specifies that the voting members are to represent the

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following groups in the number shown:

- TRCA (1);
- GTAA (1);
- Business community leaders (8);
- Municipal leaders (4).

While this composition ensures an appropriate distribution of public and private representatives, it misses opportunities to include voices from youth, Boards of Trade and Chambers of Commerce, and other key interest groups.

Additionally, currently the EMC may have up to five (5) non-voting Advisory members that can be drawn from Federal, Provincial, or Municipal governments, or from the business community. Advisory members provide insights and opinions on PPG strategy, programs and efforts, however, do not currently have voting rights on issues before the committee.

The distinction between voting and non-voting members serves to divide the committee unnecessarily in creating two classes of EMC members, as well as limiting engagement of key stakeholders in the governance, decision-making and priority-setting processes of PPG by not conferring voting rights to important leaders from target sectors and levels of government.

Updates to the PPG EMC Terms of Reference are required to ensure that PPG EMC effectively serves to achieve the vision and objectives of PPG.

RATIONALE

Since the 2019 TRCA and PPG have taken steps to ensure that committees reflect the communities we serve, and opportunities to improve committee efficiency and effectiveness have come to the forefront. For example, work has been undertaken to include community representation from equity deserving groups, and the meeting structure has been changed to allow for a ‘think-tank’ conversation following governance activities. These factors present an opportunity to revise the PPG EMC Terms of Reference in order to ensure effective delivery of the goals and governance of PPG.

In order to better reflect the needs of the community and direct the actions of the committee, it is proposed that EMC purpose be updated to:

- To act as a catalyst for new ideas, innovation, excellence, and improvement of organizational environmental and social impacts in employment lands in TRCA’s jurisdiction.
- To provide strategic oversight to the Partners in Project Green (PPG) initiative, with the aim of creating an internationally recognized community of leaders advancing environmental action and economic prosperity across the Greater Toronto Area.

It is further proposed that the objectives of the EMC be updated to:

- Lead a member-based network of environmental and social impact leaders;
- Provide insight on industry trends and major policy directions as it relates to organizational environmental and social impacts;
- Advance sustainable technology and infrastructure on private and public lands in the Greater Toronto Area; and
- Make recommendations for long-term equitable access financial sustainability of TRCA’s eco-business programs, specifically Partners in Project Green.

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In terms of committee composition, it is recommended that all members be classified as voting members and be appointed from the stakeholder groups listed below. The pre-existing membership categories are augmented by adding representation from additional groups such as Ontario Chamber of Commerce or affiliate Local Board of Trade or Chamber of Commerce, youth and previously approved in principle (RES.#PPG8/20) community representation filled by a participant or alumnus of TRCA's NYGEP or PAIE programs. The proposed composition of the committee is designed to reflect the public-private partnership of PPG, while ensuring voices from diverse perspectives can be heard.

The proposed composition follows:

- Greater Toronto Airports Authority (GTAA) representative (1)
 - To be appointed by the GTAA
- TRCA's Chief Executive Officer (1)
- Municipal representatives (4)
 - To be appointed by the Region of Peel (2), the City of Toronto (1), and the Region of York (1)
- Business representatives with an affiliation to TRCA's jurisdiction (8)
 - To be selected from Partners and Project Green member organizations
- Ontario Chamber of Commerce or affiliate Local Board of Trade or Chamber of Commerce representative (1)
 - To be appointed by the chambers of commerce
 - To be appointed by the Ontario Chamber of Commerce
- Community representative (1)
 - To be selected from TRCA's Professional Access into Employment (PAIE) and/or Newcomer Youth Green Economy Project (NYGEP) programs and/or other TRCA programs as appropriate
- Youth representative attending a post-secondary educational institution in TRCA's jurisdiction (1)
 - To be selected through the advertised recruitment process
- Up to three (3) members at large
 - To be appointed as per TRCA's policy, as determined by program staff, striving for a balance of public and private representation and variety of perspectives, skills, and experiences. Those members can be representatives of Federal, Provincial and/or Municipal governments; businesses; research institutions; or local Indigenous groups and communities. Those members can be representatives of Federal, Provincial and/or Municipal governments; businesses; research institutions; or local Indigenous groups and communities.

For current members, non-voting members will immediately be granted voting rights under the members at large category for the remainder of the current term, which ends on November 14, 2022 (RES.#A14/21). Additionally, recruitment for the previously approved community representation (RES.#PPG8/20) position is ongoing. All remaining vacancies will remain unfilled for the rest of the current term.

A wholesome appointment and selection process as per the Terms of Reference and TRCA policies will be conducted for the new 2023-2024 term.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan

This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:

Strategy 1 – Green the Toronto region's economy

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Strategy 5 – Foster sustainable citizenship

Strategy 8 – Gather and share the best sustainability knowledge

DETAILS OF WORK TO BE DONE

Based on the input and approval of the EMC, the revised Terms of Reference will be brought to the TRCA Board of Directors for approval. In addition, a recruitment plan for representatives will be developed and included in PPG communications and Membership packages to ensure a robust selection process for the next term.

Report prepared by: Jennifer Taves

Emails: Jennifer.Taves@trca.ca

For Information contact: Jennifer Taves

Emails: Jennifer.taves@trca.ca

Date: August 7, 2021

Attachments: 1

Attachment 1: Draft Partners in Project Green Executive Management Committee Terms of Reference for EMC Review

Attachment 1: Draft Partners in Project Green Executive Management Committee
Terms of Reference

**DRAFT PARTNERS IN PROJECT GREEN EXECUTIVE MANAGEMENT COMMITTEE
TERMS OF REFERENCE FOR EMC REVIEW**

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Attachment 1: Draft Partners in Project Green Executive Management Committee
Terms of Reference

1. PURPOSE

- 1.01. To act as a catalyst for new ideas, innovation, excellence, and improvement of organizational environmental and social impacts in employment lands in TRCA's jurisdiction.
- 1.02. To provide strategic oversight to the Partners in Project Green (PPG) initiative, with the aim of creating an internationally recognized community of leaders advancing environmental action and economic prosperity across the Greater Toronto Area.

2. OBJECTIVES

- 2.01. Through working with TRCA and municipal, association, and Industrial, Commercial and Industry (ICI) partners, advance the strategic objectives of Partners in Project Green, as endorsed by the TRCA Board of Directors, by providing thought leadership on environmental and social impact issues impacting businesses and municipalities in the Greater Toronto Area. Specifically:
 - (a) Lead a member-based network of environmental and social impact leaders;
 - (b) Provide insight on industry trends and major policy directions as it relates to organizational environmental and social impacts;
 - (c) Advance sustainable technology and infrastructure on private and public lands in the Greater Toronto Area; and
 - (d) Make recommendations for long-term equitable access financial sustainability of TRCA's eco-business programs, specifically Partners in Project Green.

3. AUTHORITY

- 3.01. The PPG EMC is authorized by the Board of Directors to:
 - (a) Make recommendations to TRCA's Board of Directors regarding improvements to frameworks, processes, education, and resources to support social and environmental business practices in the Greater Toronto Area;
 - (b) Provide leadership and communication among PPG members and supporters;
 - (c) Act as an ambassador for Partners in Project Green;
 - (d) Monitor overall Partners in Project Green priorities;
 - (e) Provides guidance relating to Partners in Project Green activities.
 - (f) The work of the Subcommittee of the Board is to meet needs located wholly or partially within the employment lands of TRCA's participating municipalities.

4. MEMBERSHIP AND ELECTIONS

- 4.01. Membership to consist of:
 - (a) Greater Toronto Airports Authority (GTAA) representative (1)
 - To be appointed by the GTAA
 - (b) TRCA's Chief Executive Officer (1)

Attachment 1: Draft Partners in Project Green Executive Management Committee

Terms of Reference

- (c) Municipal representatives (4)
 - To be appointed by the Region of Peel (2), the City of Toronto (1), and the Region of York (1)
 - (d) Business representatives with an affiliation to TRCA's jurisdiction (8)
 - To be selected from Partners and Project Green member organizations
 - (e) Ontario Chamber of Commerce or affiliate Local Board of Trade or Chamber of Commerce representative (1)
 - To be appointed by the Ontario Chamber of Commerce
 - (f) Community representative (1)
 - To be selected from TRCA's Professional Access into Employment (PAIE) and/or Newcomer Youth Green Economy Project (NYGEP) programs and/or other TRCA programs as appropriate
 - (g) Youth representative attending a post-secondary educational institution in TRCA's jurisdiction (1)
 - To be selected through the advertised recruitment process
 - (h) Up to three (3) members at large
 - To be appointed as per TRCA's policy, as determined by program staff, striving for a balance of public and private representation and variety of perspectives, skills, and experiences. Those members can be representatives of Federal, Provincial and/or Municipal governments; businesses; research institutions; or local Indigenous groups and communities.
- 4.02. The selection and appointments process will be conducted in accordance with TRCA policies and procedures.
- 4.03. PPG Executive Management Committee (PPG EMC) members will be appointed by the TRCA Board of Directors for a two-year, renewable term aligned with municipal Terms of Council or until their successors are appointed. Members will be canvassed prior to the expiration of their first two-year term to establish whether they wish to pursue a term renewal. Should members choose renewal, their terms will be automatically renewed for another two-year term. The two-year term can only be renewed once, after which the member would need to undergo application and selection process again.
- 4.04. PPG EMC shall have two Co-Chairs. The first Co-Chair will be the appointed Greater Toronto Airports Authority representative. The second Co-Chair will be elected from amongst PPG EMC members for the term of the Committee at the inaugural meeting of the term. The Board of Directors may appoint an interim Chair until such time as an election can take place. The election procedures and procedural matters used for this election and in the administration of the subcommittee will be that outlined in the Board of Directors Administration By-law.

Attachment 1: Draft Partners in Project Green Executive Management Committee
Terms of Reference

5. ROLES AND RESPONSIBILITIES

- 5.01. The **Co-Chairs** are responsible for:
- (a) Acting as the primary spokespersons for Partners in Project Green at public and official functions;
 - (b) Presiding over Committee meetings, setting the agenda and generally ensuring the effectiveness of meetings; and
 - (c) Calling special meetings, as required.
- 5.02. **Committee Members** are responsible for:
- (a) Attending Committee meetings as required;
 - (b) Acting as a role model for organizational environmental and social action;
 - (c) Representing Partners in Project Green at events and engagements;
 - (d) Sharing the stories of the network to inspire others to action;
 - (e) Acting as a resource to TRCA, TRCA's municipal partners and the Toronto and Region Conservation Foundation by providing advice on matters of interest to the business community and facilitating access to strategic partners and advisors;
 - (f) Maximizing the collective impact of the Committee through information sharing and reporting on priorities, activities, and results as it pertains to organizational environmental and social action;
 - (d) Monitoring the performance of Partners in Project Green and reporting to the Board of Directors on a regular basis; and,
 - (e) Appointing an Acting Chair in the absence of the Co-Chairs who for the purposes of that meeting shall have all the powers and shall perform all the duties of the Chair.
- 5.03. **TRCA's Director, Education and Training** is responsible for providing general support in regards to the activities and actions of the Committee and setting agendas for the meetings.
- 5.04. **TRCA's Clerk's Office** is responsible for acting in a Committee Clerk capacity, arranging meeting logistics, preparing the agenda, maintaining meeting minutes, tracking and delegating action items.

6. GOVERNANCE

General

- 6.01. The Committee is an advisory board of the Board of Directors and as such does not have decision-making power but shall make recommendations to the Board of Directors.
- 6.02. The Committee may establish subcommittees/working groups or standing committees as needed.

Attachment 1: Draft Partners in Project Green Executive Management Committee
Terms of Reference

Meetings and Attendance

- 6.03. The Committee shall meet at minimum four times per year or more frequently as required. Members are required to attend all meetings of the Committee.
- 6.04. In order to maintain a high level of commitment, members may be required to resign if they have been absent for three consecutive meetings without good cause.

Quorum

- 6.05. A quorum will consist of one-third of appointed Members.
- 6.06. If there is no quorum within one half hour after the time appointed for the meeting, the Chair for the meeting shall declare the meeting adjourned due to a lack of a quorum, or shall recess until quorum arrives, and the Clerk shall record the names of the Members present and absent. If during a meeting a quorum is lost, then the Chair shall declare that the meeting shall stand recessed or adjourned, until the date of the next regular meeting or other meeting called in accordance with the provisions of the Board of Directors Administrative By-law. Agenda items may be covered and presented, and issues discussed, but no formal recommendation may be made by the remaining Members which do not constitute a quorum.
- 6.07. Should a member resign or be removed from a committee, quorum provisions for the committee with a vacant position, until the vacancy is filled, will be reduced by the number of vacant positions, as determined by the Clerk.

Remunerations

- 6.08. At official Committee meetings, Members will be eligible for travel expenses according to Board of Directors Administrative By-Law, where these are not covered by their agency or other source. Members shall not receive a per diem or honorarium for attendance at meetings and functions.

Compliance and Procedure

- 6.09. If any part of the Terms of Reference conflicts with any provisions of the Board of Directors Administrative By-Law, the *Municipal Conflict of Interest Act* or the *Municipal Freedom of Information and Protection of Privacy Act* or a provision of a Regulation made under one of those Acts, the provision of that Act, Regulation, or By-Law prevails.
- 6.10. In all matters of procedure not specifically dealt with under the Terms of Reference, Board of Directors Administrative By-Law shall be binding.

Attachment 1: Draft Partners in Project Green Executive Management Committee
Terms of Reference

7. REPORTING

- 7.01. The Committee is considered an advisory board of TRCA and shall make recommendations and report to the Board of Directors.
- 7.02. The minutes of the Committee will be received by the Board of Directors.
- 7.03. Each member shall report back to their appointing municipality, government, organization, or agency as required.

8. DEFINITIONS
None.

9. ADMINISTRATION

Review Schedule:	5 Years	Next Review Date:	October 22, 2026
Revision History			
Version Number	Approval Authority and Date		
1	TBD		

Item 8.1

Items for the Information of the Partners in Project Green Executive Management Committee

TO: Chair and Members of the Partners in Project Green Executive Management Committee
Tuesday, September 21, 2021 Meeting

FROM: Darryl Gray, Director, Education and Training

RE: **PARTNERS IN PROJECT GREEN 2021 MEMBERSHIP SURVEY RESULTS**

KEY ISSUE

Identification of key areas of opportunities for PPG related to Membership benefits, engagement, and communications.

RECOMMENDATION

IT IS RECOMMENDED THAT the following information report and presentation on the results and opportunities identified through the 2021 Membership Survey be received.

BACKGROUND

Toronto and Region Conservation Authority (TRCA) and the Greater Toronto Airports Authority (GTAA), with support from municipalities including Peel, York, the City of Toronto, and lower tier municipalities including Mississauga and Brampton, and from the nearby business community has been working to transform the employment lands surrounding Toronto Pearson and located within TRCA's Etobicoke-Mimico Creeks Watershed into an internationally recognized community of eco-friendly businesses.

In order to ensure Partners in Project Green is meeting the needs of its members and to further clarify benefits and communications strategies to be employed in the upcoming Membership Program relaunch (Q1 2022), a survey was sent to all PPG members and completed between May 3 and May 21, 2021. The survey was sent to a total of 67 organizations and had a 57% response rate.

The goal of the survey was to identify:

- Why organizations sign up for Membership;
- What value they receive after signing up;
- What benefits they value now and want in the future;
- What their sustainability focus areas will be over the next 1-3 years.

In order to remain both responsive to member and community needs and support ongoing program adaptation the survey will be repeated in Q2/Q3 2022. The survey further provides an additional benefit of measuring performance and value of the overall PPG membership program.

RATIONALE

The Committee will be updated on the results of the 2021 Membership Survey and provided with an overview of next steps in implementing recommendations resulting from the survey.

Key findings include:

- Networking opportunities are a high motivator for joining and considered highly valuable by current members. Additional networking opportunities are desired.

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- Knowledge & Resources are a high motivator for joining and are the top ranked benefit.
- Many organizations rely on us for technical expertise and skill. When asked "What is the most valuable thing you have gotten out of your membership?", this was the second most mentioned feature (after access to programs).
- Many respondents indicated the desire for more opportunities to share their stories and promote offerings (events, services, publications).
- Key areas of sustainability focus over the next 1-3 years include (top five, in order of ranking): waste reduction, employee engagement, carbon neutrality and emissions, social sustainability (impact on people and communities), and water efficiency. This demonstrates our performance areas are in line with Member needs, with the opportunity to enhance our social sustainability offerings.
- PPG can strengthen its role as a broker or hub of knowledge, resources, technical expertise and networking connections to better meet member needs.

Please see below for a list of key recommendations and potential actions based on the survey results. In cases where action status is noted as "not started", additional review and evaluation is, or may be, required, including staff and resource planning. Further updates will be provided, as appropriate, to the PPG EMC at future meetings on both "in progress" and "not started" potential actions.

Recommendation #1: Build out networking opportunities

Potential Action	Status
Expand the Green Economy Networking events	In progress: Pilot a paid non-member, free member model in September 2021. Determine 2022 event schedule based on interest.
Reintroduce In Person Networking	Not started: Reintroduce in person networking in 2022, consider a spring or fall large networking event with a paid non-member, free Member model.
Expanded consortium networks & collective projects	In progress: Two self-funded consortium streams currently in development (GreenBiz Caledon and Zero Waste Leaders) Two more consortiums to be developed for launch in Q1 2022.
Explore the development of a mentorship program	Not started: Have had initial conversations with internal TRCA groups who have run mentorship programs. Initial research suggests that the model may be resource intensive. Potential to be explored in future.

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Recommendation #2: Communicate PPG Benefits to Members and their employees

Potential Action	Status
Create short videos on different benefits available by grouping or Member category to live on the website and be shared out through social media	Not started: will be developed as marketing materials for the Membership launch
Include a Member Benefit feature in every newsletter	Not started: will commence with Membership launch
Member Benefits package included in Onboarding Package	Not started: to be developed in October 2021
Create email templates and/or other products for Members to send to their staff outlining the benefits they can utilize	Not started: to be developed in October 2021

Recommendation #3: Build out additional resources

Potential Action	Status
Leverage member resources where appropriate	In progress: have created an affiliate partnership with GreenWill Toronto and have a list of potential opportunities
Leverage TRCA resources where appropriate	In progress: working with STEP and Ecosystem and Climate Services to determine how to share knowledge resources
Develop Case Studies regularly	In progress: see Share Member Stories and Service Offerings)
Create additional Business Guides	Not started: to be explored. These are valuable but resource intensive.
Create Member Only newsletter	In progress: list is created and has been utilized for one-offs. Strategy to be developed.
Create vendor lists for University/College list for students along with lists of funding opportunities	Not started: to be explored
Create Green Vendor list; consider member only features	In progress: research being undertaken with City of Toronto
Create incentive database	Not started: to be explored
Create a jobs board, or job listings in newsletter	Not started: to be explored
Create a podcast, showcasing the people behind the projects	Not started: to be explored

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Recommendation #4: Share member stories & services offerings

Potential Action	Status
Make the system for Members to submit 'Member Spotlights' more visible and ensure high visibility on the site, newsletter and social media	In progress: reviewing process.
Create a system for Members to apply to share their expertise and experience at events	Not started: develop a PPG Standards guide for event presentations and create an application and evaluation process.
Create a system for developing case studies (video and digital) on Members & Collective Projects	In progress: reviewing process
Green Business of the Month feature for TRCA's social media – a PPG project, member or collective project	Not started: to be explored

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan

This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:

Strategy 1 – Green the Toronto region's economy

Strategy 5 – Foster sustainable citizenship

Strategy 7 – Build partnerships and new business models

DETAILS OF WORK TO BE DONE

At upcoming PPG Executive Management Committee meetings, staff will provide detailed reports and updates related to the evolution of PPG's membership programming and communications, ensuring delivery of program outcomes while acting in accordance with public health directives related to pandemic spread.

