

**Report to
Rapport au:**

**Standing Committee on Environmental Protection, Water and Waste Management
Comité permanent de la protection de l'environnement, de l'eau et de la gestion
des déchets**

20 October 2020 / 20 octobre 2020

**and Council
et au Conseil**

28 October 2020 / 28 octobre 2020

**Submitted on October 6, 2020
Soumis le 6 octobre 2020**

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Ward: CITY WIDE / À L'ÉCHELLE DE LA VILLE File Number: ACS2020-PIE-EDP-0036

**SUBJECT: Climate Change Master Plan - Energy Evolution: Ottawa's
Community Energy Transition Strategy Final Report**

**OBJET: Plan directeur sur les changements climatiques - l'évolution
énergétique : la stratégie de la collectivité d'ottawa pour la transition
énergétique**

REPORT RECOMMENDATIONS

That the Standing Committee on Environmental Protection, Water, and Waste Management recommend that Council:

- 1. Receive the final report for Energy Evolution: Ottawa’s Community Energy Transition Strategy and supporting documents attached as Document 1 through Document 9 and summarized in this report;**
- 2. Receive the list of projects identified in Documents 7 and 8 to be more developed by staff and brought before Standing Committee and Council for approval, where required;**
- 3. Direct staff leading new or updates to City plans, strategies and policies to take into consideration the energy emissions model and the City’s greenhouse gas reduction targets in the development of such plans, strategies and policies.**
- 4. Approve that the 2019 Hydro Ottawa dividend surplus of \$2.6M be used to fund the proposed spending plan attached as Document 11 and summarized in this report.**

RECOMMANDATIONS DU RAPPORT

Que le Comité permanent de la protection de l’environnement, de l’eau et de la gestion des déchets recommande au Conseil :

- 1. de recevoir le rapport final sur Évolution de l’énergie : la stratégie de la collectivité d’Ottawa pour la transition énergétique et les documents 1 à 9 à l’appui, dont le résumé figure dans le présent rapport;**
- 2. de recevoir la liste des projets présentés dans les documents 7 et 8 afin qu’elle soit retravaillée par le personnel, puis présentée au Comité permanent et au Conseil à des fins d’approbation, au besoin;**
- 3. de demander au personnel qui procède à l’élaboration ou à la révision des plans, des stratégies et des politiques de la Ville de tenir compte du modèle de gestion de l’énergie et des émissions et des cibles municipales de réduction des gaz à effet de serre; et,**
- 4. d’approuver l’utilisation de l’excédent des dividendes d’Hydro Ottawa de 2019, qui s’élève à 2,6 millions de dollars, aux fins du financement du plan**

de dépenses proposé dans le document 11 ci-joint et résumé dans le présent rapport.

EXECUTIVE SUMMARY

In January 2020, Council approved the Climate Change Master Plan (CCMP) and adopted new short, mid and long-term community targets to reduce greenhouse gas (GHG) emissions 100 per cent by 2050 and corporate targets to reduce greenhouse gas (GHG) emissions 100 per cent by 2040 in line with the Intergovernmental Panel on Climate Change's recommendation to limit global warming increases to 1.5°C. The implementation of Energy Evolution is one of the eight priority actions.

Energy Evolution: Ottawa's Community Energy Transition Strategy sets the framework for what it will take for Ottawa to meet the Council approved long-term GHG emission reduction targets. It is a renewable energy strategy designed to manage energy consumption, promote the use of renewable energy and advance local economic development opportunities in Ottawa.

In January 2020, Council received a project status update ([ACS2019-PIE-EDP-0053](#)) on Energy Evolution including the draft energy and emissions model and a draft list of proposed projects to be more developed as part of the Energy Evolution final strategy. Council also directed staff to bring forward the final report for Energy Evolution that includes:

- a. Finalized energy and emissions model;
- b. A financial and affordability analysis of the model to identify the investment required, the net present value, the return on investment, marginal abatement costs, and employment impacts;
- c. Detailed descriptions of the proposed Energy Evolution projects listed in this report including roles and responsibilities, timelines, municipal authorities and barriers to implementation, equity and inclusion considerations, and resourcing needs;
- d. A proposed spending plan for the 2019 Hydro Ottawa dividend surplus once the value of the dividend surplus is known.

This strategy responds to Council's directive to identify the scale of change and investment required to achieve Council's long-term GHG reduction targets. It acknowledges that achieving these targets will require concerted efforts and

collaboration across all sectors of society, and that the scope and scale required is unprecedented in both action and investment. Realizing this action and investment carries many risks including that the strategy is currently under resourced and unfunded and will rely on involvement and funding from all levels of government.

This report and associated recommendations advance the 2019-2022 Term of Council priority Environmental Stewardship by identifying projects to reduce the City's GHG emissions and embed climate change considerations across all operations. The recommendations of this report aim to strengthen Council's commitment to naming, framing, and deepening Ottawa's commitment to protecting our economy, our ecosystems, and our community from climate change and it helps implement the Climate Change Master Plan.

Beyond Energy Evolution, staff have continued to advance other priorities in the Climate Change Master Plan including the release of climate projections for the National Capital Region, which were developed in partnership with the National Capital Commission and Environment and Climate Change Canada. These climate projections used climate science and modelling to predict future changes in temperature, precipitation, wind and extreme weather until the year 2100. The City will use the climate projections to identify risks in a climate vulnerability assessment, develop a long-term climate resiliency strategy and a short-term plan to address immediate priorities. The climate projections will also inform the development of the Official Plan, Master Plans and Asset Management Plans.