Report prepared by: Jennifer Taves

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For Information contact: Jennifer Taves

Emails: jennifer.taves@trca.ca

Date: August 4, 2021

Attachments: 1

Attachment 1: 2021 PPG Member Survey Results Presentation

PPG Member Survey Results

Presented by: Jennifer Taves, Senior Manager, Partners in Project
Green, 2021





1. Executive Summary
 - a) Background
 - b) Key Takeaways
 - c) Recommendations
2. Respondents
3. Results



Executive Summary

Background

- Survey sent to all PPG members and completed between May 3 and May 21, 2021
- The goal of the survey was to identify:
 - Why organizations sign up for Membership
 - What value they receive after signing up
 - What benefits they value now and want in the future
 - What sustainability focus areas will be over the next 1-3 years
- The survey will be repeated in Q2 2021

Key Takeaways

- **Networking** opportunities are a high motivator for joining and considered highly valuable by current members. Additional networking opportunities are desired.
- **Knowledge & Resources** are another high motivator for joining and the top ranked benefit.
- Many organizations rely on us for **technical expertise** and skill. When asked "What is the most valuable thing you have gotten out of your membership?", this was the second most mentioned feature (after access to programs).
- Many respondents indicated the desire for more opportunities to **share their stories** and promote offerings (events, services, publications).
- **PPG can strengthen its role as a broker or hub of knowledge, resources, technical expertise and networking connections to better meet member needs.**

Recommendations

1. Expand networking opportunities
2. Improve benefit communications to members and their employees
3. Build out available resources
4. Share member stories & offerings

Recommendation #1: Expand networking opportunities

Potential Action	Status	Responsible
Expand the Green Economy Networking events (virtual)	In progress: Pilot a paid non-member, free member model in September 2021. Determine 2022 event schedule based on interest.	Membership & Business Engagement Coordinator
Reintroduce In Person Networking	Not started: Reintroduce in person networking in 2022, consider a spring or fall large networking event with a paid non-member, free Member model.	Membership & Business Engagement Coordinator
Expanded consortium networks & collective projects	In progress: Two self-funded consortium streams currently in development (GreenBiz Caledon and Zero Waste Leaders)	Senior Manager - GreenBiz Caledon Energy Program Manager – Waste Leaders Consortium
	Two more consortiums to be developed for launch Q1 2022	TBD – Future consortiums
Explore the development of a Mentorship program	Not started: Have had initial conversations with internal TRCA groups who have run mentorship programs. Potential to be explored in future.	Senior Manager

Recommendation #2: Improve benefit communications to Members & their employees

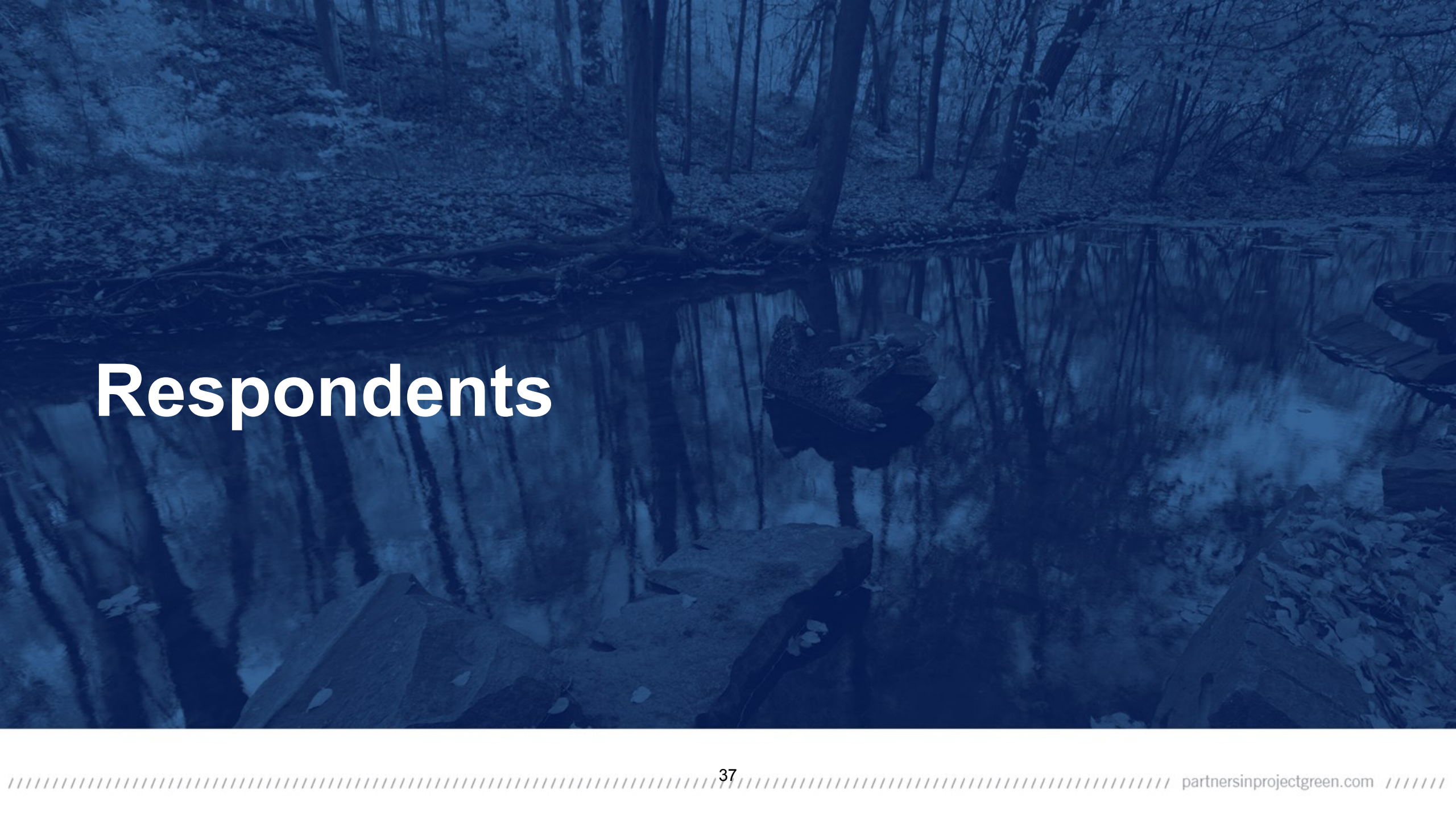
Potential Action	Status	Owner
Create short videos on different benefits available by grouping or Member category to live on the website and be shared out through social media	Not started: will be developed as marketing materials for the Membership launch	Program Manager, Membership and Business Engagement
Include a Member Benefit feature in every newsletter	Not started: will commence with Membership launch	Program Manager, Membership and Business Engagement
Member Benefits package included in Onboarding Package	Not started: to be developed in October 2021	Program Manager, Membership and Business Engagement
Create email templates and/or other products for Members to send to their staff outlining the benefits they can utilize	Not started: to be developed in October 2021	Program Manager, Membership and Business Engagement

Recommendation #3: Build out available resources

Potential Action	Status	Owner
Leverage member resources where appropriate	In progress: have created an affiliate partnership with GreenWill Toronto and have a list of potential opportunities	Coordinator, Membership & Business Engagement
Leverage TRCA resources where appropriate	In progress: working with STEP and Ecosystem and Climate Services to determine how to share knowledge resources	Senior Manger
Develop Case Studies regularly	In progress: see Share Member Stories and Service Offerings)	Coordinator, Membership & Business Engagement
Create additional Business Guides	Not started: to be explored. These are valuable but resource intensive.	TBD
Create Member Only newsletter	In progress: list is created and has been utilized for one-offs. Strategy to be developed.	Coordinator, Membership & Business Engagement
Create vendor lists for University/College list for students along with lists of funding opportunities	Not started: to be explored	TBD
Create Green Vendor list; consider member only features	In progress: research being undertaken with City of Toronto	Program Manager, Energy
Create incentive database	Not started: to be explored	TBD
Create a jobs board, or job listings in newsletter	Not started: to be explored	TBD
Create a podcast, showcasing the people behind the projects	Not started: to be explored ³⁵	TBD

Recommendation #4: Share member stories & offerings

Potential Action	Status	Owner
Make the system for Members to submit 'Member Spotlights' more visible and ensure high visibility on the site, newsletter and social media	In progress: reviewing process	Coordinator, Membership & Business Engagement
Create a system for Members to apply to share their expertise and experience at events	Not started: develop a PPG Standards guide for event presentations and create an application and evaluation process.	Coordinator, Membership & Business Engagement
Allow Members to submit events for inclusion on events calendar	Not started: develop a criteria for inclusion on the website and an application process.	Coordinator, Membership & Business Engagement
Create a system for developing case studies (video and digital) on Members & Collective Projects	In progress: reviewing process	Program Manager, Membership & Business Engagement
Green Business of the Month feature for TRCA's social media – a PPG project, member or collective project	Not started: to be explored	TBD



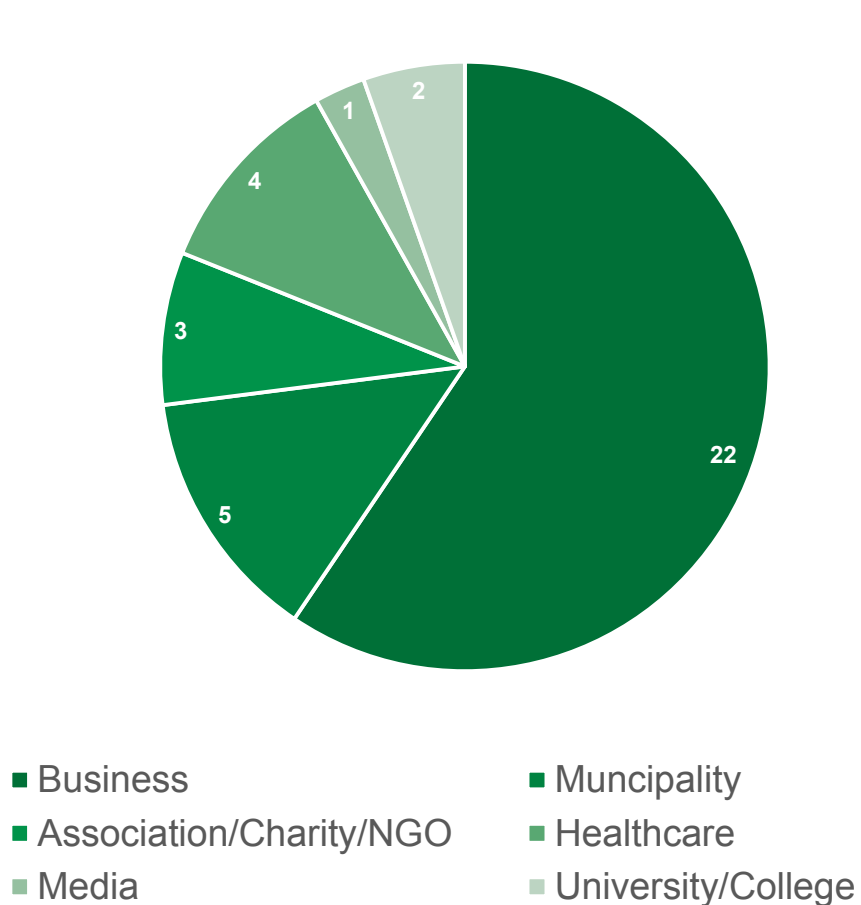
Respondents

Respondents

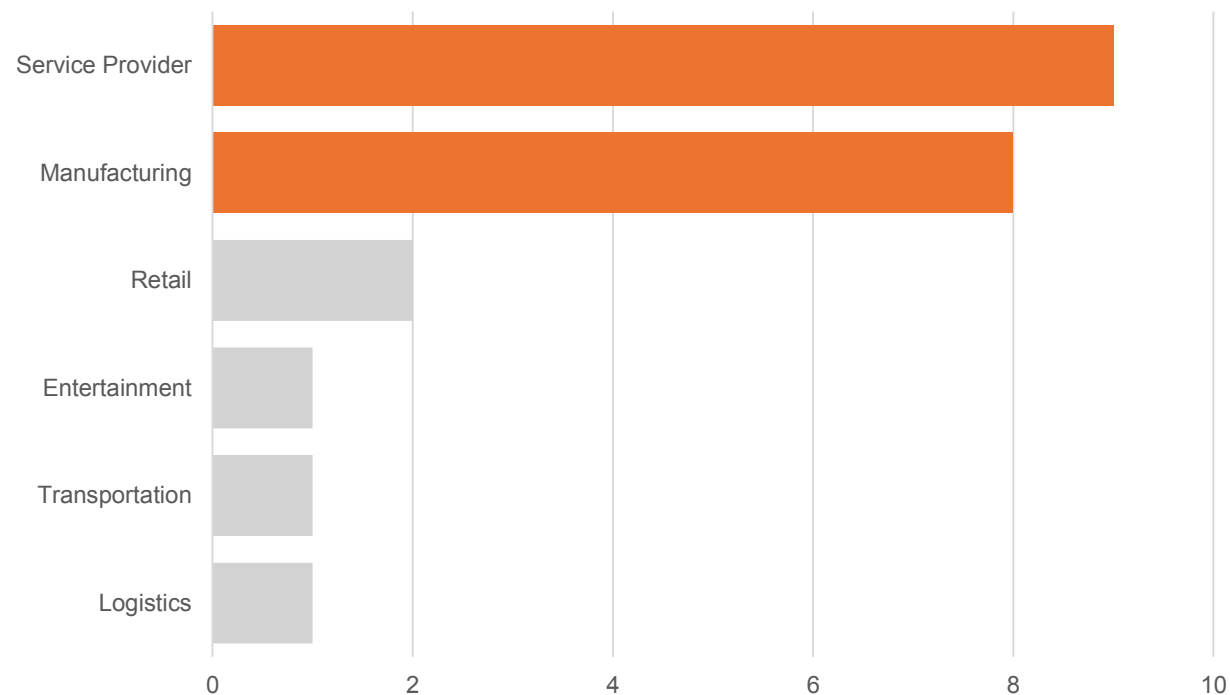
- Sent to PPG Members (67 at time of survey)
- 57% response rate
- Respondent sectors align with overall PPG Member sectors

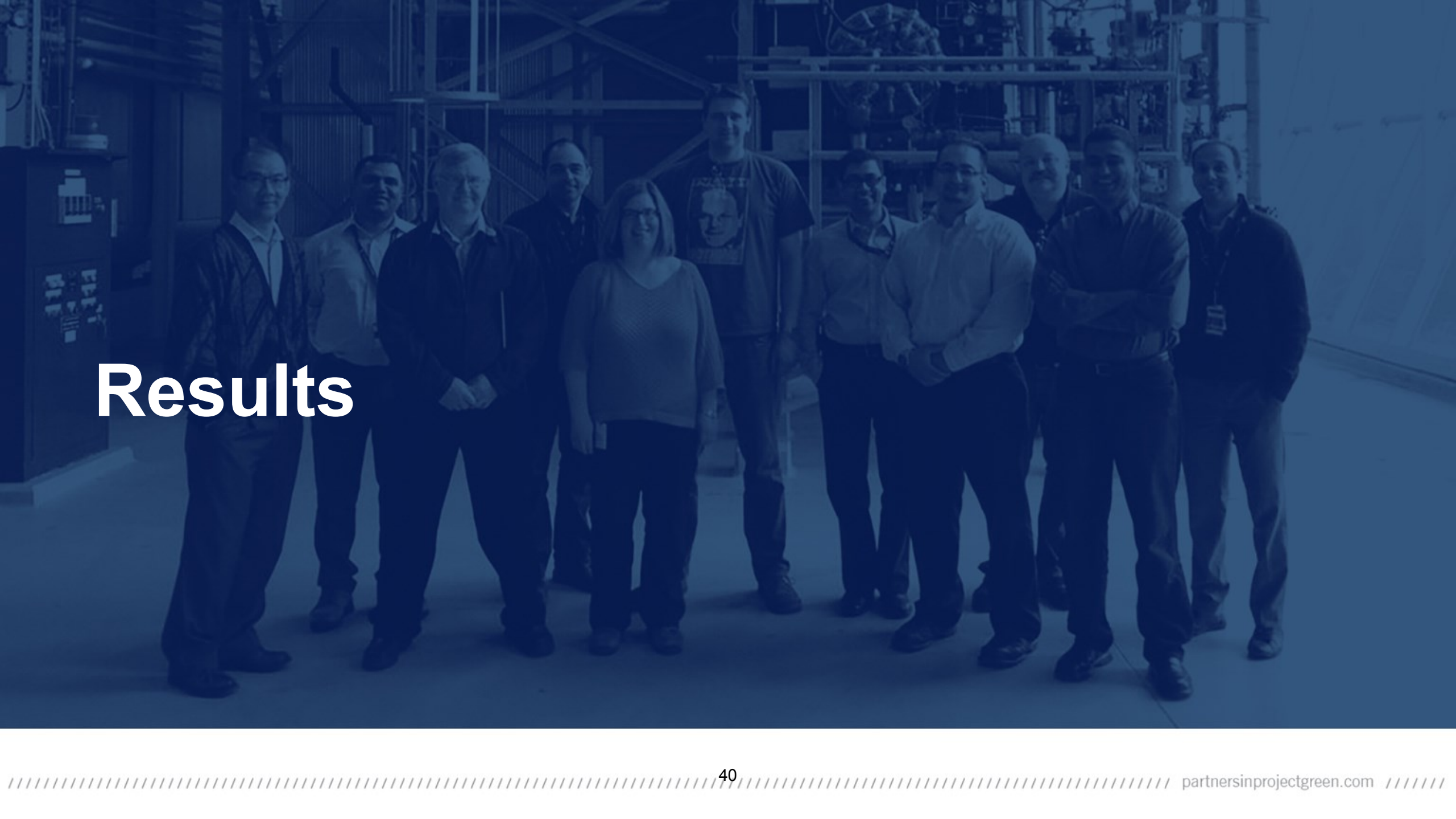
PPG Member Sectors	Number
Service Provider	20
Manufacturing	17
Association/Charity/NGO	14
Municipal Government	6
University/College	3
Health Care	3
Entertainment	2
Transportation	2
Retail	2
Warehousing and Logistics	1
Developer, Property Management, Real Estate	1
Finance	1
Media	1

Survey Respondents by Sector



Business Respondents: **Service Provider** and **Manufacturing** appear most often.





Results

Why did you join PPG?



Other reasons

“To better align with sustainability activities around YYZ and to facilitate our goal to provide renewable fuels to YYZ customers”

“The primary reason was to have a partner to divert more materials from landfills. And to learn more about what the program offers.”

Benefit Rankings

	Very/ Somewhat Important	Neutral	Not Very/ Not Important
Resources (webinars, white papers, etc.)	34	3	1
Networking opportunities	32	4	2
Materials Exchange	26	10	2
Access to Vendor lists	24	3	11
Consultant hours with experts	24	7	7
Discounts on technical webinars and employee lunch and learns	23	12	3
Discounts on PPG programs	22	13	3
Employee engagement campaigns with tools, templates and resources	22	12	4
Leadership opportunities (sitting on committees, awards, speaking opportunities)	18	12	8
Discounts on nature based team building activities	13	15	10

Other benefits you would like PPG to provide:

- Promote our events
- Sector based networking
- Review our sustainability plans
- Discounts for our employees
- Communicate available benefits
- Promotional opportunities
- Promote our publications and events

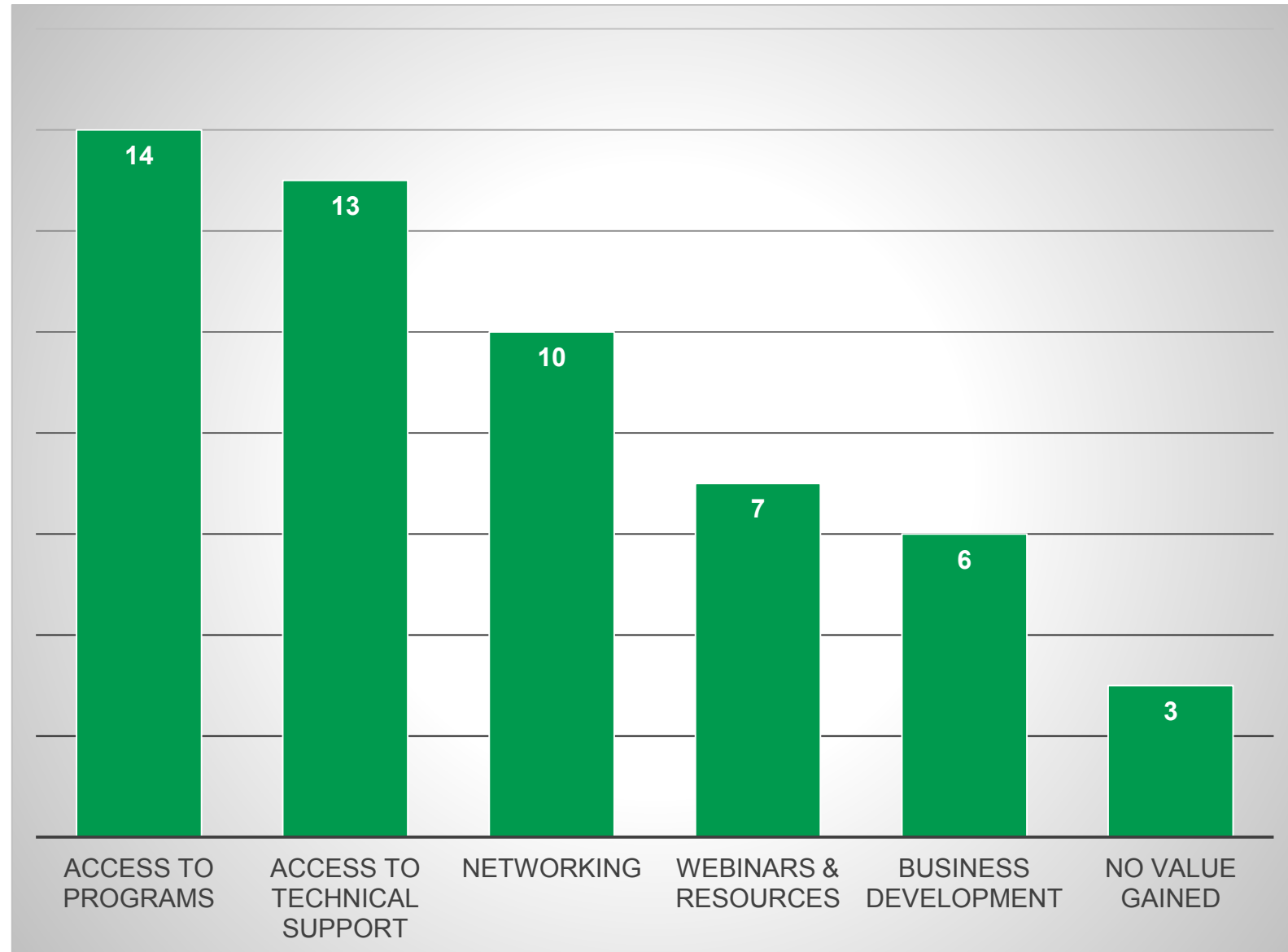
**What are
your
Sustainability Priority
Areas over
next 1-3
years?**

	Strongly Agree / Agree	Neutral	Disagree / Strongly Disagree
Waste reduction	35	3	0
Employee engagement	33	4	1
Carbon neutrality and emissions	31	6	1
Social sustainability (impact on people and communities)	31	5	2
Water efficiency	30	6	2
Climate change resilience	28	9	1
ESG Reporting	26	11	1
Alignment with the UN SDGs	25	11	2
Eco-designed products	22	12	4
Stormwater management	15	20	3

Other sustainability priority areas

- Do not currently have a plan (4)
- Sustainable supply chain / procurement (3)
- Sustainable Reporting (2)
- Other (4)
 - Meet client needs
 - Food waste
 - Green Development Standards review
 - Natural capital

**Open Ended:
What is the
most valuable
thing you have
gotten out of
your
membership?**



**What can
we do
better?**

broker

connections
resources
promotion
knowledge
incentives
expertise
templates



Kudos!

- “Very pleased with what you currently do”
- “Doing great, thanks for everyone's work.”
- “You are amazing!”
- “You are doing a great job!”
- “Thanks for the great work and leadership in the community.”
- “You guys are great! Thank you for all that you do!”
- “I think PPG is always striving to be relevant, helpful and inclusive of all their members, so we know we are getting good value out of our membership. Thanks!”



 @TRCA_HQ

Items for the Information of the Partners in Project Green Executive Management Committee

TO: Chair and Members of the Partners in Project Green Executive Management Committee
Tuesday, September 21, 2021 Meeting

FROM: Darryl Gray, Director, Education and Training

RE: **THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 2021 SIXTH ASSESSMENT REPORT SUMMARY**

KEY ISSUE

A summary of the Intergovernmental Panel on Climate Change Sixth Assessment Report, *Climate Change 2021: The Physical Science Basis*.

RECOMMENDATION

IT IS RECOMMENDED THAT the following report summarizing the Intergovernmental Panel on Climate Change Sixth Assessment Report, *Climate Change 2021: The Physical Science Basis*, be received.

BACKGROUND

On August 9, 2021, the International Panel on Climate Change (IPCC) released the Sixth Assessment Report (AR6). The AR6 presents findings of 234 authors from Working Group I on the physical science basis of climate change and required the approval of 195 member countries, diplomats, and scientists. The report addresses the most-up-to-date physical understanding of the climate system and climate change, drawing on the latest advances in climate science, and combining multiple lines of evidence from paleoclimate archives, observations, process understanding, and global and regional climate simulations.

This report summarizes key findings from the AR6 in the areas of climate projections, regional adaptation, and limiting future climate change. It presents a case for enhancing climate lenses in PPG programming, as it is critical to ensure the business community is equipped to face the challenges of climate change and to do their part in creating a more sustainable future for all. Demonstrated throughout AR6 are climate-related risks and challenges that impact urban areas and the IC&I sector. It also presents opportunities for immediate action that, if performed collaboratively, can slow future global warming.

RATIONALE

Throughout the AR6, language is used to convey “virtual certainty” that human caused emissions has led to climate extremes, such as extreme heat, weather events, and drought. The AR6 provides compelling evidence that we need to deeply address greenhouse gas emissions (GHGs) as soon as possible and achieve net zero by 2050 if we are going to affectively curb global warming in the next 20 years. Without these efforts, the earth will continue to warm and existing climate extremes will worsen significantly.

The general level of confidence in claims that human behaviour is to blame for climate change is much stronger in the AR6 than in the AR5. IPCC’s AR5 placed a greater emphasis on the impacts of climate change on human health, while the AR6 places a greater emphasis on impacts to natural systems which humans interact with on a regular basis. Understanding

that both are at great risk presents a paradigm shift in which the reinforcing relationship between human and environmental health is evermore present, and that we must protect the environment to protect ourselves.

Climate Status and Projections

Since the AR5, researchers have been able to utilize new resources to better understand human influence on a wider range of climate variables, including weather and climate extremes. The AR6 has high confidence that these extremes are human-induced. Some examples of climate extremes include heatwaves, heavy precipitation, agricultural and ecological droughts, and tropical cyclones, all of which have increased in intensity and frequency since the 1950s. The scale of changes to aspects of the climate system in the last several centuries to thousands of years is unmatched to the changes documented in recent years. The last four decades have been warmer than any decade preceding the year 1850.

Furthermore, the AR6 has high confidence that human activity has contributed to specific global warming impacts that are irreversible. These include oceanic acidification (the ongoing decrease in the pH value of the Earth's oceans), contributing to ocean salinity since the mid-20th century, and the global degradation of glaciers since the 1990s, contributing to sea level increases.

In *Section B: Possible Climate Futures*, AR6 considers a set of five illustrative emissions scenarios to explore climate response to a broader range of human drivers than was assessed in AR5. These scenarios also account for natural drivers and natural climate variability (processes intrinsic to the climate system).

Through these scenarios, the AR6 projects with high confidence that even under very low GHG emission scenarios, global surface temperature will continue to increase until at least the mid-century, and not start to decline back to below 1.5 °C toward the end of the 21st century. Unless we commit to significant reductions in carbon dioxide and other GHGs in the next decade, global warming of 1.5 °C and 2 °C will be exceeded during the 21st century. If we do not commit to a decarbonized future, extreme climate events will only worsen, permafrost thawing will be expedited, and the ability of ocean and land carbon sinks to slow down the accumulation of carbon dioxide in the atmosphere will be overpowered. With every additional increment of global warming, changes in climate extremes continue to grow, and the likelihood of unprecedented extreme events is very likely.

Regional Adaptation

The AR6 has medium to high confidence that severe agricultural and ecological droughts, extreme heat, and heavy precipitation and associated flooding are projected to become more frequent and intense in North American regions. The AR6 speaks directly about the urban context of climate change, indicating that human-induced local warming of cities and urbanization precipitate things like heatwaves, increases in heavy precipitation events, and stormwater runoff intensity. With many of PPG's members doing business in urban contexts, and with suppliers in the agricultural sector and in other parts of the world facing more severe climate realities, it is critical for the business community to assess upstream and downstream impacts related to their operations.

The potential of severe agricultural and ecological droughts can result in food shortages and supply chain disruptions. When growing seasons are impacted and crop production is compromised industries, especially those that rely on agricultural goods, are at risk.

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The AR6 has high confidence that all regions will experience increases in hot temperatures. Among its impacts to natural systems, extreme heat is especially detrimental to human and agricultural health. Especially in urban centers, the presence of grey infrastructure and impermeable surfacing are key contributors to urban heat island effect and extreme heat.

There is stronger evidence since the AR5 that the global water cycle will continue to intensify as global temperatures rise. The result will be increased variability of precipitation and surface water flows and intensification of very wet and very dry weather in many North American regions. The AR6 also states that human activity is responsible for the global degradation of glaciers since the 1990s, contributing to sea level increases. In coastal cities like Toronto, the combination of more frequent extreme sea level events (due to sea level rise and storm surge) and extreme rainfall/river flow events will make flooding more probable.

PPG's [Business Case for Natural Infrastructure](#) business guide outlines the various impacts of flooding on private lands and business operations, from supply chain disruptions, infrastructure repair costs, employee absenteeism and more. Natural infrastructure solutions involving vegetation not only sequester carbon but provide a host of benefits to mitigating impacts of climate change, including flood risk and urban heat island effect. PPG will continue to utilize STEP and TRCA resources to educate and promote the transition from grey to natural infrastructure across the TRCA jurisdiction.

Although the AR6 demonstrates clear evidence that human drivers are the cause of global warming, it is important to consider the role of natural drivers and natural climate variability, especially in localized and near-future contexts. For example, variations in solar and volcanic drivers have distracted from human-caused global warming. Based on paleoclimate and historical evidence, it is likely we can expect at least one large explosive volcanic eruption in the 21st century. Due to the cooling aerosols emitted, the climate will temporarily cool, masking human-caused climate change. These events should be considered when planning for a full range of possible climate changes, and not distract from efforts to address human-caused impacts.

Although exceptionally severe outcomes such as ice sheet collapse, abrupt ocean circulations changes and other compounding events are low likelihood, the AR6 has ensured they are part of risk assessment should global warming temperatures rise above 2 °C.

Limiting Climate Change

AR6 simulations of varying GHG emission scenarios demonstrate with high confidence that we will see clear improvements in GHG and aerosol concentrations and air quality if we achieve low or very low GHG emission scenarios in the coming decades. If we commit to deep decarbonization, we can expect to see temperatures begin to lower around mid-century. Specifically, the AR6 prescribes that we must limit cumulative carbon dioxide emissions, along with strong reductions in other GHGs 50% by 2030 and achieve net zero by 2050. The emphasis on cumulative emissions indicates the need for collective action. As PPG programming has demonstrated, aggregated efforts can produce significant positive results.

As climate change becomes more focal across the globe, there is increasing demand from shareholders, consumers and asst managers that businesses commit to net zero pathways. Primary GHG concentrations produced through human activity which have contributed to global warming include carbon dioxide, methane, nitrous oxide, and fluorinated gases. Each of these GHGs are produced through the production and burning of fossil fuels, industrial activities, agricultural and land uses, the treatment of wastewater and solid waste,

Item 8.2

etc. The AR6 presents a unique opportunity for businesses to examine how they contribute to the production of GHGs by looking at how they perform their operations, their procurement policies, the energy used to produce materials and deliver services, the life cycle of their products, and the commitment to climate action among partners and suppliers. There are interventions that can make a measurable difference in each of these areas of consideration, especially when cooperation and collaboration across sectors and supply chains is emphasized.

Finally, the AR6 anticipates we can avoid a high GHG emission scenario (e.g., 4°C centigrade of warming) and subsequent climate disasters because of the general trajectory of progressive climate action occurring across the globe.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan

This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:

Strategy 5 – Foster sustainable citizenship

Strategy 8 – Gather and share the best sustainability knowledge

DETAILS OF WORK TO BE DONE

Moving forward, PPG is committed to strengthening the integration of climate mitigation and adaptation lenses into its programming and leveraging the four performance areas (water stewardship, waste management, energy performance and stakeholder engagement) to inspire action on climate change among the business community. Actions in each of these sustainability areas have potential to directly address human drivers of climate change, such as GHG emissions and sustainable land use practices.

PPG is well-equipped to support the PPG membership base in aligning with international targets to achieve net zero emissions by 2050, and in preparing for future climate impacts. These climate impacts are especially severe in urban contexts with high levels of grey infrastructure, where many PPG member businesses operate. PPG can play a role in supporting the IC&I sector to plan strategically to achieve this target within the scope of their own business practices and operations. Now is an opportune time for PPG to continue playing a role in supporting the IC&I sector to understand climate risks, develop action plans, and implementing projects with measurable impacts.

PPG will provide summaries to the Executive Management Committee on each of the IPCC's upcoming reports shortly after their release. These reports include:

- Working Group II: Impacts, Adaptation and Vulnerability (14-18 February 2022)
- Working Group III: Mitigation of Climate Change (21-25 March 2022)
- Synthesis Report (26-30 September 2022)

Report prepared by: Anna Currier, extension 6489

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Emails: anna.currier@trca.ca

Date: September 7, 2021

Items for the Information of the Partners in Project Green Executive Management Committee

TO: Chair and Members of the Partners in Project Green Executive Management Committee
Tuesday, September 21, 2021 Meeting

FROM: Darryl Gray, Director, Education and Training

RE: **UPDATE ON RE-ENERGIZING THE PPG MEMBER BASE THROUGH BOARDS OF TRADE, CHAMBERS OF COMMERCE AND ECONOMIC DEVELOPMENT OFFICES**

KEY ISSUE

Update on Partners in Project Green's (PPG) efforts to strengthen relationships and collaboration with Boards of Trade, Chambers of Commerce and Economic Development Offices ("BOT, COC and EDO") to enhance PPG's reach and more effectively promote sustainable business operation across the Greater Toronto Area.

RECOMMENDATION

WHEREAS Partners in Project Green was launched in 2008 to advance the adoption of sustainability practices within the Pearson Airport economic zone;

AND WHEREAS a Strategic Refresh to the Partners in Project Green program was completed in 2019 that affirmed objectives related to the expansion and advancement of eco-business programming and services to additional economic clusters across TRCA's nine watersheds;

AND WHEREAS at Meeting #1/20 the Partners in Project Green Executive Management Committee ("PPG EMC") received an information update on the Partners in Project Green 2020 Strategic Priorities;

IT IS RECOMMENDED THAT the following information report on progress updates related to engagement with Boards of Trade, Chambers of Commerce and Economic Development Offices by Partners in Project Green be received.

BACKGROUND

Partners in Project Green: A Pearson Eco-Business Zone was launched in 2008 by Toronto and Region Conservation Authority (TRCA) and the Greater Toronto Airports Authority (GTAA), with support from the Regional Municipalities of Peel and York, the City of Toronto and from the nearby business community to transform the employment lands surrounding Toronto Pearson, and located within TRCA's Etobicoke-Mimico Creeks Watershed into an internationally recognized community of eco-friendly businesses.

The creation of Partners in Project Green (PPG) stemmed from an eco-business model recommendation identified in a 2006 joint TRCA and GTAA report that provided restoration strategies for the natural and aquatic systems surrounding Toronto Pearson.

At Board of Directors Meeting #4/19, held on April 26, 2019, Resolution #A51/19 was approved in part as follows:

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THAT the Partners in Project Green Strategic Refresh 2019-2023 and Executive Management Committee Terms of Reference 2019-2023 ... be approved

This strategic refresh was intended to guide the next generation of eco-business activities through PPG focused on increased engagement, improved performance outcomes and enhanced alignment with municipal and business priorities.

As part of the 2020 priority-setting exercise, TRCA staff identified specific areas of activity for 2020 that are intended to increase the reach and potential of PPG while building additional capacity for long-term growth of the program. One such activity area is outlined below:

- Re-energize the PPG network through improved programming, outreach and membership, with a particular emphasis on engagement of Boards of Trade (BoT)/ Chambers of Commerce (CoC) and municipal economic development offices.

RATIONALE

The following progress updates are provided for the information of the Executive Management Committee in relation to PPG's identified priority of engagement with BOT, COC and Economic Development Offices (EDO):

- PPG hosted a virtual "Economic Development Office Roundtable" event on Friday, November 20, 2020. The purpose of the roundtable was to identify synergies in economic development programs and priorities across the GTA in support of a stronger and more sustainable COVID-19 economic recovery. PPG also made use of the event to raise the EDO contacts' awareness of available PPG programs to support businesses in their regions. Nine economic development offices confirmed interest in the event, and seven attended. The full list of attendees is below.

Name	Region	Title
Daryl Van Moorsel	City of Brampton	Sector Manager, Advanced Manufacturing
John Barber	City of Mississauga	Research Analyst
Walter Garrison	City of Mississauga	Officer, Advanced Manufacturing Business Integrator
Matthew Premru	City of Toronto	Officer - West Office (Etobicoke Civic Centre)
Raphael Costa	City of Vaughan	Acting Director, Economic and Cultural Development at City of Vaughan
Sandra Dolson	Town of Caledon	Economic Development Officer
Sonia Salomone	Durham Region	Manager Business Development & Investment, Planning & Economic Development

Item 8.3

Rob McMonagle	City of Toronto	Green Sector, Sector Development Office
Chris Banfield	Region of York	Strategic Economic Initiatives

- Twenty action items for collaboration amongst the EDOs and PPG were identified during the Roundtable, fourteen of which have been completed, and four of which are in progress. Please see the attached status report update from July 19, 2021.
- A 2021 EDO Roundtable is being planned for Q3 to further build on the success of the 2020 meeting.
- PPG staff is undertaking research in partnership with City of Toronto Economic Development and Culture Department into the feasibility of a Green Industries Directory; building a web platform to track and connect green industry businesses across the Greater Toronto Area with relevant audiences. This research is expected to be completed in Q4 2021.
- PPG staff is working with Town of Caledon Economic Development to share PPG programs and services via the EDO website (<https://www.caledonbusiness.ca/en/business-support/green-your-business.aspx>). This website lists various programs and services to help businesses become more sustainable. PPG programs are listed under Energy, Water and Waste, and the People Power Challenge is highlighted directly on the page. The PPG website is also directly linked to from the page.
- PPG staff is working with Town of Caledon Economic Development to develop the GreenBiz Caledon consortium focused on securing PPG membership and providing focused sustainability resources, tools and education to Caledon businesses.
- PPG facilitated a joint PPG / Mississauga Board of Trade podcast interview, published by the Mississauga Board of Trade and featuring Darryl Gray, Director, Education and Training, TRCA. Topics discussed included employee engagement and return to office plans.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan

This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:

Strategy 1 – Green the Toronto region’s economy

Strategy 7 – Build partnerships and new business models

Strategy 8 – Gather and share the best sustainability knowledge

Strategy 12 – Facilitate a region-wide approach to sustainability

DETAILS OF WORK TO BE DONE

PPG staff will continue to strengthen relationships with BOT, COC and EDO across TRCA’s watershed and investigate opportunities for collaboration. In particular, PPG staff will incorporate all identified BOT, COC and EDO into the Membership relaunch communications plan scheduled to commence Q1 2022.