Staff have also advanced the Climate Change Master Plan priority to encourage community action by submitting funding proposals and supporting community initiatives. Examples include:

- In September 2019, Envari, with support for the City, submitted a funding application to Natural Resources Canada for the installation of 26 electric vehicle chargers at 12 locations in the right of way and one location at a Park and Ride. Staff were notified of the successful funding application in January 2020. Consultations on the proposed locations will start in the fall of 2020 on engage.ottawa.ca. The first installations could happen as soon as December 2020 and will continue into 2021.
- In April 2020, staff submitted a funding application to the Independent Electrical Systems Operator (IESO) Grid Innovation Fund for a project that would support the development of a High-Performance Development Standard for new subdivision requirements. In September 2020, staff were notified that Ottawa has

advanced to the second stage of evaluation. A decision from the IESO is expected in 2021.

- In June 2020, the City signed a Memorandum of Understanding with the Ottawa Community Foundation to work together on reducing GHG emissions. The Ottawa Community Foundation, in collaboration with the City and other key players, is leading the establishment of Ottawa's Low Carbon Cities Canada centre called the Ottawa Climate Action Fund (OCAF). Ottawa is set to receive a \$20 million endowment from the Federation of Canadian Municipalities (FCM). The General Manager of the Planning, Infrastructure and Economic Development Department has been a member of OCAF's initial advisory board and continues to support the work of OCAF through sharing information, participation in OCAF meetings, and coordinating efforts to reduce GHG emissions in Ottawa.
- In July 2020, staff submitted a proposal to FCM for funding to launch a proposed Better Homes Loan Program that would help cover the cost of home energy improvements through a local improvement charge mechanism. Staff expect to be notified of FCM's decision by the end of 2020.
- In September 2020, staff provided a letter of support for EnviroCentre's application to Natural Resources Canada Zero Emissions Vehicle Awareness Initiative for development of an electric vehicle public engagement toolkit.

Staff will provide an annual status update on the Climate Change Master Plan in December 2020 including the latest corporate and community GHG emissions inventories, and progress towards achieving the targets and implementation of the eight priority actions.

Assumptions and Analysis

This report includes:

1. Energy Evolution: Ottawa's Community Energy Transition Strategy including:
 - a. Energy and emissions modelling results
 - b. Financial analysis
 - c. Overview of the 20 supporting projects
2. Proposed spending plan for the 2019 Hydro Ottawa Dividends

Energy and Emissions Model

Energy Evolution used a comprehensive energy, emissions and finance model to identify what it will take to achieve the 100 per cent by 2050 target in five key sectors: Land Use and Growth Management, Buildings (New and Existing), Transportation, Waste and Renewable Natural Gas, and Electricity. In order to achieve the 100 per cent scenario, the model identifies the need to greatly reduce energy demand through conservation and efficiency and that:

- All fossil fuels will have to be phased out.
- Heating and transportation systems will have to be fully electrified or transition to zero emission.
- Waste heat utilization and renewable natural gas production will have to be added.
- Sufficient renewable electricity (mostly wind and solar) generation and electricity storage will be required to meet demand and offset emissions on the provincial grid.

Proposed Projects

The strategy includes 20 projects over the next five years (2020-2025) to accelerate and scale action and investment towards the achievement of the 100 per cent scenario. The projects are as follows:

Sector	Project
Land Use and Growth Management	<ul style="list-style-type: none"> • Integration of energy and climate mitigation policies into the new Official Plan and supporting master plans
Buildings (New and Existing)	<ul style="list-style-type: none"> • Residential Building Retrofit Accelerator Program • Commercial Building Retrofit Accelerator Program • Building Retrofits through Local Improvement Charge Program • Energy Community Improvement Plans

Sector	Project
	<ul style="list-style-type: none"> • Community Building Heating Strategy • Municipal Buildings Renewal and Retrofit Program • Update Municipal Green Building Policy • High-Performance Development Standard
Transportation	<ul style="list-style-type: none"> • Personal Vehicles Electrification Strategy • Zero Emissions Commercial Vehicles Strategy • Municipal Green Fleet Plan Update • Alternative Energy Sources for Transit Project • Transportation Mode Shift
Waste and Renewable Natural Gas	<ul style="list-style-type: none"> • Organics Resource Recovery Strategy • Renewable Natural Gas Strategy
Electricity	<ul style="list-style-type: none"> • Electricity Resource Strategy
Enablers	<ul style="list-style-type: none"> • Climate Ambassadors Network • Climate Change Education and Outreach Program • Fund the Evolution

More work is required in each of the projects to identify the specific actions associated with the projects and then prioritize them with equity and inclusion considerations. The Energy Evolution project team will work with staff, stakeholders, and the public to further develop the projects and identify technical, operational, financial, staffing, advocacy and equity and inclusion considerations, as appropriate, prior to going to Standing Committee and Council for approval.

Additionally, multiple City plans and strategies are in the process of being developed or updated that directly relate to Energy Evolution, including the new Official Plan, the Transportation Master Plan Update, the Solid Waste Master Plan, the Alternative

Energy Sources for Transit Project, and the Municipal Green Fleet Plan. It is understood that these plans will complete their own options analysis to achieve each respective plan's goals and targets and that the outcomes may differ from what has been identified in Energy Evolution. It is also expected that the range of options evaluated will include one or more scenarios that achieve the GHG reductions required in the 100 per cent scenario, although those scenario(s) may not ultimately be recommended.

Financials

A community-wide financial analysis was undertaken to analyze those Energy Evolution actions that are projected to have financial impacts. All financial information presented represents high level estimates that are currently uncommitted and unfunded capital and operational needs. The analysis is not intended to provide sufficiently accurate financial information to make decisions and does not commit the municipality or any partners to any financial decisions or provide direction on how to address funding gaps.

The financial analysis projects that in order to meet the 100 per cent scenario, cumulative community-wide investment from 2020 to 2050 will total \$52.6 billion with a present value of \$29.7 billion. All costs and net returns projected for the 100 per cent scenario are incremental, above and beyond what is currently planned or underway. Starting in 2032, there is a projected net financial benefit to society when the net annual savings and potential revenues could exceed the annual investments. Investments made by 2050 could accrue a community-wide net return of \$87.7 billion (\$12.4 billion when discounted to 2020\$) over the life expectancy of the asset¹. In the year 2050, the community is projected to accrue a potential net return of \$28.4 billion, (\$2.7 billion in 2020\$).

Annual incremental community-wide investments of approximately \$1.6 billion per year net present value are projected to be required for the next decade (2020-2030) in order to achieve GHG reductions in line with the model and the 100 per cent scenario. Of this, \$581 million per year net present value would be required (2020-2030) for transit and active transportation infrastructure and an additional \$40 million per year net present value would be required (2020-2030) for municipal building retrofits, zero emission non-transit municipal fleet, and renewable natural gas generation at wastewater, solid waste or agricultural facilities.

¹ The life expectancy of some assets may extend beyond 2050. The end date for Sustainable Solution Group and whatIf Technology Inc's financial analysis is 2094.

It is recognized that the municipality alone will not be able to accomplish the scale of investment required. Future year funding commitments by the municipality, combined with revenue streams, private capital sources, and funding from senior levels of government will ultimately influence the City's success in achieving GHG emissions reductions.

Risks to Implementation

The scope and scale required to achieve the 100 per cent scenario is unprecedented in both action and investment. Realizing this action and investment carries many risks.

These risks may include:

- Insufficient financial support from different levels of government and the private sector to meet the budgetary and staffing needs of the Action and Investment Plan and beyond.
- Higher capital and operating costs, as well as lower than expected saving and revenues, beyond what's currently estimated for project implementation and municipal operations.
- Regulatory barriers and compliance issues that impede the municipality from action and innovation, either by impeding the municipality directly through its own operations or impeding how the municipality can enact change in the community.
- Lack of uptake or buy-in from residents, businesses, industry or the municipality that impacts the viability of a new program or new standard.
- Diverging interpretations between stakeholders on how best to achieve the 100 per cent scenario.
- Competing Council priorities or processes associated with other projects across the corporation.
- Competing departmental priorities including current operational mandates of impacted services, and how their mandates will need to change in order to work to achieve the emissions reductions in Energy Evolution.
- Lack of alignment between what the Energy Evolution model calls for and recommendations that come forward for plans and strategies that directly relate to Energy Evolution. Note that although it is expected that the range of options evaluated will include one or more scenarios that achieve the GHG reductions

required in the 100 per cent scenario, those scenario(s) may not ultimately be recommended.

- Aggressive implementation timelines which may not account for typical City processes including capital budget approval, long-range financial plan, planning, consultation, approvals, design, construction, and commissioning or account for provincial or federal approval processes that are out of the City's control.
- Changes in behavior, policy, and best practices related to COVID-19.

To mitigate these risks, the Energy Evolution project team will continue to work with City staff at all levels across the corporation, community partners, other levels of government, and the public to build out Energy Evolution projects and act as a resource or provide technical advice on related projects. Information and recommendations to support project implementation will be shared with a Tiger Team comprised of all General Managers, the Chief Financial Officer, the City Manager's Office and Ottawa Health; the Climate Change Council Sponsors Group; the Environmental Stewardship Advisory Committee; a community-wide governance structure; and community partners to align and coordinate priorities, work plans, annual budgets, communications and advocacy efforts. The Energy Evolution project team will also continue to work with municipal colleagues across the country through organizations like the Canadian Urban Sustainability Practitioners network, Clean Air Partnership and Low Carbon Cities Canada to share information, best practices, and lessons learned.

2019 Hydro Ottawa Dividend Surplus

A Hydro Ottawa dividend surplus of \$2.6 million will be allocated in support of Energy Evolution. It is intended to support Energy Evolution priority projects, leverage federal and provincial funds where possible, and implement energy efficiency, conservation and renewable energy generation projects. The funding is for all project related costs including feasibility and design studies, pilots, construction, and equipment acquisition or installation.

Next Steps and Reporting

Subject to Council approval:

- All 20 projects will be further developed with input from staff, stakeholders, and the public as required. Some projects may evaluate options beyond what's been identified prior to going to Standing Committee and Council. Once projects are fully

developed projects will be brought to the appropriate future Standing Committee and Council for approval.