Report prepared by: Jennifer Taves

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For Information contact: Jennifer Taves

Emails: jennifer.taves@trca.ca

Date: August 6, 2021

Attachments: 1

Attachment 1: EDO Action Items Status Update

TRCA EDO Rountable - Action Item Tracker

Last updated: July 19, 2021

#	Action Item	Time Frame	Responsible	Next Steps	Status	Due By
1	Define green industry NAICS codes	Medium term	Raphael Costa/ Rob McMonagle/ Nat Magder	Conduct research	IN PROGRESS - to be included as part of the proposed Green Industries Directory research	Q4 2021
2	Cantrace system – Sonia to send the info to the group and contact info	Short term	Sonia Salomone	Sonia to send info	COMPLETE	
3	Brampton – SME consortium – contact IESO and see if we can include latecomers to the program, discuss opportunities with NRCAN to engage smaller companies in energy efficiency	Short term	Nathaniel Magder	Nathaniel to reach out to IESO	COMPLETE	Q4 2020
4	Connect Vaughan with TRCA social enterprise activities – connect with Darryl	Short term	Jennifer Taves	Jennifer to do intro email	COMPLETE	Q4 2020
5	One pager on what expertise PPG has in house and what we can provide with contact info	Short term	Jennifer Taves	Jennifer to create document	COMPLETE	Q1 2021
6	Sonia to connect with City of Toronto with Green Directory	Short term	Sonia Salomone/Rob McMonagle	Sonia to connect with Rob		
7	Hydrogen strategy: coordinate efforts on comments on federal announcement (City of Mississauga)	Medium term	Walter Garrison/ Nathaniel Magder	Nathaniel to connect with Walter	COMPLETE	Q4 2020
8	Added: connect with Rob McMonagle (City of Toronto) to deliver presentation on Green Industries Directory to interested EDO reps and PPG	Medium term	Nathaniel Magder/ Rob McMonagle	Nathaniel to connect with Rob	COMPLETE	Q1 2021
9	ADDED: Create master Green Industries Directory list across the EDO's built off of the one shared by City to Toronto. To see if we can remove duplication, enhance the size/scope of the list, and make it virtual/readily accessible across the region.	Medium term	Nathaniel Magder / Eric Meliton / Rob McMonagle	1. Nathaniel and Eric to connect with Rob McMonagle 2. Explore with funding agents (e.g. FCM) to see if they'd be willing to fund that administrative effort	IN PROGRESS - Green Industries Directory research proposed to commence Q3 2021	Q4 2021
10	ADDED: Plastic waste alignment: support the EDO's with their end users and manufacturers with the impending impact of the blue box review EBR and the extended producer responsibility requirements that the federal government is imposing through the zero plastic waste strategy	Medium term	Catherine Leighton	Identify businesses that would require assistance to adjust to changes to blue box program (province level) or zero waste program (federally) as both are major policy changes in 2021 onward.	COMPLETE	Q1 2021
11	Touch base with Raphael on Activate Vaughan	Medium Term	Jennifer Taves / Raphael Costa	Jennifer to connect with Raphael	COMPLETE	Q4 2020
12	Town of Caledon – connect with Nathaniel on Peel ZEV strategy and survey to see if there are ways to adopt strategies from other jurisdictions in Peel	Medium term	Sandra Dolson /Nathaniel Magder	Nathaniel to connect with Sandra	COMPLETED (12/14/2020)	Q4 2020
13	Region of York – connect with Nathaniel on Peel ZEV strategy and survey to see if there are ways to adopt strategies from other jurisdictions in Peel	Medium term	Charles Banfield/ Nathaniel Magder	Nathaniel to connect with Charles	COMPLETE	Q4 2020
14	Drive efforts to increase uptake of Caledon's energy retrofit program	Medium term	Nathaniel Magder / Sandra Dolson	Nathaniel to connect with Sandra, looping in Jennifer as needed	COMPLETED (12/14/2020)	Q4 2020
15	Bolton revitalization plan: work with TRCA on trail strategy – improvement and access to green space. Currently working with SNAP, identify any additional TRCA supports	Medium term	Sandra Dolson / Eric Meliton	Eric to connect with Sandra	COMPLETED (12/14/2020)	Q4 2020
16	Manufacturing Action Plan, Toronto Made strategy: PPG and City of Toronto to connect and identify role	Long term	Jennifer Taves / Nat Magder / Rob McMonagle	Nat to connect with Rob	IN PROGRESS - potential alignment with Green Industries Directory	Q3 2021
17	Eric and Sonia to connect around OPG Darlington Plant refurbishment nutrient run off control project	Long term	Eric Meliton / Sonia Salomone	Eric to connect with Sonia	IN PROGRESS - next steps TBD	Q4 2020
18	Support for the growth/alignment with Riverwalk project	Long term	Eric Meliton / Victoria Kramkowski (both participating in the advisory group for the project)	Identify access points for potential PPG business community partners to learn more about the growth/developmental opportunities within the project scope	COMPLETED (12/11/2020)	Q1/Q2 2021
19	Identify sectoral approaches across the regions to identify alignment and opportunities to unify effort	Long term	Eric Meliton	Obtain all EDO strategy reports for next 3-5+ years and identify alignment for sector based approach (e.g. innovation/cleantech, agri-food, industrial manufacturing, etc.) to unify cross-jurisdictional pursuit.	COMPLETED (12/14/2020)	Q4 2020
20	PPG acting as a source for information on the programs and incentives from the federal government	Ongoing	PPG	Continue to distribute information via newsletters and events	ONGOING	Ongoing

Items for the Information of the Partners in Project Green Executive Management Committee

TO: Chair and Members of the Partners in Project Green Executive Management Committee
Tuesday, September 21, 2021 Meeting

FROM: Darryl Gray, Director, Education and Training

RE: **UPDATE ON THE ALTERNATIVE FUNDING MODELS AND EV POLICES**

KEY ISSUE

Update on two items for further inquiry identified at the June 16, 2021, Executive Management Meeting: (1) Alternative funding models to finance capital projects, and (2) Electric Vehicle (EV) policies in the public and private sectors.

RECOMMENDATION

IT IS RECOMMENDED THAT the following information report be received.

BACKGROUND

At PPG EMC Meeting #02/21, held on June 16, 2021, members of the committee inquired for further information on:

1. Alternative funding models to finance capital projects, referring to the ESCO model and a service-based model to provide Charging-as-a-Service.
2. EV policies in the public and private sectors that members and staff can refer to.

RATIONALE

The Committee will be updated on the two identified areas.

Alternative Funding Models to Finance Capital Projects

Financing models for energy projects have existed since the start of energy efficiency industry in the 1970s and 1980s. The first models were called energy service companies (ESCOs) and were commissioned by businesses to develop, design, build, and arrange financing for projects to save energy and decrease operations and maintenance costs at their customers' facilities.

Energy Service Performance Contracts (ESPCs) are common agreements entered into by customers and ESCOs. The objective is to be budget neutral, meaning the cost savings achieved are equal to or greater than the expense of procuring the ESCOs services. The US Department of Energy's background information on developing programs, selection considerations and more, can be found at <https://www.energy.gov/eere/slsc/energy-savings-performance-contracting>. In May 2021, Global Industry Analysts, Inc. published a report entitled "Energy As A Service – Global Market Trajectory and Analysis" that stated the global market for Energy-as-a-Service estimated at US\$49.6 Billion 2020 is projected to reach a revised size of US\$88.4 Billion by 2027, growing at a compound annual growth rate of 8.6% over the analysis period 2020-2027. In 2019, Deloitte published a report called "Energy-as-a-Service" that provides a sound overview of the model, players, and potential outcomes. It is attached to this report.

The greatest challenge with these types of arrangements is clarifying terms of payment based

Item 8.4

on the energy *not used*. Energy savings must be calculated based on the baseline of energy that would otherwise have been consumed. Leveraging a third-party to verify these calculations is a trend that helps avoid disputes over achieved energy savings. For example, if energy savings are measured at the facilities' utility meter (whole building) then a significant change to the equipment on site due to, say, an unplanned replacement of an HVAC unit, can call for a "baseline adjustment." How these adjustments are calculated can be complex and it can be beneficial to have a third-party to verify the payments required by the host. The Efficiency Valuation Organization offers standardized protocols for measurement and verification of energy savings known as the International Performance Measurement Verification Protocol (IPMVP). In general, thorough submetering of any equipment included in an energy performance arrangement improves transparency of savings.

Slightly alternative arrangements, called "As-a-Service" models, can be attributed to a variety of services wherein the customer agrees to regular payments in lieu of capital investments upfront, in order to receive a minimum standard of service by the provider. For EV charging, for example, a Charging-as-a-Service (CaaS) arrangement would define responsibilities of the provider and the host facility along with minimum standards the provider must meet.

There are several businesses initiating networks of Level 3 Fast Chargers in Canada based on the CaaS model. Host facilities pay minimal fees to have chargers installed and the vendor owns and operates the stations, ostensibly recovering costs through customer use fees. Examples include Ivy Network, Electrify Canada and Baseload Power. It is possible (though unconfirmed) that host facilities desirous of CSR/ESG credentials or who are looking to attract customers to the site agree to make regular payments to the vendors to ensure success of the business model on their sites. There are no cases of a CaaS model known to PPG at this time that have not relied on up-to 50% capital costs offset by government grants. Nor are there any known cases of Level 2 charger CaaS agreements in place.

EV Policies in the Public and Private Sectors

Few published policies have been identified for the private sector with regards to EV chargers. These are far more common in the public sector, typically providing guidance to facility operators on: (A) How and when to install charging stations, and (B) How to manage driver use of the stations and (C) Procurement of Green Fleets.

Examples of public bodies implementing station use policies includes: Toronto and Region Conservation Authority (Attachment 2), City of Vaughan (Attachment 3), Town of Aurora (Attachment 4) and York Region (Attachment 5). In 2021, Clean Air Partnership released a Green Fleets Support Package, which includes: Green Fleets Business Case Series, Model EV Employee Policy, and a Model Green Fleets Policy. These currently can be accessed at: <https://www.cleanairpartnership.org/caps-releases-green-fleets-support-package/>. In addition, in April 2019 the federal Office of Energy Efficiency released the "EV Readiness Requirement Framework". The report provides guidance on establishing minimum requirements for EV charging infrastructure in buildings and provides recommendations for Natural Resources Canada to advance provinces' and local governments' adoption of minimum requirements for EV charging infrastructure for buildings.

It is notable also that in December 2019 the provincial Ministry of Transportation amended the Highway Traffic Act to include parking in a dedicated EV parking spot as an offence (Reserved Parking for Electric Vehicle Charging Act, 2019, S.O 2019, c.18 – Bill 123).

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Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan

This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 8 – Gather and share the best sustainability knowledge

Report prepared by: Nathaniel Magder, extension 5845

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Date: September 7, 2021

Attachments: 5

Attachment 1: Deloitte UK Energy-as-a-Servicer Report 2019

Attachment 2: TRCA's Electric Vehicle Charging Policy

Attachment 3: Vaughan Workplace Electric Vehicle Charging Policy

Attachment 4: Aurora Electric Vehicle Charging Station Policy Process

Attachment 5: Region of York Electric Vehicle Charging Station Policy



Energy-as-a-Service

The lights are on. Is anyone home?

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Executive Summary

Imagine a highly synchronised and sustainable energy platform, where millions of smart physical assets interconnect. The result will be a large array of data-driven energy products and services that incorporate new technologies and efficiency improvements. Multiple entities, from corporations to cities, are making moves to prepare for this future.

There are likely to be more changes in the next ten years than there have been in the previous 100 as the grid is made 'smart'. These developments will play out at national, regional and local levels.

- Deployment of distributed generation and microgeneration
- Adoption of connected technologies
- Expansion of energy efficiency
- Installation of utility-scale storage
- Embracing new market participants
- Harnessing big data and visibility
- Development of local energy markets.

Energy-as-a-Service (EaaS) is a delivery model that combines hardware, software and services. Solutions should combine demand management and energy efficiency services, facilitate the adoption of renewables and other decentralised supply sources, and also optimise the balance between demand and supply. The chief benefit for the consumer is in the simplification of an increasingly multifaceted service offering.

The physical, digital and communications infrastructure required means that a range of players can participate in the Energy-as-a-Service market: utilities; industrial companies; tech companies; oil & gas majors; specialist renewable providers; telcos and start-ups.

Four possible scenarios may emerge, depending on who holds the balance of power, and how widely technological advances take root: the Energy-as-a-Service platform provider; the infrastructure provider; the fallen giant; or the stagnant utility company.

Business models will need to transform, in some cases significantly, to keep pace in the 'new normal'. The same trends that have disrupted retail, transport and consumer electronics are coming to the energy markets.

Companies should identify the opportunities they can exploit, the capabilities they will need to do this, and what market segments have the greatest potential to drive their future growth. They can sequence the shift to Energy-as-a-Service offerings in the following stages: first, digitise core capabilities; next, extend the product and service range; and finally, provide total energy solutions.



Why Energy-as-a-Service?

If you could build a perfect city from scratch, what would the energy system look like?
It would be clean, connected and community-based.

Gone will be the traditional model of centralised generation, where energy flows in one direction to passive, rate-paying consumers. Everyone will be able to generate as well as consume. Welcome to the world of Energy-as-a-Service (EaaS).

Imagine a highly synchronised and sustainable energy platform, where millions of smart physical assets interconnect. A digital layer coordinates and distributes both energy and information in real-time, enabling myriad interactive products and services to be traded.

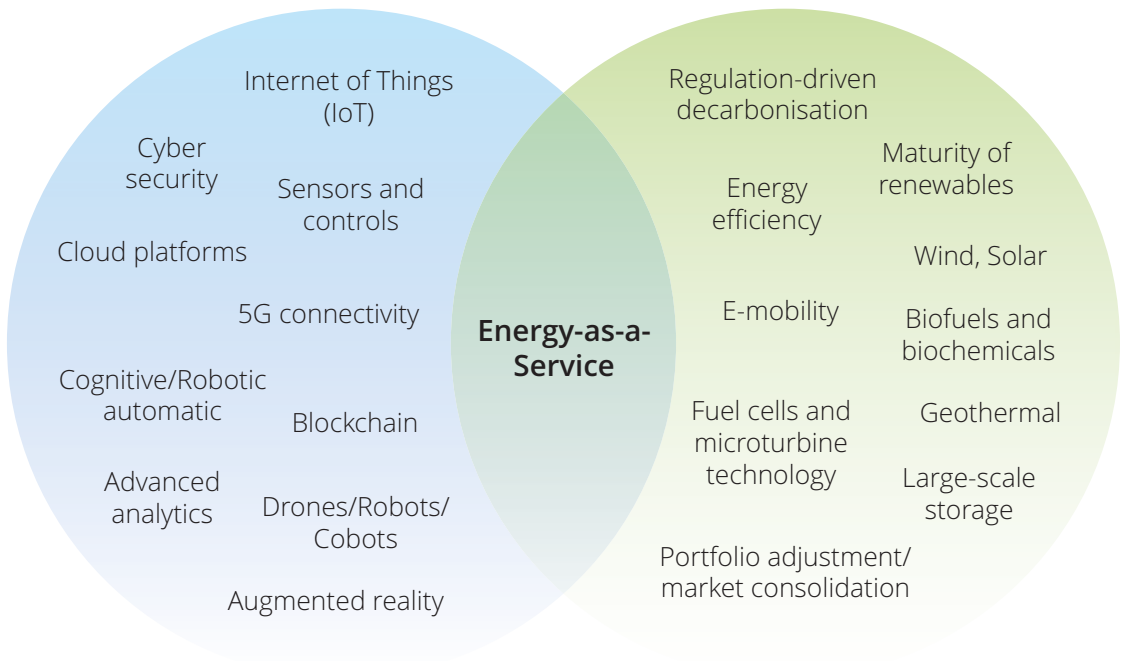
The same convergence that has swept across industries, such as retail, media and manufacturing, is now coming to energy; and the processes that have underpinned generation, distribution and consumption will merge with digital technology and telecommunications. Digital platforms that have transformed how car rides and spare rooms are bought and sold will be adopted for use in energy markets.

The result will be a large array of data-driven energy products and services that incorporate efficiency improvements and new technologies. People will be able to manage their excess supply through peer-to-peer (P2P) markets. Energy will be bundled into customer-centric subscription models and sold as a secondary product embedded in primary products, such as ‘an electric car that has power’ or ‘a home that is warm’.

The evolving energy landscape will become vastly more complex as the cost to produce comes down, the ability to generate moves to micro levels, and products are serviced on digital platforms. End-users will look for an aggregating agent to act as a single source point for all their energy-related needs. This will create opportunities for providers who can deliver a streamlined, cost-effective solution to clients, all for a fixed monthly payment.

A lot has to happen to make this a widespread reality, but multiple entities from corporations to cities are gearing up for such a future. This paper explores what this new world might look like, how it will evolve, and who will be best placed to succeed in it.

Figure A. Tech + Energy = Energy-as-a-Service



Source: Deloitte



Evolution of the electricity grid

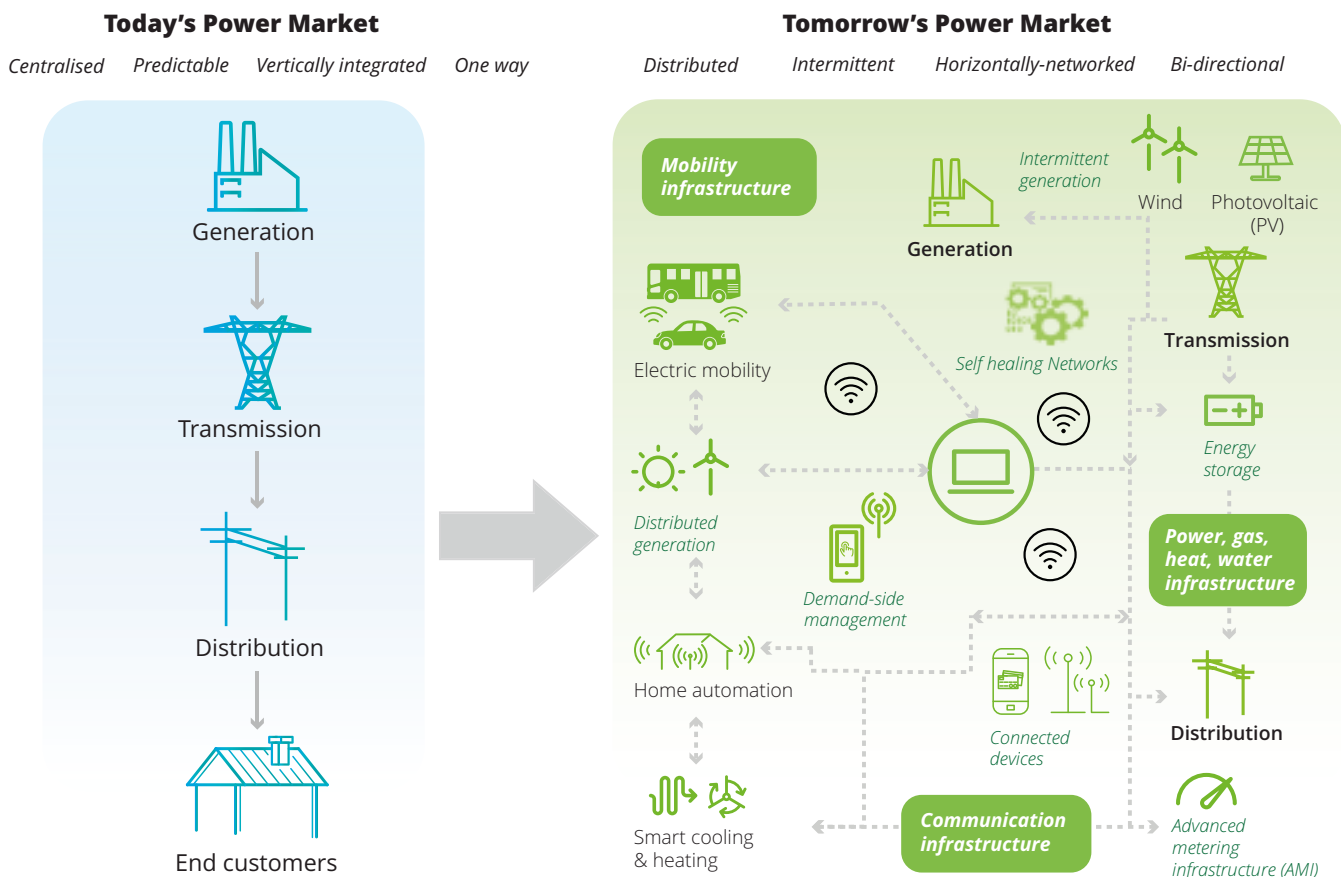
Changes to the way the grid operates will create the conditions for new and very different business models to emerge.

From traditional to technological

Traditionally, power has been generated centrally by highly-regulated vertically-integrated utilities whose main mission has been safe, affordable and reliable power. Sources were mostly fossil fuels, such as coal and gas, but also hydro and nuclear. The flow has been one-way, delivered via the transmission and distribution networks to passive rate-payers.

But there are likely to be more changes in the next ten years than there have been in the previous 100 as the grid is made 'smart'. Traditional power generation, renewable generation, distribution points and users will all integrate into a system that has a high level of automation with a two-way flow of electricity and information, thanks to advanced communication and digital technologies.¹ See Figure B.

Figure B. Changes in the power market



Source: Deloitte

A multi-decade transition

The transformation to an efficient, distributed and flexible energy system that encompasses smart grids, smart buildings and smart transport will be many decades in the making.

We are still in the early days of transition. There already exists a certain level of connectivity, through the deployment of millions of connected devices such as smart meters, demand response thermostats and smart street lights. But the energy system of the future will need to encompass a lot more.