- Staff will develop a 10-year spending plan that can be considered in annual municipal budget processes and feed into the City's Long-Range Financial Plan. The next Long-Range Financial Plans will be updated within this term of Council and at the beginning of the 2022-2026 term of Council. Budget and staffing requirements would be brought forward as part of the annual budget process.
- Staff will continue to engage with and provide training to staff and the public to embed climate considerations more broadly across the corporation and the community.
- Staff will prepare department specific presentations on Energy Evolution starting in Q1 2021 to ensure that staff across the corporation are aware of, can align with, and continue to make use of relevant information. They will be delivered to Departmental Leadership Teams and offered to appropriate Service Area, Branch or Units teams to support ongoing alignment of priorities, work plans, and budgets.
- Staff intend to rerun the energy and emissions model every five years to assess how the City and the community are tracking towards achieving the 100 per cent scenario and to determine what actions should be prioritized in the short-term.
- As part of the annual status update on the Climate Change Master Plan, staff will include annual corporate and community GHG inventories to help gauge Ottawa's progress towards GHG emission reduction targets, a status update on the Energy Evolution projects, and recommendations to advance the projects as required.
- A full review and update of the Climate Change Master Plan will be completed in 2025. Simultaneously, Energy Evolution and the future Climate Resiliency Strategy will be reviewed to see whether the three standalone documents can be merged into one.

Consultation/Input

Energy Evolution was developed with input from City staff, key stakeholders and consultants (Leidos, Sustainability Solutions Group, and whatIf? Technologies Inc) through targeted corporate and community consultation. To facilitate collaboration between the municipality and community partners on Energy Evolution, the project team worked with City staff from across the corporation, a Sounding Board, general and

technical working groups, three Council Sponsors Groups, the Environmental Stewardship Advisory Committee, consultants, and the public.

Between 2016 and 2020, the project hosted over 45 meetings with more than 200 key stakeholders representing approximately 90 organizations in Ottawa. Inputs from these stakeholders, as well as consultants engaged to provide background information and technical analysis, has been critical in guiding and informing the development of the energy and emissions model, the strategy and supporting documents.

Input from stakeholders has been considered in Energy Evolution's name, vision, goals, pathway studies, the energy and emissions model, financial analysis and financial model, and project overviews. Ongoing engagement with staff, **councillors**, community partners and the public will be crucial to implementing Energy Evolution. A governance structure to support implementation will be developed under the Climate Change Master Plan.

RÉSUMÉ

En janvier 2020, le Conseil a approuvé le Plan directeur sur les changements climatiques et adopté de nouvelles cibles communautaires à court, moyen et long terme pour réduire les émissions de gaz à effet de serre (GES) de 100 % d'ici 2050, ainsi que des cibles municipales pour une réduction de 100 % des émissions d'ici 2040. Ces cibles cadrent avec la recommandation du Groupe d'experts intergouvernemental sur l'évolution du climat visant à limiter le réchauffement planétaire à 1,5 °C. La mise en œuvre d'Évolution de l'énergie est l'une des huit mesures prioritaires.

Évolution de l'énergie : la stratégie de la collectivité d'Ottawa pour la transition énergétique établit le cadre qu'Ottawa devra respecter pour atteindre les cibles à long terme approuvées par le Conseil. Il s'agit d'une stratégie d'énergie renouvelable visant à gérer la consommation d'énergie, à promouvoir l'utilisation de l'énergie renouvelable et à favoriser le développement économique à Ottawa.

En janvier 2020, le Conseil a reçu une mise à jour sur son avancement ([ACS2019-PIE-EDP-0053](#)), qui comprenait les versions provisoires du modèle de gestion de l'énergie et des émissions et d'une liste des projets à retravailler en prévision de la version définitive de la stratégie Évolution de l'énergie. Le Conseil a aussi demandé au personnel de présenter le rapport final sur Évolution de l'énergie, lequel comprend :

- a) le modèle définitif de gestion de l'énergie et des émissions;

- b) une analyse financière et de l'abordabilité du modèle visant à déterminer l'investissement requis, la valeur actuelle nette, le rendement du capital investi, les coûts marginaux de réduction et les répercussions sur l'emploi;
- c) la description des projets proposés dans le rapport sur Évolution de l'énergie, qui comprendra les rôles et les responsabilités, les délais, les pouvoirs municipaux et les obstacles à la mise en œuvre, les considérations relatives à l'équité et à l'inclusion, ainsi que les besoins en ressources;
- d) une proposition de plan de dépenses pour l'excédent des dividendes d'Hydro Ottawa de 2019, une fois que le montant sera connu.

Cette stratégie donne suite à la directive du Conseil visant à déterminer l'ampleur du changement et de l'investissement requis pour atteindre ses cibles de réduction des émissions de GES à long terme. Elle tient compte du fait qu'il faudra un travail concerté et collaboratif dans tous les secteurs de la collectivité, et que la portée et l'ampleur des mesures et des investissements nécessaires sont sans précédent. Ces mesures et ces investissements comportent de nombreux risques, notamment parce qu'il manque actuellement de ressources et de financement pour mener à bien la stratégie, et que tout dépend de la participation et de la collaboration financière de tous les ordres de gouvernement.