Deploy distributed generation and microgeneration

New investment in distributed energy resources (DER), where energy is generated closer to the point of consumption, surged from US\$46bn in 2004 to US\$279bn in 2017.²

They are predominantly renewable: solar, wind, hydro, biomass, waste-to-energy, fuel cells and geothermal. They can also include small-scale storage and internal combustion generators. They are smaller, modular and more flexible than traditional large-scale centralised generation. When combined with storage, they can serve as micro-grids, either connecting to the low-voltage section of the grid through local distribution networks, or operating independently as self-contained 'island grids'. The improving cost profile, combined with new financing models, means that consumers are opting over time to install these systems in their homes or communities. Their smaller size means less investment, less margin for error, and more scope for 'future-proofing' the technology. Regulatory changes are also helping to create demand, such as the state of California's mandate that all new builds should have solar.³

This burgeoning industry of 'behind-the-meter' onsite generation is one of the fastest growing areas in the energy sector. Investment in behind-the-meter storage is expected to climb from 3.7GW in 2018 to 29GW by 2025.⁴

Yet a power system that includes a greater number of players and relies much more on intermittent renewables will be a lot harder to manage in terms of resilience and reliability.



Adopt connected technologies

Increasing levels of digitisation will help integrate activities and facilitate new ways of buying and selling energy.

More and more devices are embedded with sensors and controls, enabling information to flow continuously between the physical and digital worlds as machines 'talk' to each other. Those tasked with managing or regulating such systems can gain detailed data from these devices to optimise the operation of the entire process.

The smart grid transformation can be seen as one massive IT project.⁵

The advanced communication and distribution technologies that will make grids 'smart' include but are not limited to:

- Private LTE and 5G
- Advanced metering equipment
- Artificial intelligence (AI): analytics and machine learning
- A big data platform with cloud computing
- An asset performance management solution that includes distributed energy resources
- Cybersecurity
- Robotics and visualisation technologies
- Blockchain
- Edge capabilities such as bi-directional connectors for energy and information, remote management, data storage and computing.

See *Deloitte's Digital Innovation: Creating the Utility of the Future* for more details.



Expand energy efficiency

Energy efficiency programmes that use smart technologies provide a significant opportunity for achieving decarbonisation goals. Energy efficiency is one of the main policy pillars in the European Union's fourth energy package, launched in 2017.⁶ Particular emphasis is on improving energy performance in buildings, which accounts for 40 per cent of final energy consumption in Europe and 36 per cent of greenhouse gas emissions. To meet the Paris Agreement targets, energy consumption by buildings will have to fall by 75 per cent.

The digitisation of buildings is not yet far advanced, compared to assets like cars and factories, but it is set to grow extensively. The future market for Internet of Things-connected products for smart buildings and homes is estimated at US\$100bn.⁷



Install utility-scale storage

Developments in the market for stationary storage will be a game-changer for development of the grid. With the increasing use of renewables there is much greater load variability and potential for grid instability. Large-scale storage offsets this, through load levelling, frequency regulation and renewables integration. It is also used for voltage support and price arbitrage. And it is often more cost-effective to support substations than build new ones.

Large-scale storage, which has been provided predominantly by pumped hydro, is set to incorporate many more stationary batteries. The total amount of grid-scale storage globally was about 170GW in 2017. Batteries made up just 4GW, but this is set to grow to around 100GW by 2030, due largely to falling costs. Technological improvements, higher battery density and economies of scale are resulting in much lower prices, and this should make storage comparable in cost to gas-fired peaker plants by 2030.



Embrace new market participants

More decentralised energy resources will mean that more individuals, networked groups and energy communities will be capable of generating and sharing their own energy. With increased transparency, choice and flexibility, consumers will be able to participate actively in energy markets, by generating, storing and selling, as well as consuming electricity.



Harness big data and visibility

The new technologies will create real-time data flows that enable participants, from generators down to consumers, to make sense of what is happening. Big data will enable system operators to balance energy flows. For example, they can use weather information to forecast changes in wind and solar generation, by location. Power generators can analyse resource use to improve asset management. Suppliers can make better predictions of consumer behaviour and preferences. And consumers can opt for more environmentally-friendly energy sources, or investigate a range of sources to get the best prices, buying energy when rates are cheaper, then storing for future use when rates are higher.



Develop local energy markets

The integration of a much wider array of distributed resources, and the growth in technologies that enable real-time views of supply and demand, will enable prosumers to offer generation, demand and storage anywhere, not just back to the grid, via secure trading platforms. More flexibility and speed will be needed to match supply with demand at an appropriate price point. The current half-hourly energy trading system seen in many markets, designed for traditional large-scale generation, will need to transmit information at much shorter intervals, such as every five minutes or every minute.

The rise of many-to-many markets

As energy is increasingly produced and consumed in local, decentralised markets, it will start to resemble other peer-to-peer markets—think eBay, Airbnb or Funding Circle. Technology is helping to bypass top-down supply, and create platforms that can manage and monetise spare capacity in the system, through the leasing and trading of assets and outputs.

Spare capacity currently exists in many locations in the energy infrastructure, from generation created by rooftop PV and on-site generation, through to demand side management. Eventually it will also include electric vehicle (EV) storage, when vehicle-to-grid becomes widespread. The ability to match supply and demand means that grid operators can do more with less, so capacity effectively expands. Less energy travelling shorter distances will also create capacity in high-voltage transmission lines.

It takes a village

These developments will play out at national, regional and local levels. A number of cities, precincts and regions are seeking to produce, supply and manage the local delivery of decentralised energy to a 'whole site' development. Examples include a peer-to-peer platform in the Brooklyn Microgrid in the US,⁸ Horizon Power's DER pilot in the Pilbara region of Australia,⁹ Samsø Island's total renewable self-sufficiency in Denmark,¹⁰ and Simris in Sweden, where a local energy system is pilot-funded by the European Union.¹¹

Community solar or smaller community-based energy networks are part of a growing trend, because renewable micro-grids can be cleaner, more affordable and more reliable than a centralised grid, particularly in more remote areas.

Electricity networks are perhaps the most appropriate platform on which to start building a smart city, connecting to every house, street, public area and, eventually, means of transport. The economy is digitising, and almost everything digital is electric. Electricity infrastructure can also connect smart features in other systems: smart street lights can also house EV chargers, ANPR or video cameras, wifi/5G and sensors. In the US alone, over 60 cities are involved in using their electricity networks to build smart cities.¹² A Deloitte report, *Renewables (em)power smart cities*, has studied how some cities are creating a renewable platform as a springboard for larger smart city implementations. The challenge will be how to get electricity companies to work together with corporations and citizens to create such cities.

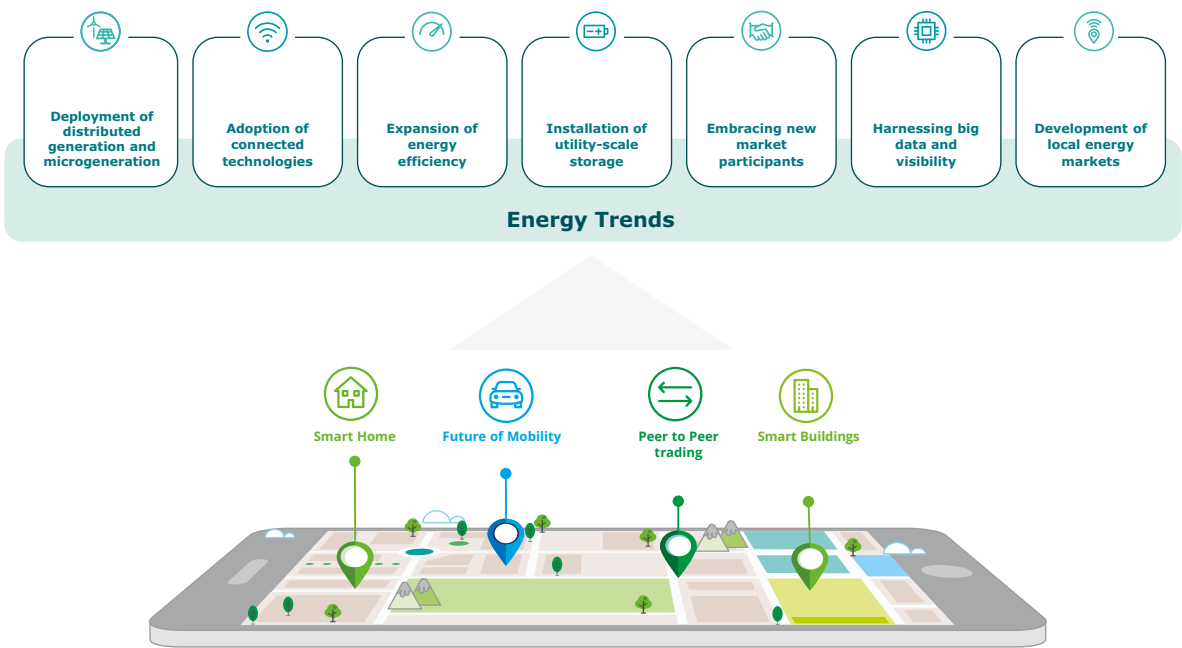
The inherent complexity of a system that needs to integrate growing amounts of distributed energy resources on the transmission and distribution side, and facilitate the many-to-many markets on the retail side, will create an opportunity for an overall orchestrator. At grid level, this could be a neutral facilitator of open and competitive markets where third parties can buy/sell from the system. At a neighbourhood level, it could be an aggregator that clusters a number of smart buildings or campuses into a virtual power plant, links to the distribution system operator (DSO), and provides layers of load balancing and control. And at a retail level it could be a service provider that helps a commercial or industrial client meet its objectives and requirements around energy supply, energy efficiency, backup or resiliency needs, and renewable or carbon reduction goals—all for a fixed monthly payment.

A word on central generation

Historically the grid was built out from the ‘bottom-up’. Local electrical and gas companies started off in cities and over time were connected through high voltage transmission lines and high pressure pipelines. This ‘centralisation’ served three purposes. It removed polluting power stations from city environments; it enabled large-scale energy resources to be utilised, such as hydro plants and gas storage, even if located far from demand centres; and high voltage transmission lines enabled regions or countries to be interconnected, to trade power as and when needed.

The regional decentralised energy systems that are now emerging will require coordination. The incorporation of intermittent energy sources will make the system more fragile; but increasing digitisation in the economy and society means that a reliable electricity supply will be vitally important.

Thus, a need will probably remain for a national or regional system operators in the public domain. System operators (often, a utility) have visibility over the entire network, to balance supply and demand. They would also ensure electricity security, which is considered a public good.





X-as-a-Service comes to energy

Energy-as-a-Service (EaaS) is an innovative business model for providing bundled energy services, propelled by technological and financial developments.

What is X-as-a-Service?

X-as-a-Service is a delivery model for diverse solutions that combine hardware, software and services. Value is generated by bundling into a single offering the various elements that are usually sold separately.¹³ There are several distinctive features.



It is sold on a subscription basis

The customer pays for an all-inclusive package, and not per unit consumed. Corporate customers benefit from predictable subscription payments rather than making 'lumpy' asset purchases, or incurring capital expenditure.



It is output-based

The customer pays for the output of the asset (when it works), not for the asset itself, nor for the parts, repairs and servicing required to maintain it. The customer pays only for what it consumes, and the service (or equipment) provider is motivated to reduce downtime and provide assets that perform well. The best known example of performance-based contracting is the Power by the Hour service that Rolls-Royce pioneered for its engines. This arrangement aligns the incentives of buyer and seller.



Service providers fund the upfront costs

All project costs, including equipment, construction, operations, monitoring and maintenance, are the responsibility of the service provider. Examples of this type of contract are the Philips/WMATA lighting-as-a-service in Washington DC, and US Department of Defense contracts for facilities maintenance, modernisation and energy supply.¹⁴



It is data-driven

Advances in digital technologies enable a level of monitoring and operational performance that was not previously possible. Thanks to sensors and other smart assets, the service provider can collect a wide range of data across multiple parameters, and monitor in real-time and 24 hours a day. Information flows continuously between the physical and digital world. Products can be tracked from source to customer, or while they are in use, enabling fast responses to internal and external changes. Figure C shows some examples.

Figure C. Examples of X-as-a-Service contract types

Software as a Service (SaaS) is a software delivery model in which software is licensed on a subscription basis and is centrally hosted. SaaS has become a common delivery model for many business applications.

Lighting as a Service (LaaS) is a service delivery model in which a lighting service is charged on a subscription basis rather than via a one-time payment. This business model has become more common in commercial and city-wide installations of LED lights, specifically in retrofitting buildings and outdoor facilities, with the aim of reducing installation costs. Lighting vendors have used a LaaS strategy to sell value-added services, such as Internet-connected lighting and energy management.

Mobility-as-a-Service (MaaS) describes a shift away from personally-owned modes of transportation and towards mobility solutions that are consumed as a service. This is enabled by combining services from public and private transportation providers through a unified gateway that creates and manages the trip, which users can pay for with a single account. Users can pay per trip or a monthly fee for a limited distance. The key concept behind MaaS is to offer travellers mobility solutions based on their travel needs.

Source: Deloitte

EaaS makes use of traditional arrangements such as energy performance contracts (EPCs), energy supply contracts (ESCs) and power purchase agreements (PPAs), and employs alternative new models that lower or eliminate upfront costs around funding, owning and operating capital-intensive energy generation and storage systems. Solutions range at one end from grid-level aggregation and management, to home or campus energy management, EV charging packages and peer-to-peer energy trading at the other end.

In the beginning, there was ESCO

Energy has always been sold as a service. Consumers don't buy electrons: they buy heating, cooling, lighting, cooking and freezing services that can be provided by equipment that uses electricity. Electricity consumption in effect is the consumption of energy services.

With the drive towards energy efficiency in recent years, energy service companies (ESCOs) have been providing solutions that cover both supply and demand management. It is a big market globally, growing by 11 per cent in 2017 to US\$28.6bn.¹⁵

The primary purpose has been to reduce energy costs of buildings, through measures such as energy audits; project design and implementation; maintenance and overhaul; retrofits for energy

efficiency; monitoring and evaluation of savings; and energy and equipment supply. The premise of the service is based on energy performance contracting (EPC), where improvements to physical plant and energy use are funded through cost reductions. As a specialist provider, the ESCO implements a project and uses the income from the cost savings or energy produced to recover its investment and any project expenses.

The ESCO takes on the technical risks by guaranteeing specified performance improvements. In effect the ESCO does not receive payment unless the project delivers the expected energy savings or services. Any equipment procured, such as backup generators, rooftop solar, combined heat and power systems, or lighting control systems, is owned by the customer.

Innovative financing methods can help customers pay for the upfront investment, through loans, capital leases or bond issuance. In some cases, projects create special purpose vehicles to avoid holding assets on their balance sheets. EPC arrangements can benefit cash-poor yet creditworthy customers that lack the energy engineering skills, capital and other resources to make their own arrangements.¹⁶ Most deployments are in large buildings, and the biggest customers tend to be government facilities, universities/schools and hospitals, and for street lighting.¹⁷

Figure D. ESCO versus EaaS

	ESCO	EaaS
Capital investment by customer	Sometimes	No
Ownership of equipment by customer	Often yes	Often no
Off-balance sheet financing	No	Yes
Performance risk borne by customer	Sometimes	No
Flexibility to add retrofit during contract period	Difficult	Yes
Scalability	No	Yes
Term of contract	10-20 years	5-20 years

Source: ACEEE 'Energy as a Service', 2019 and Deloitte

The evolution into Energy-as-a-Service

Energy-as-a-Service is different from ESCO offerings in several respects. Currently its target customers are owners of commercial and industrial buildings. The service provider is responsible for all the capital investment in the project, and owns and manages the equipment on behalf of the customer. In EaaS, customers are not committed to a specific piece or type of technology as all upgrades over the course of the contract are funded by the provider. Figure D summarises the main differences.

With the emergence of renewable energy generation and energy efficiency deployments a range of specialist financial products and investors has emerged to cater to this growing market, such as Sustainable Development Capital LLC in the UK, Hannon Armstrong, Sparkfund in the US, and SUSI Partners in Switzerland.

The solution: Supply + demand + balancing

EaaS offers demand management and energy efficiency services, facilitates adoption of renewables and other decentralised supply sources, and also optimises the balance between demand and supply. This requires a higher level of digital technologies and analytics than with ESCO contracts. The ability to link multiple sites in a bundled service package means that EaaS can also work on a much larger scale.

EaaS can include on- and off-site energy supply solutions, including PPAs, and energy storage and management. It will also involve strategic guidance across procurement, financing, operations and maintenance of the customer's entire energy portfolio. On the demand side there will be traditional energy efficiency services, and load-balancing to link the distributed resources and demand response.

As transactive energy markets develop, offerings will include platforms that facilitate P2P trading, wholesale contracts, renewable energy certificate (REC) tracking, and broader distributed payment management.

See Figure E.

Figure E. Energy-as-a-Service offerings

 Application	 Service	 Technology	Examples
Energy Supply	Ancillary Services	Platform	Distributed energy resource interconnection portal, transactive energy
	Energy Storage	Batteries Power-to-anything (P2X)	Microgrid, residential and commercial energy storage
Energy Transition Enabler	Distributed Generation	Renewables	Solar, wind, fuel cell, combined heat and power (CHP), etc.
	Energy Load Balancing	Front-end algorithm	Monitoring and load management services
Energy (Demand) Optimisation	Energy Savings	Smart meter	Demand response, building energy management, advanced metering services, energy efficiency
	External Supply Optimisation	Software app	P2P trading, real-time pricing

Source: Deloitte

Benefits for the customer

The chief benefit is in the simplification of an increasingly multifaceted service offering. All aspects of ownership, software, analytics, and operations & maintenance are kept ‘behind the curtain’. It is also tailored to customers’ specific needs.

Energy management is not a core competency for many organisations. Microgrids and sophisticated tools to manage distributed energy resources are costly and complex. Many firms that are keen to benefit from such equipment may not necessarily want to own the assets themselves. With an EaaS contract, customers can avoid the need to stay on top of the technology by selecting vendors that provide design, installation, maintenance and performance management services. The responsibility shifts to the service provider. Figure F illustrates how a contract works.

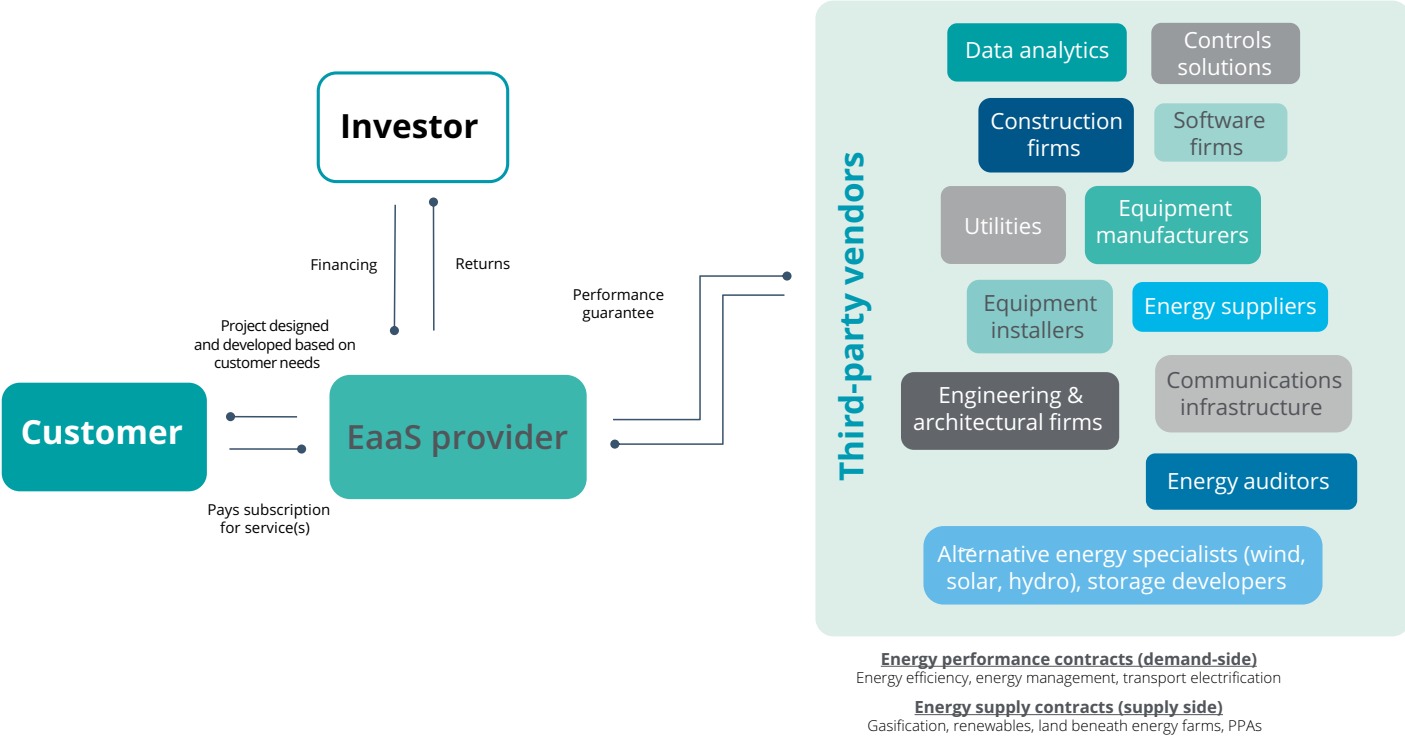
The EaaS market builds on ESCO services, but includes a wider range of energy supply options, and integrates and manages them across multiple sites through digital technologies. Navigant estimates that commercial and industrial sectors will be the early adopters in this market, estimated to be worth US\$221bn by 2026.¹⁸ See Figure G.