Le présent rapport et les recommandations associées concourent à l'atteinte de la priorité d'Intendance environnementale pour le mandat 2019-2022 du Conseil en établissant les projets pour réduire les émissions de GES de la Ville et intègrent les considérations en matière de changements climatiques dans toutes les sphères d'activité. Les recommandations visent à réaffirmer la promesse du Conseil de nommer, d'encadrer et d'approfondir l'engagement de la Ville à protéger notre économie, nos écosystèmes et nos communautés des changements climatiques, et aident à mettre en œuvre le Plan directeur sur les changements climatiques.

Au-delà d'Évolution de l'énergie, le personnel a continué à faire avancer d'autres priorités du Plan directeur sur les changements climatiques, entre autres en publiant des projections climatiques pour la région de la capitale nationale, qui ont été préparées en partenariat avec la Commission de la capitale nationale et Environnement et Changement climatique Canada. Il s'est appuyé sur les principes de la climatologie et la modélisation pour prévoir les variations futures de la température, des précipitations, du vent et des conditions météorologiques extrêmes jusqu'en 2100. La Ville se servira de ces projections pour déterminer les risques au moyen d'une évaluation de la vulnérabilité aux changements climatiques et pour élaborer une stratégie de résilience

climatique à long terme ainsi qu'un plan à court terme pour répondre aux priorités immédiates. Les projections climatiques orienteront aussi l'élaboration du Plan officiel, des plans directeurs et des plans de gestion des actifs.

Le personnel a également travaillé à la concrétisation de la priorité du Plan directeur sur les changements climatiques qui vise à favoriser l'action communautaire en soumettant des propositions de financement et en appuyant les initiatives communautaires. Voici quelques exemples :

- En septembre 2019, Envari, avec l'appui de la Ville, a présenté une demande de financement à Ressources naturelles Canada pour l'installation de 26 bornes de recharge pour véhicules électriques sur 12 emprises et dans un parc-o-bus. On a informé le personnel que la demande avait été acceptée en janvier 2020. Les consultations sur les emplacements proposés débuteront à l'automne 2020 sur participons.ottawa.ca. L'installation des bornes pourrait commencer dès décembre 2020, et se poursuivra en 2021.
- En avril 2020, le personnel a envoyé une demande de financement à la Société indépendante d'exploitation du réseau d'électricité (SIERE) au titre du Fonds d'innovation pour le réseau pour un projet qui contribuerait à l'élaboration d'une norme pour l'aménagement d'immeubles à haut rendement énergétique dans les nouveaux lotissements. En septembre 2020, on a avisé le personnel qu'Ottawa passait au deuxième stade de l'évaluation. La décision de la SIERE est attendue en 2021.
- En juin 2020, la Ville a signé un protocole d'entente avec la Fondation communautaire d'Ottawa en vue de collaborer à la réduction des émissions de GES. La Fondation communautaire d'Ottawa, avec l'aide de la Ville et d'autres acteurs importants, orchestre la mise en place d'un des centres de la Ligue des communautés canadiennes sobres en carbone à Ottawa, le Ottawa Climate Action Fund (OCAF). Ottawa devrait recevoir un fonds de dotation de 20 millions de dollars de la Fédération canadienne des municipalités (FCM). Le directeur général de la Planification, de l'Infrastructure et du Développement économique était du premier conseil consultatif de l'OCAF et continue de soutenir son travail en transmettant de l'information, en participant à ses réunions et en coordonnant des démarches visant à réduire les émissions de GES à Ottawa.
- En juillet 2020, le personnel a présenté à la FCM une demande de financement pour le lancement d'un programme de prêts pour la mise en valeur des

habitations qui contribuerait à couvrir le coût des améliorations énergétiques résidentielles au moyen d'une taxe d'améliorations locales. Le personnel devrait être informé de la décision d'ici la fin de 2020.

- En septembre 2020, le personnel a envoyé une lettre d'appui à la demande d'EnviroCentre dans le cadre de l'Initiative de sensibilisation aux véhicules à émission zéro de Ressources naturelles Canada pour la création d'une trousse d'engagement du public sur les véhicules électriques.

Le personnel déposera un bilan annuel sur le Plan directeur sur les changements climatiques en décembre 2020; il présentera notamment l'inventaire des émissions de GES de la Ville et de la communauté et parlera de l'avancement des cibles et de la mise en œuvre des huit mesures prioritaires.

Hypothèses et analyse

Le présent rapport comprend :

3. Évolution de l'énergie : la stratégie de la collectivité d'Ottawa pour la transition énergétique, qui comprend à son tour :
 - a. les résultats de la modélisation de l'énergie et des émissions;
 - b. l'analyse financière;
 - c. un aperçu des 20 projets en appui;
4. Un plan de dépenses proposé pour les dividendes d'Hydro Ottawa de 2019.

Modèle de gestion de l'énergie et des émissions

La stratégie Évolution de l'énergie s'appuie sur un modèle complet en matière d'énergie, d'émissions et de financement pour déterminer ce qu'il faudra faire pour atteindre l'objectif de 100 % d'ici 2050 dans cinq secteurs principaux : utilisation du sol et gestion de la croissance; bâtiments (nouveaux et existants); transport; déchets et gaz naturel renouvelable; et électricité. Ce modèle indique que pour atteindre l'objectif, il faudra grandement réduire la demande en énergie en misant sur l'économie et l'efficacité, et qu'il faudra :

- éliminer les combustibles fossiles;
- électrifier quasi intégralement les systèmes de chauffage et de transport ou viser l'émission zéro;

- augmenter l'utilisation de la chaleur résiduelle et la production de gaz naturel renouvelable;
- produire suffisamment d'énergie renouvelable (essentiellement solaire et éolienne) et stocker assez d'électricité pour répondre à la demande et compenser les émissions du réseau provincial.

Projets proposés

La stratégie prévoit 20 projets à réaliser au cours des cinq prochaines années (2020-2025) pour accélérer et rehausser les mesures et les investissements nécessaires à la concrétisation du scénario de 100 %. Les voici :

Secteur	Projet
Utilisation du sol et gestion de la croissance	<ul style="list-style-type: none"> • Intégration des politiques relatives à l'énergie et à la maîtrise des changements climatiques dans le nouveau Plan officiel et dans les plans directeurs auxiliaires.
Bâtiments (nouveaux et existants)	<ul style="list-style-type: none"> • Programme d'accélération des travaux de modernisation des bâtiments résidentiels • Programme d'accélération des travaux de modernisation des bâtiments commerciaux • Modernisation des bâtiments au moyen du Programme de taxes d'améliorations locales • Plans d'améliorations de l'efficacité énergétique communautaires • Stratégie de chauffage des bâtiments de la collectivité • Programme de rénovation et de modernisation des bâtiments municipaux • Mise à jour de la Politique de la Ville sur les bâtiments écologiques • Norme pour l'aménagement d'immeubles à haut rendement énergétique

Secteur	Projet
Transport	<ul style="list-style-type: none"> • Stratégie d'électrification des véhicules personnels • Stratégie pour les parcs de véhicules commerciaux non polluants • Mise à jour du Plan vert du parc de véhicules municipaux • Projet de transport en commun pour les différentes formes d'énergie • Transformation des modes de transport
Déchets et gaz naturel renouvelable	<ul style="list-style-type: none"> • Stratégie de récupération des matières organiques • Stratégie du gaz naturel renouvelable
Électricité	<ul style="list-style-type: none"> • Stratégie des ressources en électricité
Moteur	<ul style="list-style-type: none"> • Réseau des ambassadeurs et des ambassadrices du climat • Programme d'information et de sensibilisation sur les changements climatiques • Financement d'Évolution de l'énergie

Il reste encore du travail à faire pour déterminer les mesures associées à chaque projet et établir leur degré de priorité en tenant compte des considérations en matière d'équité et d'inclusion. L'équipe de projet d'Évolution de l'énergie collaborera avec le personnel, les intervenants et le public pour continuer d'élaborer les projets et recenser les considérations techniques, opérationnelles, financières et relatives à la dotation, à la défense des intérêts, à l'équité et à l'inclusion, le cas échéant, avant de demander l'approbation des comités permanents et du Conseil.

De plus, plusieurs plans et stratégies de la Ville relativement à Évolution de l'énergie sont en cours d'élaboration ou de mise à jour : Plan officiel, Plan directeur des transports, Plan directeur de la gestion des déchets solides, Projet de transport en commun pour les différentes formes d'énergie, Plan vert du parc de véhicules municipaux. Il est entendu que ces plans feront l'objet de leurs propres analyses des options pour atteindre leurs cibles et leurs objectifs, et que les résultats peuvent être différents de ceux décrits dans Évolution de l'énergie. On s'attend par ailleurs à ce que

les options évaluées comprennent un ou plusieurs scénarios qui permettront d'atteindre les cibles de réduction des GES exigées pour réaliser le scénario de 100 %, mais qui ne seront pas nécessairement recommandés.

Volet financier

On a procédé à une analyse financière à l'échelle de la communauté pour analyser les mesures d'Évolution de l'énergie qui pourraient avoir des répercussions financières. Toutes les données financières présentées sont des estimations globales des besoins opérationnels et en immobilisations, pour le moment non financés et ne faisant l'objet d'aucun engagement. L'analyse ne fournit pas de données financières suffisantes pour orienter les décisions, n'engage la Ville et ses partenaires à aucune décision financière et ne fournit aucune indication sur la manière de combler les lacunes en matière de financement.

D'après les données financières, pour concrétiser le scénario de 100 %, il faudra investir en tout 52,6 milliards de dollars (valeur actuelle : 29,7 milliards) entre 2020 et 2050. Tous les coûts et le rendement net projetés pour ce scénario sont progressifs et supérieurs à ce qui est prévu ou en cours. À partir de 2032, il pourrait y avoir un bénéfice financier net pour la société, si les économies et recettes nettes annuelles dépassent les investissements annuels. Les investissements réalisés d'ici 2050 pourraient se traduire par un rendement net, pour l'ensemble de la municipalité, de 87,7 milliards de dollars pour la durée de vie de l'actif, soit 12,4 milliards en dollars de 2020². En 2050, le rendement net de la communauté devrait se chiffrer à 28,4 milliards (soit 2,7 milliards en dollars de 2020).