Figure G. Global commercial and industrial EaaS market by value



Source: Navigant

Figure F. How an Energy-as-a-Service contract works



Source: ACEEE, Deloitte



Players and potential outcomes

Companies will need to determine what capabilities they have, what they need, what alliances they should form, and what their role should be.

The physical, digital and communications infrastructure required means that a range of players can participate in the EaaS market. To do so, they must bring together the following capabilities: technology, data, energy systems, wire and non-wire infrastructure, devices, and commercial understanding of output-based or performance contracting.

Major players: A mix of incumbents and new

Large international control equipment companies and electricity companies are already developing EaaS propositions; and telecommunications companies, technology companies and oil and gas majors, among others, are capitalising on their specific strengths to offer services in energy platforms. Before long, larger renewable developers are likely to join in as well.

The market is at such an early stage of development that companies looking to offer EaaS will need to form partnerships and collaborate to provide a full range of capabilities. Over time, competition is likely to intensify in specific segments; and as providers develop expertise in their segment, we will see horizontal and vertical consolidation of players, through mergers and acquisitions. Figure H lists some of the current and expected players in EaaS solutions.



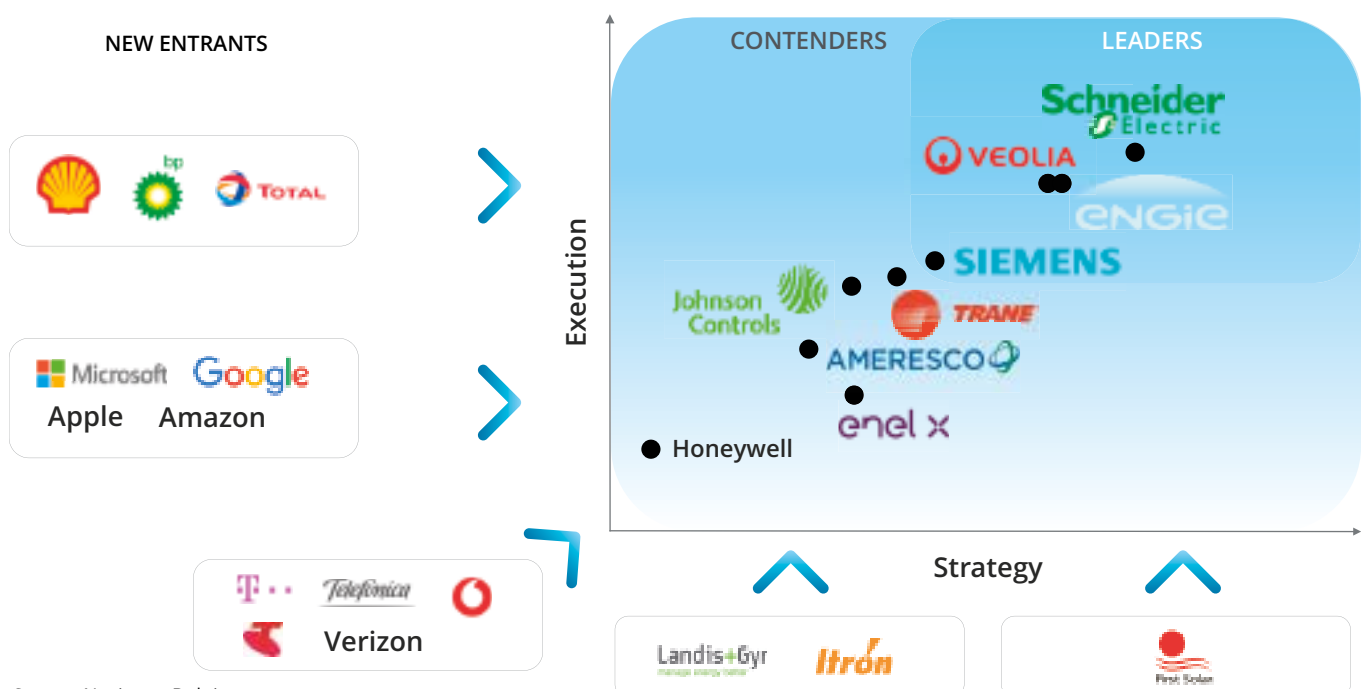
Utilities

Utilities have a natural advantage in this space: long experience of owning and operating the essential physical assets. They now face pressure to adapt their business models and develop strong capabilities in digital technologies, offer cleaner and greener energy options, and work with a range of partners to construct and deliver winning customer propositions. These new models will require agile and innovative approaches.

French utility Engie has been expanding its service offering thanks to a series of acquisitions: commercial storage with Green Charge Networks; PPA facilitator OpTerra Energy Services; electric vehicle charging network EVBox; solar developer SoCore Energy; and energy services company Ecova.¹⁹

Utilities recognise the need to manage change successfully. Failure to adapt adequately to digital and distributed energy resources, or to improve their connection to energy consumers, may erode their advantages over time as new, nimbler competitors enter the market.

Figure H. Players in EaaS solutions



Source: Navigant, Deloitte



Industrial companies

Large industrial manufacturers with strong businesses in power electronics, energy management systems, energy storage systems or advanced metering and control devices are also in EaaS. They include major ESCOs such as Johnson Controls, Honeywell, Trane, Siemens, and Schneider Electric. Their ability to link discrete systems through automation gives them a powerful advantage. Other niche providers are moving into the business. AMI vendors Landis+Gyr and Itron are partnering with a range of companies to offer behind-the-meter energy monitoring and control devices, and are building out their data analytics capabilities to support these efforts.²⁰ Landis+Gyr has also been selling Smart Grid as a Service (SGaaS) to clients, including big utilities.²¹



Tech companies

Many of the big tech companies have begun to offer services in specific segments. Their familiarity with the communications and IT layers, together with their ability to move quickly, higher risk appetite and deep pockets, means that they can become serious contenders, even if they are not yet noticeably active. By purchasing or partnering with other companies, they could put together a range of propositions.

Google has already made a number of moves into smart devices and energy. Its Nest brand sells smart home products, such as thermostats, smoke detectors, and security systems.²² It recently partnered with Leap to sell energy back to the grid.²³ Google Energy (now part of Google Environment) produces and sells energy and in 2010 was granted permission by the US government to trade energy at market rates.²⁴ And its Deep Mind AI is being used to optimise the delivery of power from wind farms.²⁵



Oil & gas majors

The big integrated oil & gas majors are moving into electricity generation as they seek out new lines of business to offset the expected slowdown in demand for their oil and gas businesses. Like the tech companies, they have deep pockets, and can apply their capabilities and extensive retail infrastructure to the provision of mobile power, especially around transport. By acquiring a number of smaller specialist players, the big oil & gas firms could also construct a broader service offering.

Shell has already announced its intention to become the world's largest electricity company by the 2030s.²⁶ To that end, it has made a number of acquisitions: it purchased UK independent supplier First Utility and New Motion, one of Europe's largest electric vehicle charging networks, at the end of 2017,²⁷ and German residential solar battery maker Sonnen and demand aggregator LimeJump at the start of 2019.²⁸



Specialist DER providers

Solar developers such as SunPower and SunRun are growing their capabilities in putting together packages for residential and business clients. As solar and storage are combined for utility-scale generation, the larger providers might look to develop alternative business lines.

Distributed energy resources will eventually be so prevalent as to become commoditised. Margins on specific technologies (rooftop, solar, storage) will decline, so building a sustainable business in any specific sector will become difficult except for companies that operate at scale. Ownership of the assets will be dispersed among customers, companies and communities, so service providers that can develop and manage large projects will be best placed to capitalise on this growing market.



Telcos

Telcos see an opportunity in the emerging smart landscape to leverage their existing relationships with customers, and their capabilities in data collection and processing. Many are bundling their mobile, broadband and ICT services into IoT packages using wifi, cloud, antenna and blockchain. Deutsche Telekom²⁹ and Telstra³⁰ have developed energy-focused offerings. Verizon has developed a cloud-based energy platform, Grid Wide Utility Solutions.³¹ Others, such as Telia,³² Telefonica³³ and Vodafone³⁴ are actively piloting and partnering in the home automation and smart meter markets.



Start-ups

The rapid innovation that has helped drive the development of Energy-as-a-Service is attributable in no small part to the legions of start-ups active in this space. For example, aggregation platforms not only collect the distributed supply of a multitude of prosumers; they also help balance loads and monitor and optimise voltage and frequency within the grid.

As the technologies mature, many of the most prominent start-ups will become acquisition targets. Software is in demand from more established hardware manufacturers with well-established products, that are seeking newer technology and platforms that connect into a more sophisticated service. For example, aggregator LimeJump was sold to Shell; REStore is now part of Centrica Business Solutions; and EnerNOC is now Enel X.

Four scenarios for the future

The future development of the Energy-as-a-Service market, in terms of speed and scope, will depend on the interplay of a number of factors: technological, economic and environmental developments; consumer and societal shifts; and political and regulatory responses.

Figure I sets out four possible scenarios that may emerge, depending on who holds the balance of power, and how widely technological advances take root.



The Energy-as-a-Service platform provider

Incumbents have the upper hand in the market, thanks to developing deep capabilities in all digital technologies (including cloud, AI, data analytics, blockchain and robotics) and distributed energy resources. They use their strengths in managing intricate energy systems to offer a range of bespoke, flexible solutions to customers. They set the standards for product integration across the industrial, commercial, residential, transport and trading sectors for energy. Their detailed knowledge of customers' preferences and energy portfolios enables them to tailor additional services to meet demand.



Stagnant utility company

Here, incumbents effectively 'capture' government policy-making and regulatory regimes to block changes to business models, by preventing or slowing access for new entrants, or new services to the market.



The fallen giant

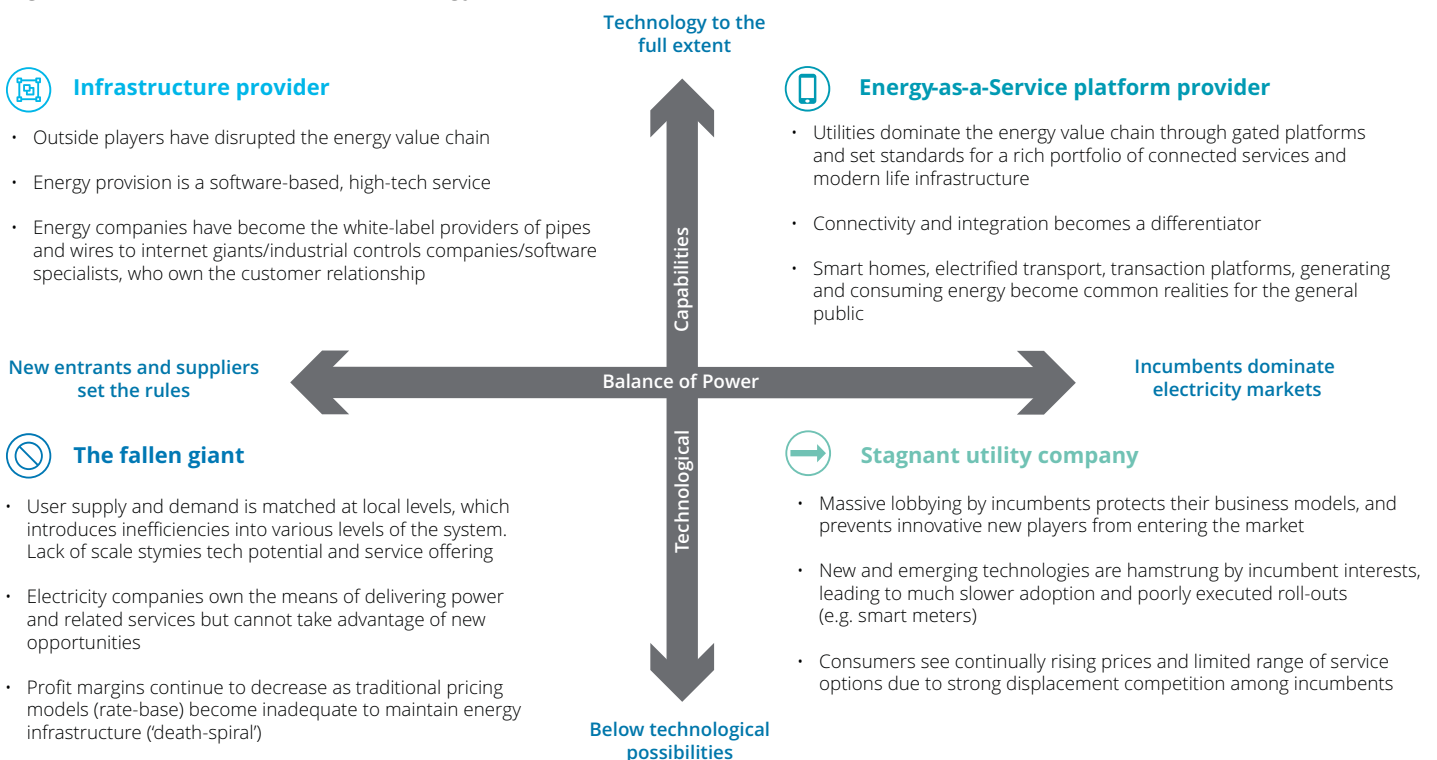
Consumers switch in larger numbers to behind-the-meter solutions. Energy is generated and traded locally, with community-level aggregation, resulting in inefficiencies at various levels of the system. The lack of scale inhibits the spread of technology and creates a so-called 'death spiral' for incumbents, where declining customer numbers mean falling revenues that are inadequate to maintain the infrastructure, much less prepare it for a higher level of services. Energy companies are reduced to providing a bare minimum of power services.



Infrastructure provider

In this fourth scenario, new entrants (large industrial conglomerates, oil & gas majors, tech companies, etc.) disrupt the value chain. Digital and communications technologies are essential for providing a wide-ranging menu of integrated services. Incumbents are reduced to providing basic transmission and distribution services, and some billing.

Figure I: Potential scenarios in the energy future



Source: Deloitte



Getting to EaaS

The transformation of a company's energy offerings should follow external market developments and expansion of internal capability.

Three global trends and macro-level shifts are affecting all players in the energy markets: decarbonisation and the need to produce energy from cleaner and greener sources; decentralisation, involving advances in energy technologies that are smaller in scale, modular and cost-effective at micro levels; and digitisation that makes 'intelligent' connections between people, places and assets, amplified by the spread of automation and artificial intelligence.

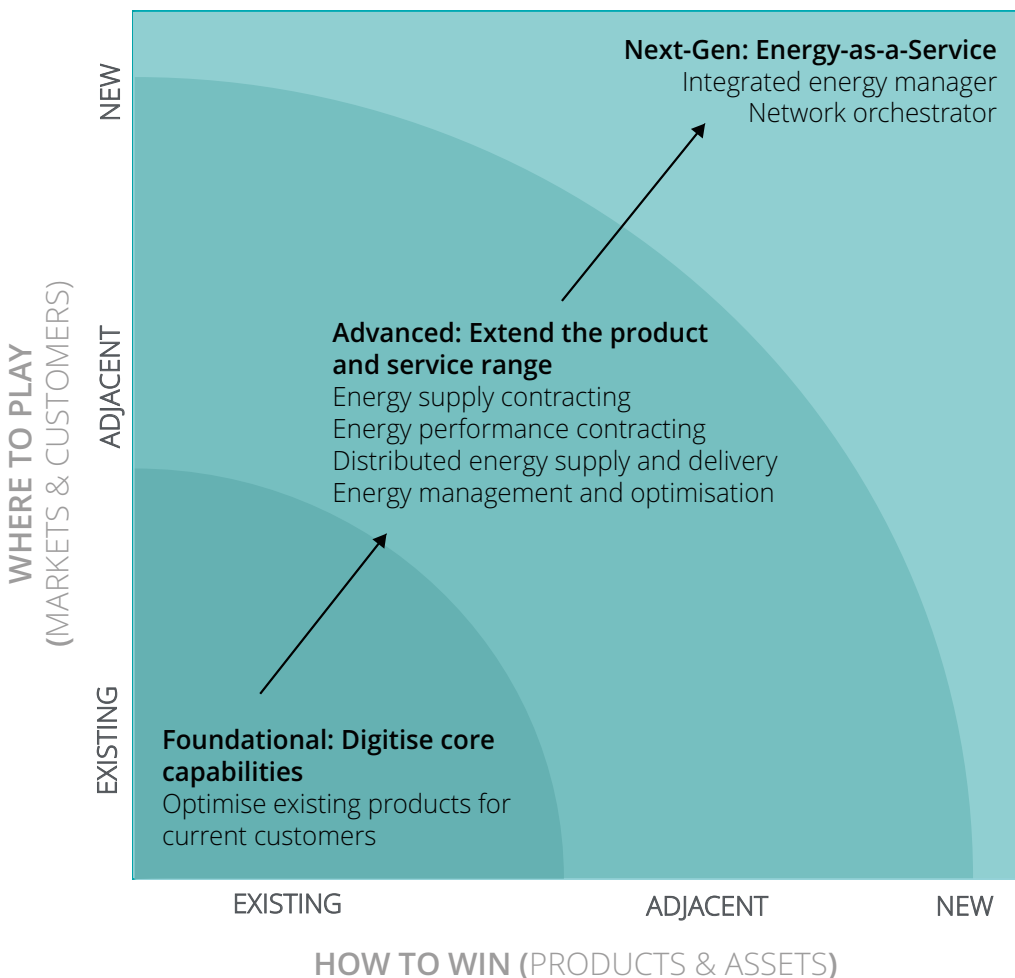
Business models will need to change, in some cases quite significantly, to keep pace in the 'new normal'. So how can companies prepare themselves for this *Future of Energy*? Figure J maps out the transition over time.

Foundational: Digitise core capabilities

Companies will need sophisticated digital capabilities to deliver EaaS, so the first steps should be to develop them. Essential building blocks are process automation, asset analytics and field mobility applications.

Companies should expand into a limited number of new business lines that track broader market developments. This can include smart grid investments, transactive energy exchanges, and embedded digital technologies in all physical assets.

Figure J. Evolution towards Energy-as-a-Service



Source: Deloitte

Analysing the data generated by the digital transformation will be essential to managing EaaS successfully. On the network side, data and software platforms can aggregate DERs and orchestrate their usage at the grid edge. On the retail side, the ability to deliver a complete customer service—a thorough audit, monitoring and understanding of customer behaviours and energy use over time, and pricing the service appropriately—will be key.

Advanced: Extend the product and service range

In the next phase of evolution, companies should reinvent themselves as platform players, getting better at using data and applying it at speed. Depending on which part of the market they are operating in—generation, distribution or retail—the next steps should be to branch out into a wider range of services. As value shifts away from centralised energy generation and delivery, this should include distribution platforms that help integrate into the grid the growing amounts of behind-the-meter distributed energy resources. Platforms should enable energy and transaction management, operations and maintenance, and optimisation of all appliances and devices.

External ecosystems of suppliers and partners will be required to deliver the extended range of value-added services and products. Companies should begin to expand their portfolio of offerings to include energy supply, large-scale storage, demand management and energy efficiency initiatives, as well as overall balancing with the grid.

Next-Gen: Provide total energy solutions

At this point in the company's evolution, a large proportion of revenue should be derived from EaaS offerings. By now smart devices will be embedded in public infrastructure, buildings and transport. Universal communications will enable instantaneous exchange of data, and multi-sided markets will exist to buy and sell energy. Transport will be largely electrified, with mobile power supply and demand.

The most value-added opportunities will be in new or combined services that foster customer loyalty and realise high margins due to the tailored, end-to-end nature of the solutions they provide.



CONCLUSION

All these developments may seem very 'space-age' and far away, but they are already happening. Smart buildings are being constructed and groupings of them are developing into smart places—automated, integrated and sustainable precincts—that manage supply and demand not just for energy, but for a range of systems in one networked whole. Over time, these will evolve into smart cities and regions.