Des investissements progressifs annuels d'une valeur actuelle nette d'environ 1,6 milliard de dollars à l'échelle de la municipalité seraient requis pour la prochaine décennie (2020-2030) afin d'atteindre les volumes de réduction prévus par le modèle et le scénario de 100 %. De ce montant, 581 millions par an (2020-2030) seraient consacrés aux infrastructures de transport en commun et de transport actif, et 40 millions de plus par an (2020-2030), à la modernisation des bâtiments municipaux, à un parc de véhicules municipaux (autres que ceux du transport en commun) qui ne produit aucune émission et aux générateurs de gaz naturel renouvelable des installations de traitement des déchets liquides et solides ou des installations agricoles.

² La durée de vie utile de certains actifs pourrait aller au-delà de 2050. L'analyse financière du Sustainability Solutions Group et de whatIf? Technologies s'étend jusqu'en 2094.

C'est un fait : la municipalité ne parviendra pas seule à réaliser les investissements nécessaires. C'est grâce à ses futures promesses de financement combinées à ses sources de recettes, aux sources de capitaux privés et aux fonds versés par les instances supérieures que la Ville parviendra à réduire ses émissions de GES.

Risques pour la mise en œuvre

L'atteinte du scénario de 100 % exigera des mesures et des investissements d'une ampleur et d'une portée sans précédent, dont la réalisation présente de nombreux risques. En voici quelques-uns :

- Aide financière des différents ordres de gouvernement et du secteur privé insuffisante pour répondre aux besoins budgétaires et de dotation en personnel pour la durée du plan d'action et d'investissement et les années suivantes.
- Coûts d'immobilisation et de fonctionnement supérieurs et économies et recettes inférieurs aux montants actuellement estimés pour le déploiement du projet et les opérations municipales.
- Obstacles réglementaires et problèmes de conformité qui freinent l'innovation de la municipalité et l'empêchent d'agir, soit parce qu'ils nuisent directement à ses propres opérations ou parce qu'ils limitent les façons dont elle peut apporter des changements dans la collectivité.
- Manque de participation ou d'adhésion de la part des résidents, des entreprises, de l'industrie ou de la municipalité qui a des répercussions sur la viabilité d'un nouveau programme ou d'une nouvelle norme.
- Opinions divergentes entre les intervenants sur la meilleure façon de réaliser le scénario de 100 %.
- Priorités ou processus concurrents du Conseil associés à d'autres projets de la Ville.
- Priorités concurrentes des directions générales, dont les mandats opérationnels actuels des services touchés et les changements à apporter à ces mandats pour atteindre les cibles de réduction d'Évolution de l'énergie.
- Disparités entre les exigences du modèle d'Évolution de l'énergie et les recommandations relatives aux plans et stratégies directement liées à Évolution de l'énergie. Soulignons que bien qu'on s'attende à ce que les options évaluées

comprennent un ou plusieurs scénarios qui permettront d'atteindre les cibles de réduction des GES exigées pour réaliser le scénario de 100 %, ceux-ci ne seront pas nécessairement recommandés.

- Calendriers de déploiement serrés qui peuvent ne pas tenir compte des processus habituels de la Ville, dont l'approbation du budget des immobilisations, le Plan financier à long terme, la planification, la consultation, les approbations, la conception, la construction et la mise en service, ni des processus d'approbation provinciaux et fédéraux qui sont hors du contrôle de la Ville.
- Modification des comportements, des politiques et des pratiques exemplaires découlant de la pandémie de COVID-19.

Pour atténuer ces risques, l'équipe de projet d'Évolution de l'énergie continuera à collaborer avec le personnel municipal de tous les échelons de l'administration, les partenaires communautaires, les autres ordres de gouvernement et le public pour mettre en place les projets d'Évolution de l'énergie, servir de ressource ou offrir du soutien technique pour les projets connexes. L'information et les recommandations nécessaires à la mise en œuvre des projets seront transmises à une équipe spéciale – réunissant tous les directeurs généraux, la cheffe des finances, le Bureau du directeur municipal et Santé publique Ottawa –, au Groupe de conseillers parrains sur les changements climatiques, au Comité consultatif sur la gérance environnementale, à une structure de gouvernance à l'échelle de la ville, et aux partenaires communautaires, afin d'harmoniser et coordonner les priorités, les plans de travail, les budgets annuels, les communications et les efforts de sensibilisation. L'équipe de projet d'Évolution de l'énergie continuera également à collaborer avec des pairs de municipalités de tout le pays afin d'échanger avec eux de l'information, des pratiques exemplaires et des leçons tirées des expériences par le truchement d'organismes comme le Canadian Urban Sustainability Practitioners network, le Clean Air Partnership et la Ligue des communautés canadiennes sobres en carbone.

Excédent des dividendes d'Hydro Ottawa (2019)

Un excédent des dividendes d'Hydro Ottawa de 2,6 millions de dollars sera accordé pour concourir aux objectifs d'Évolution de l'énergie, plus précisément pour financer les projets prioritaires, compléter les fonds des gouvernements fédéral et provincial le cas échéant, et mettre en œuvre des projets liés à l'efficacité énergétique, l'économie d'énergie et la production d'énergie renouvelable. Le financement servira à couvrir

l'ensemble des coûts de projet, y compris les études de faisabilité et de conception, les projets pilotes, la construction, ainsi que l'acquisition et l'installation d'équipement.