The energy infrastructure in the future will be very different from today, with new players, new products, and new customer preferences. EaaS service providers will take information on energy supply, demand and prices, and overlay it with other data points, such as weather conditions, building occupancy, and current traffic conditions, to manage smart places as a dynamic portfolio of products and services.

The same trends that have disrupted retail, transport and consumer electronics are coming to energy markets: digital technologies driving disintermediation, and the rise of many-to-many markets trading over peer-to-peer platforms.

Companies should identify the opportunities they can exploit, the capabilities they will need to do this, and what market segments have the greatest potential to drive their future growth.

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CORPORATE POLICY & PROCEDURE

POLICY TITLE: ELECTRIC VEHICLE CHARGING
POLICY NO.: CS-5.07-P

Chapter:	Corporate Services		
Section:	5. Property and Risk Management		
Effective Date:	December 1, 2019	Last Review Date:	November 12, 2019
Approval Authority:	Chief Executive Officer		
Issued to:	All TRCA Employees		
Policy Owner:	Property and Risk Management		

1. PURPOSE

- 1.01. The purpose of this Statement of Policy and Procedure is to establish and promote the standards and best practices for the use of and or the installation of electric vehicle charging infrastructure equipment at Toronto and Region Conservation Authority (TRCA) facilities, ensuring optimum usage to assist in a reduction of fuel consumption and associated reductions in environmental impact. Workplace EV charging supports Corporate Sustainability goals and or targets, in addition EV charging at TRCA facilities indirectly supports EV adoption within the communities served by TRCA.
- 1.02. This Statement of Policy and Procedure is intended to improve TRCA alignment with Canada Revenue Agency guidelines.

2. SCOPE

- 2.01. This policy applies to all employees using EV charging stations while working for TRCA, whether the EVs are personally owned or TRCA fleet vehicles, in addition to visitors and or guests of TRCA administrative facilities and Conservation Parks.
- 2.02. While TRCA supports the adoption of EVs on a wide scale TRCA is not in the business of providing fuel for the operation of vehicles and equipment outside of TRCA owned/rented or operated vehicles and equipment. However, third parties may use TRCA charging stations in compliance with this policy.

3. POLICY

- 3.01. With Electric Vehicles (EV) becoming more widely adopted and approaching the prominent choice of vehicle selection of alternative fueled vehicles, Toronto and Region Conservation Authority (TRCA) recognizes the importance of EVs in

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contributing to the improvement of local air quality, a reduction of greenhouse gasses which cause climate change and reductions in operating and maintenance costs.

- 3.02. Where feasible and funding is available TRCA will install EV charging stations to support its own Fleet and will allow both staff and third parties to charge their personal vehicles as per the conditions of this policy.

4. RESPONSIBILITY

- 4.01. **Information Technology and Records Management** business unit is responsible for:

(a) The participation in the contract review process with the service provider if the charging stations services will utilize TRCA-operated technology infrastructure (e.g. network or Internet services); the administration of the charging provider's cloud-based service management portal as required.

- 4.02. **Project Management Office** business unit is responsible for:

(a) Assisting Facility Supervisors regarding feasibility assessments and recommendations in addition to the facilitation, coordination and management of implementation of contracts for the supply and installation of EV charging infrastructure.

- 4.03. **Corporate Sustainability and Community Transformation** business unit is responsible for:

(a) Collaborating with Program Manager, Fleet regarding sustainability targets, data analysis and progress reporting;
(b) Developing and submitting of applications for various grants and incentives related to the implementation of EV charging infrastructure within TRCA facilities.

- 4.04. **Program Manager, Fleet** is responsible for:

(a) Oversight all of the EV charging infrastructure within TRCA facilities;
(b) The inventory of all EV charging stations within TRCA facilities;
(c) The inventory and management of user groupings within cloud-based management system of charging stations;
(d) Liaising with Facility Supervisors regarding the feasibility including operating and maintenance associated with EV charging infrastructure;
(e) Coordinating the contract review process and service management portal administration with Information Technology and Records Management as required; and
(f) Collection, interpretation and management of data records collected from networked charging stations, and collaboration with Corporate Sustainability and Community Transformation regarding sustainability progress.

- 4.05. **Employees** are responsible for ensuring that electric vehicle charging systems are used/optimized in accordance with this policy and procedure.

- 4.06. On advice of the Chief Executive Officer, TRCA may accept, revise or rescind this policy.

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5. PROCEDURE

Electric Vehicle Charging Infrastructure

- 5.01. EV charging at any TRCA facility is permissible at dedicated EV Charging Stations only. At no time is it permissible to charge an EV by plugging a vehicle, with any 'adaptor' charging cords, to standard 110v or 240v outlet.
- 5.02. The use of adapters to allow the J1772 plug to connect to other EV charging ports is permissible. TRCA will not stock adapters for alternative charging port connections.
- 5.03. Additional charging infrastructure differing from that outlined in section 5 may be required from time to time, to facilitate the charging of electrically powered equipment which may have different charging connections
- 5.04. Electric vehicle charging stations installed at TRCA facilities should be at minimum a Level 2 station supported by 'cloud' based operating system allowing for management of the station operating system.
- 5.05. Level 3 (DC Quick Charge) stations can be installed at TRCA facilities where practical and operating on a similar 'cloud' based service management portal as that of currently installed Level 2 stations.
- 5.06. Facility supervisors must consult with the Program Manager, Fleet along with the Project Management Office prior to installation, to assess feasibility and determine recommendations for charging stations.
- 5.07. Staff should consult with their facility supervisor regarding the desire for EV charging station installation at their respective facility.
- 5.08. Charging stations should be installed in locations at TRCA facilities which are accessible to all users including TRCA fleet vehicles, personal vehicles used on extended TRCA business and that of visitors and guests to TRCA facilities.
- 5.09. Preference should be made for 'dual wand' EV chargers over 'single wand' charging stations.
- 5.10. Any EV charger installed at TRCA facilities shall have the capacity of network management where practical.

General

- 5.11. Charging cords are not to be removed from another vehicle which it is plugged into without the owner's explicit consent.
- 5.12. EV owners are responsible to move their vehicle from the charging stall after their vehicle has sufficiently charged and relocate to an available parking stall at the facility to allow usage by other EV drivers and ensure optimum utilization.

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- 5.13. At no time is it permissible for an EV to park in a charging stall when the vehicle is not actively charging, additionally it is not permissible for an ICE vehicle to park in a charging stall.
- 5.14. EV charging stalls are to be solely used for charging vehicles and not that of a 'preferred parking' location.
- 5.15. Charging stalls are to be clearly identified through signage and markings (asphalt painting) where applicable.
- 5.16. Employees with personal EVs will be allowed to charge their vehicles during regular business hours.
- 5.17. TRCA staff must consult with Program Manager, Fleet regarding procedures for charging of personal vehicles.

Charging Costs

- 5.18. In order to ensure the charging stations are in operating condition for all users', fees will apply on a time per use basis (per hour).
- 5.19. These fees are intended to cover the related capital and operating costs including capital depreciation, utility, software and administrative costs of the charging stations.
- 5.20. These fees may be subject to a cost of living adjustment to account for increasing costs associated with new equipment, and adjustment of operating costs as required.
- 5.21. TRCA charging station authorization cards or keys may not be used to initialize charging of personal or privately-owned vehicles. Owners are responsible for any costs associated with use of TRCA charging stations.
- 5.22. A plugged in EV will continue to be charged posted per hour cost until it is disconnected from the charging station by its owner.
- 5.23. Charging fees will be posted on the charging stations themselves and will be adjusted by Program Manager Fleet on a quarterly or as needed basis.
- 5.24. TRCA Fleet vehicles may not be subject to electricity costs.

EV User	Access Priority	Time Limits	Cost
TRCA Vehicles	1 st	None	Per hour cost
Visitors (Business)	2 nd	Regular business hours	Per hour cost
Visitors (Guest)	3 rd	Site operational hours	Per hour cost
TRCA Staff	4 th	Regular business hours	Per hour cost

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Enforcement

- 5.25. Vehicles which do not comply with this policy and procedure or charging stall signage may be removed/relocated at the owner's expense.
- 5.26. Facility Managers and the Program Manager, Fleet will be responsible to enforce this policy, and will make best efforts to notify EV owners prior to relocating a vehicle. However, if it is not possible to notify the EV owner, the EV may need to be moved without further warning at the owner's expense.

6. DEFINITIONS

- 6.01. **"Electric Vehicle"** covers all types of vehicles including but not limited to battery electric vehicles and plug-in hybrid vehicles
- 6.02. **"Battery Electric Vehicle"** means a vehicle which is solely propelled by electric motor(s) using energy stored in rechargeable storage cells (batteries)
- 6.03. **"Plug-in Hybrid Vehicle"** means a hybrid vehicle whose battery can be recharged from an external source as well as by that of the onboard engine/generator
- 6.04. **"Hybrid Vehicle"** means a vehicle with two distinct types of power supply such as a conventional internal combustion engine and the use of electric vehicle technologies i.e. regenerative braking systems
- 6.05. **"Fleet"** means any Motor Vehicle (owned, rented, leased or personal), Off-Road Vehicles, Motorized Snow Vehicles, or equipment including but not limited to landscaping, agricultural, construction, industrial and vessels used in the conduction of TRCA business.
- 6.06. **"Fuel"** means all forms of energy used to propel vehicles and equipment including but not limited to that of petroleum products, propane, natural gas, electricity and biogenic based or blended fuels i.e. biodiesel, ethanol etc.
- 6.07. **"Charging Stall"** means a piece of land serviced by a charging station, signed and marked for electric vehicle charging and is solely used for charging electric vehicles and not short or long-term parking.
- 6.08. **"Level 1 Charging"** means a method of charging an EV wherein the vehicle is plugged in to a standard wall socket receptacle. Typically recharges a vehicle at a rate of approximately 8 kms of range per hour of charging.
- 6.09. **"Level 2 Charging"** means a method of charging an EV wherein the vehicle is plugged into a dedicated EV charging station. Level 2 chargers can be installed at the EV owner's residence. It is the most common charging platform for EVs using the J1772 charging cord. Level 2 charging typically provides approximately 30 kms of range per 1 hour of charge.

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- 6.10. **“J1772”** is a North American standard for electrical connectors for electric vehicles. The connector became standard equipment in North America due to the quantity of charging stations equipped with the J1772 plugs.
- 6.11. **“Level 3 Charging (DC Quick Charge)”** is the fastest method of charging an EV commonly referred to as “DC Quick Charge”. These chargers can recharge a vehicle at a rate of approximately 250 kms of range per hour of charge. The CHAdeMO is commonly found on Level 3 Charging stations.
- 6.12. **“CHAdeMO”** is a global industry standard quick charge plug used by most German and North American auto manufacturers. Dedicated charging stations equipped with CHAdeMO charging ports can convert the AC current from the electrical grid to DC current (required by EVs) at higher levels.
- 6.13. **“Combined Charging System (CCS)”** allows AC charging using Type 1 and Type 2 connector depending on the geographical region and incorporates two additional direct Current (DC) contacts for DC fast charging at rates of up to 80 – 350 kilowatts
- 6.14. **“Parking Stall”** means a designated piece of land where staff, guests and visitors to TRCA facilities can park their vehicle for the duration of their stay.
- 6.15. **“Networked Charging Stations”** means an EV charging stations which have a cloud-based operating system/software to manage station operations remotely. Networked stations require users to have an active account with the service provider to activate stations to charge vehicles.
- 6.16. **“Internal Combustion Engine (ICE)”** means a vehicle that is powered by an Internal Combustion Engine (ICE) fueled by petroleum or biogenically based fuels i.e. gasoline, diesel, conventional hybrid vehicles etc.
- 6.17. **“Visitors”** means non TRCA staff including external stakeholders or members of the public visiting TRCA administrative facilities for meetings and or attending Conservation Parks and Outdoor Education Centers.

7. ADMINISTRATION

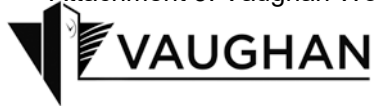
Administered by the Clerk's Office

Review Schedule:	5 Years	Next Review Date:	November 12, 2024
Supersedes:	N/A		
Related Legislation, Regulations and Guidelines:	Plug 'n Drive – Guide to EV Charging Clean Air Partnership – Creating an Effective Workplace Electric Vehicle Charging Policy		
Related Policies and Policy Tools:	CS-4.02-P Technology Access Control and User Access Management CS-4.04-P IT Passwords CS-5.04-P Fleet Safety and Driver Certification CS-5.05-P Employee Use of Vehicles for TRCA Business		

Policy Title: ELECTRIC VEHICLE CHARGING

Policy No.: CS-5.07-P

Revision History		
Version Number	Version Date	Description
1	December 1, 2019	Policy went into effect.



CITY OF VAUGHAN POLICY MANUAL

Policy No:	AD – 019
Department:	ADMINISTRATION
Subject:	WORKPLACE ELECTRIC VEHICLE CHARGING POLICY

1. BACKGROUND

In April 2009, the City of Vaughan approved *Green Directions Vaughan*, the Community Sustainability and Environmental Master Plan, which outlines several initiatives related to encouraging sustainable transportation and leadership in environmental sustainability. The City of Vaughan has an active Smart Commute program that provides incentives to employees to consider sustainable transportation choices.

2. PURPOSE

The City of Vaughan recognizes that electric vehicles contribute to improving local air quality, employee retention/attraction and enhancing the overall image of the organization with respect to sustainability.

The purpose of this policy is to:

- Provide guidance to staff driving personal Electric vehicles.
- Promote a corporate culture at the City that recognizes and places a priority on sustainability.

3. SCOPE

This policy initially applies to Vaughan City Hall employees only.

4. GENERAL

4.1 Employees with Electric Vehicles (EVs) wishing to use the workplace charging station must register with the Environmental Sustainability Office who will coordinate with Building and Facilities, Legal and Finance. Upon registration, employees will be provided with a short information session on the proper use of EV charging equipment and additional program information.

4.2 EV parking spots will be clearly delineated by appropriate signage.

4.3 Employees with EVs will be allowed usage of the charging station for up to 4 hours during the regular business hours of 8:30 AM- 4:30 PM. EVs may continue to be

Council Approval:	2015/04/21	Amended:	N/A
Report No/Item:	8/3	Report No/Item:	N/A
Cross Reference:	N/A		

Policy No:	AD – 019
Department:	ADMINISTRATION
Subject:	WORKPLACE ELECTRIC VEHICLE CHARGING POLICY

parked in the designated EV parking spots if not connected to a charging station during regular business hours.

4.4 Employees with EVs using the charging station as a registered full-time user will be charged a monthly subscription fee of \$24.27/month. This fee will be deducted as a payroll deduction and revisited annually.

4.5 Employees with EVs using the charging station as a registered part-time user shall report, via email, single use charges to the Sustainability Coordinator following every charge. Part-time users will report the date of use and the number of hours used to charge their EV.

4.5.1 Employees who are registered as a part-time user will be charged a rate of \$24.27 for 80 hours of charging.. This fee will be invoiced by the Environmental Sustainability Office with payment through the Vaughan City Hall cashier.

4.7 Any operational issues related to the EV charging stations or designated parking spots should be documented in writing and forwarded to the Environmental Sustainability Office for further action.

4.8 Employees with EVs violating the provisions of this Policy will have their Workplace charging privileges removed.

4.9 Any visitors with EVs requiring the use of the charging station will be asked to contact the Environmental Sustainability Office who will make the appropriate arrangements.

5. RESPONSIBILITY OF CITY STAFF

City staff, reporting and/or visiting Vaughan City Hall, are responsible to become familiar with this policy and apply the established principles.

6. CONTINUAL IMPROVEMENT

The City of Vaughan is committed to a process of continuous improvement through regular review of this policy, its scope and implementation processes on an ongoing basis.

Council Approval:	2015/04/21	Amended:	N/A
Report No/Item:	8/3	Report No/Item:	N/A
Cross Reference:	N/A		



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Town of Aurora

Memorandum

Planning and Development Services

Re: Electric Vehicle Charging Station Policy and Process

To: Environmental Advisory Committee

From: Natalie Kehle, Energy and Climate Change Analyst

Date: February 24, 2021

Recommendation

1. That the memorandum regarding Electric Vehicle Charging Station Policy and Process be received; and
2. That the Environmental Advisory Committee comments regarding the Electric Vehicle Charging Station Policy and Process documents be received and referred to staff for consideration and further action as appropriate.

Background

The Electric Vehicle Charging Station Policy and Process documents for Town Properties allows for strategic, guided future expansion of the Town's electric vehicle charging station program. The Policy and Process are best practices documents for the Town to follow in the event it decides to purchase additional chargers. The Policy and Process documents defines Town Division's roles and responsibilities, installation requirements, revenue and pricing, charging features, accessibility considerations and operating requirements.

Public and Private Sectors are Investing in Electric Vehicles and Infrastructure

The International Energy Agency predicts an 800 percent increase in the number of electric vehicles (EV)s over the next decade. The Federal and Provincial governments are investing more than \$500 in electric vehicle technology and production in Ontario. Through government support, Ford Canada's Oakville Assembly Complex is being retooled to manufacture EVs. Ford also announced plans to present a lineup of 40 new electrified vehicles by 2022. Similarly, investment in the Windsor Assembly Plant will facilitate the production of at least one (1) new electric vehicle (EV) model by 2025.

The Federal government, through Natural Resources Canada (NRCAN) has provided over \$300 million to support the establishment of a coast-to-coast network of EV chargers. The infrastructure resulting from these investments will ensure that the population can drive and charge their vehicles across Canada.

In the Fall of 2020, York Region announced that 70 EV chargers will be installed across the region at Region-owned facilities as part of the government's commitment to a low-carbon future, with \$350,000 funding from the NRCAN program. Two of the chargers are planned for the York Regional Police HQ in Aurora, while the remaining are in Vaughan (8 chargers), Richmond Hill (10 chargers), East Gwillimbury (10 chargers) and Newmarket (39 chargers).

The private sector is also investing in the EV market. Auto parts manufacturer Magna International Inc. recently announced a deal with LG Electronics for a joint venture to build components for EVs. The new venture will manufacture electric motors, inverters and on-board chargers. This is in addition to the company announcing two joint ventures with Chinese companies to engineer and build EVs in 2018.

Other large automakers such as General Motors, Linamar Corp., Martinrea International Inc. and Fiat have invested in EV technology, such as artificial intelligence and next-generation transmission systems. Martinrea International Inc., recently projected that in five years, nearly 25% of the automobile market will be made up of EVs or hybrids.

Environmental Benefits of Electric Vehicles

There are a number of environmental benefits of EV ownership when compared to Internal Combustion Engine Vehicles (ICEV):

- Greenhouse gas emissions from vehicle use account for 37% of Aurora's total emissions in 2018. Personal vehicle use is responsible for 99% of all transportation energy and emissions in the Town. Electric vehicles allow drivers to maintain the convenience of a personal vehicle while significantly reducing emissions.
- Electric vehicles release zero emissions at the source, but instead use a battery, charged by electricity that is generated in other locations of the province. The environmental benefits of EVs in Ontario are in large part due to Ontario's clean electricity grid.
- Based on a recent analysis provided by the Ontario Power Generation, internal combustion engine vehicles in Ontario emit 26 times more greenhouse gas emissions to operate per year compared to a battery electric vehicle (BEV)

(based on 2020 values). Over the lifetime of a BEV, it saves 29,000 tonnes of carbon dioxide equivalent (assuming the lifetime of the vehicle being 2020-2028).

Economic Benefits of Electric Vehicles

There are several socio-economic benefits to EV ownership when compared to ICEV:

- EVs are cheaper cars to own over a 10-year period when compared to conventional gas car equivalents. In a 2018 analysis by the 2 Degree Institute comparing a Kia Soul ICEV and a Kia Soul BEV, the fuel savings for an Ontario owner over a 10-year period was \$26,110 and the maintenance costs savings was \$6,933, saving \$30,563 in total. This is a 65% reduction in costs over 10 years. The EV model cost \$12,850 more upfront in 2018 without any rebates, providing the owner with a net savings of \$17,713, or \$1,771 annually.
- A 2015 analysis by Plug'n Drive estimated fuel savings in Ontario to be 70% compared to ICEV.
- There is inequality within the emerging EV market in who may obtain these cost savings. Higher-income owners are more likely to afford the higher upfront costs of an EV, while also more likely to have access to off street parking with charging infrastructure. Municipalities play a key role in increasing access of EV infrastructure to the whole community to those otherwise might not have access to it by: installing charging infrastructure in public places and mandating EV ready design for new developments in the community.
- Shifting to BEV from ICE vehicles means a shift in domestic energy use. Using locally generated electricity supports infrastructure and jobs in Ontario compared to imported gasoline use.

Analysis

Aurora's policy is based on the York Region's Electric Vehicle Charging Station Policy and Municipal Best Practices

The Policy and Process for Aurora follows Canadian best practices for EV charging station management as identified by the Clean Air Partnership, NRCAN and other Ontario Municipalities. Aurora's policy is based on the York Region's Electric Vehicle Charging Station Policy, which was approved in March 2019, and was revised to fit Aurora's context. The development of the Policy was the subject of consultation with Town staff from Engineering, Operations, Facilities, Finance and Accessibility Services. Ontario Power Generation was also consulted for technical expertise and for the latest

energy data for Ontario. The Policy sets out requirements and recommendations for electric vehicle charging stations at Town facilities

The objective of the Policy is to guide the Town in the use, management and expansion of electric vehicle charging stations at Town facilities. Based on municipal best practices, some provisions under the Policy are listed as requirements while others as recommendations (see Attachments 1 and 2) as follows:

- New charging stations installed will be a minimum of Level 2 (Fast Charge), being the most economical charging type, while still providing effective charging capabilities;
- All charging stations installed in publicly accessible locations will have a usage fee system, aligned with York Region fees (currently \$2-3 per hour);
- Vehicles found at an EV charging station that are not actively charging are subject to penalties found under the Town's Parking By-law;
- All parking lot surfacing projects located at Town facilities will include a needs assessment of EV infrastructure within the project scope and consider the installation of EV chargers at a rate based on the latest LEED (requirement SSc4.3) for alternative fuel refueling stations. An additional 10% of parking spaces should be made EV Capable to allow for future installation of EV infrastructure;
- All new Town facilities and major facility renovations will consider installing the minimum number of EV chargers as required under the latest version of LEED (requirement SSc4.3) for alternative fuel refueling stations. An additional 10% of parking spaces should be made EV Ready to allow for future installation of EV infrastructure;
- Any new Town parking lot projects will include a needs and feasibility assessment of EV infrastructure within the project scope and consider the installation of partial EV infrastructure as a minimum;
- Capital planning will consider electrical capacity increases for future EV charging stations at the time of asset replacement or upgrading;
- Existing stations installed prior to this Policy will be networked to the same network as any expansion program, if applicable. Any chargers that cannot be networked will be removed and repurposed when possible to avoid complications associated with free service (i.e. deemed taxable benefit). Un-networkable infrastructure will be removed.

Attachments

Attachment 1 – Draft Electric Vehicle Charging Station Policy for Town Properties

Attachment 2 – Draft Electric Vehicle Charging Station Process for Town Properties



Status: Final

Electric Vehicle Charging Station Policy

Approved By: Chief Administrative Officer

Approved On: March 5, 2019

Last Reviewed: N/A

Policy Statement

The Regional Municipality of York is committed to supporting the increased use of electric vehicles by the Region and its staff, and will make reasonable efforts to provide access to charging infrastructure that supports the viability of electric vehicles.

Application

This policy applies to all existing and planned electric vehicle charging infrastructure, including its associated management and use, at all York Region-owned buildings.

Purpose

This policy governs how York Region establishes and manages the electric vehicle charging infrastructure using a demand-based, revenue-neutral growth model that allows for consistent deployment of infrastructure to support the viability of electric vehicles.

Definitions

Charging Station

Charging stations in this document are inclusive of the electric vehicle charging station pillar, electronic/physical parts, head, and the parking space designated for use when charging an electric or plug-in hybrid vehicle.

Charging station data

Charging station data must include time and usage data for chargers, at a minimum. However, identifying information will not be collected.

EV Charger Service Provider

EV Charger Service Provider is the third-party organization that supplies and/or operates the electric vehicle charging station

Fleet

Fleet vehicles (for the purposes of this policy) are electric or plug-in hybrid vehicles owned by York Region and shared by staff for the purposes of carrying out Region business.

Level 2 charging station

Level 2 charging stations provide the current industry standard for average duration EV charging at 240 volt AC.

Level 3 charging station

Level 3 charging stations provide up to 500 volt DC capacity, providing the highest speed alternative for EV charging.

Operator

Entity in charge of the electric vehicle charging station will be the Regional Department or Branch responsible for maintaining the corresponding building.

Payment Card Industry (PCI) Standards

[PCI standards](#) were created to increase controls around cardholder data to reduce credit card fraud. Validation of compliance is performed annually.

Process

Process refers to [Electric Vehicle Charging Station Process](#), which is enabled by this policy and governs the operation and usage of the charging infrastructure, including specific rules related to use of the charging station and its management.

Public

Public includes members of the general public and Regional staff using charging stations for personal vehicles. This includes personal vehicles being used for Regional business.

Third party ownership

Third party ownership refers to an ownership model where York Region provides parking spaces and electrical connection for a third party service provider to install, maintain, and operate an EV Charging Stations with no ownership rights for the Region. All costs, revenues, and risk are borne solely by the third party service provider and York Region receives a portion of the revenue to cover costs.

Description

Charging station type

Charging stations installed shall be a minimum of level 2 that is in compliance with Payment Card Industry (PCI) standards. Installation of charging stations higher than level 2 shall be based on the needs and speed required for EV charging.

Since level 3 charging stations can lead to spikes in electricity demand, concerns associated with higher electricity demand should be considered by the Operator and discussed with the Manager of Climate Change and Energy Conservation before moving forward with any level 3 charger installation.

York Region electric vehicle charging stations shall be open by default for use by anyone, including Regional staff personal vehicles and the general public for a fee as outlined under the Process. Exceptions can be provided for dedicated charging stations installed in locations with York Region employee-only access dedicated to support York Region-owned fleet vehicles.

Usage requirements

Electric vehicle charging stations shall be for charging purposes only. Any vehicle parked in an electric vehicle charging station space that is not actively charging as defined under the Process shall be subject to increased fees or measures including those outlined in the [Parking at the Regional Administrative Centre Policy](#).

Electric vehicle charging stations are available on a first-come first-served basis. This includes dedicated fleet spaces, which are open to all fleet vehicles.

Users of charging stations are required to be registered and active members of the EV Charger Service Provider's network to use the service.

Appropriate signage shall be erected to provide information for users, with content identified under the Process. Signage shall include a reference to this Policy and the associated Process.

Data requirements

Usage data must be accessible to the Region in perpetuity, regardless of contract status and/or available in a form that can be stored in a central repository to be analyzed by Regional staff to facilitate evidence-based/data-driven decision making for future stations.

Revenue and rates

In cases where the Region owns or leases the chargers, rates are to be set based on a revenue-neutral business model (no net monetary loss). Rates for charging stations shall be based on the time a vehicle is connected to a charging station as outlined in the Process.

Regardless of the ownership model, revenues generated by electric vehicle charging stations shall be kept by the Operator in a dedicated revenue account (separate from general revenues). Depending on the specific ownership model, the funds can only be drawn down for asset management, infrastructure operating costs, and to add additional charging stations (as described in the Process) related to electric vehicle charging stations.

Demand-based implementation and expansion

All expansions to the public electric vehicle charging station infrastructure shall be based on data-demonstrated demand, as outlined in the Process.

Decisions related to purchase, lease, or contract from providers shall be based on the lowest life-cycle cost, as outlined in the Process.

Supporting infrastructure in new buildings

New buildings shall install infrastructure to support future electric vehicle charging stations that meet requirements under Section 3.1.21 and Section 9.34.4 of the [O. Reg. 332/12 Ontario Building Code](#).

Electric capacity

Plans for expansion of electric vehicle charging stations should consider potential impacts that charging stations may have on the electric capacity of a building. If there are significant impacts, mitigation should be addressed under the implementation / capital plan for the charging station project, with timing tied to planned replacement of capital, when feasible.

Transition of existing stations

Charging station infrastructure installed prior to establishment of this policy shall be upgraded to meet the requirements of this policy. The upgrade will be subject to capital plan and budget cycle, within 36 months from approval of the policy. This will help ensure consistency across all charging facilities and avoid complications (i.e. deemed taxable benefit) associated with free, unmetered and standalone charging facilities.

Leased Buildings

For leased buildings, proposed installations of EV charging stations will be considered on a case by case basis, only to be installed where an agreement has been negotiated between the Region and the building Operator.

Term

Electric vehicles and their associated charging station technology have been evolving rapidly and it is anticipated that this trend will continue in the future. As a result, this policy will be reviewed every two years following initial approval to ensure the policy remains up to date with the state of electric vehicles and associated charging technology.

Responsibilities

Responsibility of Regional Staff

Regional staff are responsible to become familiar with this policy and the associated Process. Staff are to required to follow requirements outlined in these documents when using charging stations.

Charging station asset management

Charging station asset management is the responsibility of the building Operator where the infrastructure is installed.

Data management, operations and expansion

The Operator of the charging stations is responsible for data acquisition, operations and decisions regarding expansion of services. The Climate Change & Energy Conservation unit will support corresponding teams with associated analysis and decision-making tasks where required.

Reference

[Electric Vehicle Charging Station Process \(#8754608\)](#)

Contact

Manager of Climate Change and Energy Conservation, Environmental Services

Approval

CAO Signature: ORIGINAL SIGNED BY BRUCE MACGREGOR

Date Approved: MARCH 5, 2019

Accessible formats or communication supports are available upon request.

#8594739



The Regional Municipality of York

Electric Vehicle Charging Station – Process

Document	Electric Vehicle Charging Station Process
Applicability	Region wide
Supporting Policy	YORK-#8594739-Electric Vehicle Charging Station Policy

Purpose:

This document provides additional guidance to York Region staff when planning or implementing the installation of electric vehicle (EV) Charging Station(s) or associated infrastructure for staff, the public or dedicated York Region fleet use.

Scope:

This process is applicable to York Region owned and operated EV Charging Stations and corresponding users including Regional staff, fleet, and the general public as defined in the EV Charging Station Policy [YORK-#8594739-Electric Vehicle Charging Station Policy](#)

Responsibility:

Document Author	Brandon Foster, Climate Change and Energy Conservation
Document Owner	Ershad Kazemi, Climate Change and Energy Conservation
Document Approver	David Szeptycki, Director, Strategy and Innovation

Definitions:

Alternative payment options

Alternate payment options include methods such as RFID cards to authenticate and authorize charging of an EV (e.g. for fleet vehicles).

Charging Station

Charging Stations in this document are inclusive of the electric vehicle Charging Station pillar, electronic/physical parts, head, and the parking space designated for use when charging an electric or plug-in hybrid vehicle.

Charging Station data

Charging Station data must include time and usage data for chargers, at a minimum. However, identifying information will not be collected.

EV Charger Service Provider

EV Charger Service Provider is the third-party organization that supplies and/or operates the electric vehicle Charging Station.

Fleet

Fleet vehicles are electric or plug-in hybrid vehicles owned by York Region and shared by staff for the purposes of carrying out Regional business.

Gateway

Gateway refers to the communication gateway that relays electric vehicle Charging Station information to the EV Charger Service Provider's server through a wireless communication.

Level 2 (SAE) J1772 electric vehicle plug

Refers to SAE standard "Surface Vehicle Recommended Practice J1772, SAE Electric Vehicle Conductive Charge Coupler", which provides a standard of how a Charging Station connects, communicates with, and charges the vehicle. This standard has been adopted by all major manufacturers of passenger vehicles worldwide.

Electric Vehicle Charging Station Process

Level 2 charging station

Level 2 charging stations provide the current industry standard for average duration EV charging at 240 volt AC.

Level 3 charging station

Level 3 charging stations provide up to 500 volt DC capacity, providing the highest speed alternative for EV charging.

NEMA

NEMA (National Electrical Manufacturer Association) provides standards for the types of environments where an electrical enclosure can be used. NEMA Type 3 enclosures are constructed for either indoor or outdoor use certifying a degree of protection from harmful effects on equipment due to the elements.

Open Application Program Interface (API)

Open Application Program Interface (API) is a set of clearly defined methods of communication, which allows access to Charging Station information from an EV Charger Service Provider's database, supporting the use of apps, dashboards and fleet management systems.

Open Charge Point Protocol (OCPP)

Open Charge Point Protocol (OCPP) is an application protocol for communication between EV Charging Stations and a charging station network. This allows EV Charger Service Provider to connect their system with any EV Charging Station, regardless of the initial vendor.

Operator

Entity in charge of the electric vehicle charging station will be the Regional Department or Branch responsible for maintaining the corresponding building.

Power sharing

Power sharing is a function of the Charging Station that intelligently manages the available power to the Charging Station enabling an owner operator to maximize the number of Charging Stations they can install at a particular location.

Electric Vehicle Charging Station Process

Power limiting

Power limiting is a function of the Charging Station that minimizes and even totally offsets the effect of electricity demand charges by limiting power transfer to EVs during the building's peak power demand.

Public

Public includes members of the general public and Regional staff using chargers for personal vehicles. This includes personal vehicles being used for Regional business.

Service capacity

Service capacity refers to the ability to power electric vehicles compared to the amount of power available by the building or facility.

Third party ownership

Third party ownership refers to an ownership model where York Region provides parking spaces and electrical connection for a third party service provider to install, maintain, and operate an EV Charging Stations with no ownership rights for the Region. All costs, revenues, and risk are borne solely by the third party service provider and York Region receives a portion of the revenue to cover costs.

Users

A person who uses an EV Charging Station.

Utilization rate

Utilization rate, in this document, is measured as a percentage value referring to the connection time of the EV charger relative to the EV charger's charging capacity from 8:30 am to 4:30 pm Monday to Friday.

Administration

1. Installation requirements
 - A. The building operator shall ensure sufficient space and capacity within the building electrical system/room and in the parking area(s) are available to house EV charging infrastructure.
 - B. The electrical tie serving the Charging Station shall have a minimum 208/240 volt electrical service on a 40 ampere breaker.

Electric Vehicle Charging Station Process

- C. Charging Stations shall be equipped with “power sharing” and “power limiting” technologies.
- D. Charging Stations shall be commissioned as per EV Charger Service Provider recommendations and is operational and functioning within the recommended specifications.
- E. EV Charger Service Provider shall provide the Region with a completed and signed off Site Commissioning form confirming proper installation and function.
- F. The ownership model for Charging Stations shall be one of the following:
 - I. The outright purchase of EV Charging Stations by the Region; or
 - II. Lease program
 - III. Third party ownership
- G. Third party advertising shall not be permitted without approval by York Region Corporate Communications.

2. Maintenance Requirements

A comprehensive preventative maintenance program for Charging Stations shall be implemented as part of the agreement with the EV Charger Service Provider, to include but not limited to:

- A. Regular hardware inspections and maintenance activities.
 - I. Inspect the condition of the charger to include but not limited to:
 - i. Charging Station Display
 - ii. Door mechanism
 - iii. Cable retraction system (cable management):
 - 1. Regular inspection and proper storage of cables
 - 2. Periodic cleaning of surfaces; especially for units close to roads or high traffic areas
- B. One (1) business day response time, by the EV Charger Service Provider, on all service issues related to charger malfunction.
- C. Regular software updates as appropriate.
 - I. The EV Charger Service Provider shall be responsible for remote monitoring and management of software.

Electric Vehicle Charging Station Process

3. Revenue collection and pricing

A. The Operator shall ensure the EV Charger Service Provider manages all revenue collection on behalf of the Region.

- I. The EV Charger Service Provider shall be responsible for handling the entire billing process, including payment processing, fund transfers, tax collections and remittance.
- II. All billing shall be in Canadian funds and be tax compliant in the Province of Ontario.
- III. Ensure availability of alternative payment options for different user types (i.e. public versus fleet).

B. Pricing

- I. Users will be charged based on the time a vehicle is connected to a charger.
- II. Time-based rates charged to users shall be based on the following formula:
 - I. $\text{Charger rate} = \text{Electricity consumption costs} + \text{EV Charger Service Provider fees} + \text{Maintenance costs} + \text{Hardware installation costs amortized over 10 years}$
 - II. In the event that York Region enters into a third party ownership agreement, York Region shall require the hourly rate not to exceed the maximum average rates in Ontario, to be approved by Climate Change and Energy Conservation unit.
- III. Once the user is notified that vehicle charging is complete, following a 30 minute grace period, the rate per hour will be increased by two (2) times the normal rate until the vehicle is moved. This is to encourage users to move their vehicles when charging is complete.
 - I. Under the third party ownership model, the third party agrees to charge a rate less than or equal to the maximum rate outlined above and reimburse York Region based on the agreed upon rate outlined in the corresponding contract.
- IV. Climate Change and Energy Conservation staff shall review the rates for EV charging on an annual basis to confirm compliance with revenue neutral operating objective, except in the case of a third party ownership agreement where a maximum allowable charge rate has been agreed to.

4. Requirements for expansion of the Charging Station network

Electric Vehicle Charging Station Process

Expansions to the Region's public EV Charging Station network shall be demand-based using the following criteria:

- A. At facilities without EV Charging Stations installed, demand will be assessed based on a survey of EV usage.
- B. At facilities with EV Charging Stations installed, additional EV Charging Stations will only be considered when utilization rates during normal business hours (8:30am – 4:30pm) exceed 80%.

Fleet electric vehicle charging infrastructure expansion shall be based on planned purchases of electric vehicles/plug-in hybrids and ensuring charging infrastructure provides sufficient flexibility to meet Fleet needs.

The Operator shall ensure there is sufficient service capacity for the installation of EV chargers, including but not limited to:

- C. Appropriately sized electrical panels and transformers with adequate access to electrical infrastructure.
- D. Appropriate planning for future parking spaces equipped with Charging Stations.

5. Required features of EV chargers to include but not limited to:

- A. Open Charge Point Protocol (OCPP) compliant systems
- B. Network capability to a private and secured connection using a cellular data network
- C. Gateway enabling sufficient communication capabilities to multiple Charging Stations.
- D. Mobile app enabling real time communication for with the Charging Station(s).
- E. The connector shall be Level 2 (SAE) J1772 EV plug.
- F. Capable of effective operation in outdoor temperatures and conditions experienced in York Region during all four seasons.
- G. Charge head to meet a minimum NEMA 3 standard.
- H. Charging station components are corrosion resistant.
- I. EV Charger Service Provider's customer service hotline, posted in plain sight, for real-time assistance.

6. Registration Requirements

Electric Vehicle Charging Station Process

All EV charging customers/users shall register for membership directly with the corresponding charger network EV Charger Service Provider through smartphone applications or dedicated radio-frequency identification (RFID) cards.

7. Public vs Fleet Use of Charging Stations

- A. Public Charging Stations shall be installed in easy to identify locations and appear on the EV Charger Service Provider's public map.
- B. Fleet Charging Stations shall only be available for fleet vehicles either through physical controlled access or controlled access via software.
- C. EV Charging Station shall have both public (staff) and fleet charger option(s), enabling notices to be set as "Private" and "not available" to the public on the web app where necessary.

8. Data Administration

- A. The Region shall have full control of its Charging Stations and access to the charger utilization data.

The EV Charger Service Provider shall make available to the Operator a complete history of EV charging session data for all the Charging Stations associated with the Region. This data will be accessible electronically with the ability to generate reports for specific dates, sites and/or EV Charging Stations, including but not limited to:

- I. Energy transferred (kW)

- II. Connection time (hours: mins)

- III. Time connected not charging (hours: mins)

- B. The Operator shall obtain from the EV Charger Service Provider non user specific EV charging session data no less than every three months to assess utilization and plan for future expansion needs. The data shall be made easily available, stored in a central repository enabling the Operator to analyze the data as required to facilitate evidence (data driven) based decision making activities.
- C. The Region shall have access to real-time Charging Station status, including but not limited to:

- I. Charging Station availability

- II. Charging Station in use

- III. Charging Stations currently inoperable

Electric Vehicle Charging Station Process

IV. Electricity use rate

V. The ability to produce detailed transaction reports for a given period

9. Considerations for Level 3 Charging Stations

The Operator has the right to assess the need for and install level 3 Charging Stations at their corresponding facilities based on:

- A. A needs assessment
- B. An assessment of the building's electricity infrastructure and electrical capacity

10. Complaint management protocols

All complaints shall be managed by the EV Charger Service Provider that are accessible and follow processes that are transparent to the Region.

11. Training for EV charging

The EV Charger Service Provider shall be responsible for all EV Charging Station training and instructions for their use.

References:

- [YORK-#8594739-Electric Vehicle Charging Station Policy](#)
- [O. Reg. 332/12: Ontario Building Code](#) (See sections 3.1.21 and 9.34.4)

Last Revision Summary:

Date	Item	Description of Change