Prochaines étapes et comptes rendus

Mesures à faire approuver par le Conseil :

- Les 20 projets seront retravaillés à la lumière des commentaires du personnel, des parties prenantes et du public, au besoin. Pour certains projets, on pourrait évaluer diverses options allant plus loin que ce qui était prévu lors de la présentation au comité permanent et au Conseil. Une fois les projets complètement mis au point, ils seront présentés au comité permanent compétent et au Conseil aux fins d'approbation.
- Le personnel préparera un plan de dépenses décennal qui pourra être étudié lors des processus budgétaires municipaux annuels et intégré au Plan financier à long terme de la Ville. Les prochains plans financiers à long terme seront mis à jour au cours du mandat du Conseil actuel et de celui de 2022-2026. Les demandes budgétaires et de dotation en personnel seraient présentées dans le cadre du processus budgétaire annuel.
- Le personnel continuera à sensibiliser et à former le personnel et le public pour que la question des changements climatiques soit mieux ancrée à la Ville et dans la communauté.
- Le personnel préparera des présentations sur l'Évolution de l'énergie adaptées à chaque direction générale, qui débiteront au premier trimestre de 2021 et devraient permettre au personnel de tout l'appareil municipal d'avoir l'information qu'il lui faut, de s'y adapter et de continuer à s'y référer. Ces présentations seront offertes aux cadres des différentes directions générales et aux équipes des secteurs d'activité, directions ou unités appropriés, afin de favoriser l'harmonisation continue des priorités, des plans de travail et des budgets au sein de l'administration municipale.
- Le personnel prévoit réexécuter le modèle de gestion de l'énergie et des émissions tous les cinq ans pour voir où en sont la Ville et la communauté dans l'atteinte du scénario de 100 % et déterminer les mesures à prioriser à court terme.
- Dans le cadre de son compte rendu annuel sur le Plan directeur sur les changements climatiques, le personnel présentera l'inventaire municipal et communautaire des GES (pour mesurer les progrès de la Ville concernant la réduction de ses émissions de GES), une mise à jour sur l'avancement des projets

d'Évolution de l'énergie et des recommandations pour les faire progresser au besoin.

- Le Plan directeur sur les changements climatiques sera entièrement révisé et mis à jour en 2025. Évolution de l'énergie et la future Stratégie de résilience climatique seront aussi revus du même souffle, afin de déterminer si l'on pourrait fusionner ces trois documents en un seul.

Consultation et commentaires

La stratégie Évolution de l'énergie a été élaborée d'après les commentaires du personnel municipal, des intervenants clés et des experts-conseils (Leidos, Sustainability Solutions Group et whatIf? Technologies Inc.) reçus lors de consultations municipales et communautaires ciblées. Pour faciliter la collaboration entre la municipalité et les partenaires communautaires, l'équipe de projet a travaillé avec toute l'administration municipale, un comité consultatif, des groupes de travail généraux et techniques, trois groupes de conseillers parrains, le Comité consultatif sur la gestion environnementale, les experts-conseils et le public.

Entre 2016 et 2020, plus de 45 réunions avec au-dessus de 200 intervenants clés représentant environ 90 organismes à Ottawa ont été organisées dans le cadre du projet. Les commentaires de ces intervenants et des experts-conseils auxquels on a fait appel pour obtenir de l'information générale et une analyse technique ont été essentiels pour guider et éclairer l'élaboration du modèle de gestion de l'énergie et des émissions, de la stratégie et des documents à l'appui.

Les points de vue des intervenants ont été pris en compte dans la définition du nom, de la vision et des objectifs de la stratégie Évolution de l'énergie, ainsi que dans les études orientationnelles, le modèle de gestion de l'énergie et des émissions, l'analyse et le modèle financiers, et les aperçus des projets. La participation permanente du personnel, des conseillers, des partenaires communautaires et du grand public sera essentielle à la mise en œuvre d'Évolution de l'énergie. Une structure de gouvernance sera mise sur pied d'après le Plan directeur sur les changements climatiques pour la mise en œuvre de la stratégie.

BACKGROUND

In July 2015, development of a Renewable Energy Strategy was identified as a strategic priority within the 2015-2018 City Strategic Plan. With this approval, Council directed staff to complete a baseline analysis of energy supply and demand within the City of

Ottawa and assess options, in collaboration with community partners, for all partners to advance energy conservation, energy efficiency and renewable energy generation within their respective areas of control/influence.

In February 2016, City Council approved a motion to set a long-term community target to reduce GHG emissions by 80 per cent below 2012 baseline levels by 2050 ([ACS2016-CMR-ENV-0001](#)). Staff worked with key stakeholders and community partners to identify ways to reduce community-wide emissions in line with the new long-term target. As part of this process, the initiative was re-named Energy Evolution: Ottawa's Energy Evolution Strategy. Late in 2016, Energy Evolution was transferred to the newly formed Planning, Infrastructure and Economic Development Department.

In February 2017, the Environment and Climate Protection Committee (ECPC) received an update on Energy Evolution. The update included a vision for the project, a baseline energy analysis, renewable energy generation pathway studies and an update on the 2017 Catalyst Projects ([ACS2017-PIE-PS-0024](#)).

In December 2017, Council received Phase 1 of Energy Evolution and directed staff to initiate the recommendations in the report, including 33 short-term (2017-2020) actions, and complete Phase 2 of the Energy Evolution Strategy. Phase 2 included transportation, buildings, waste streams and energy storage pathways, developed in collaboration with community partners. Phase 2 also included the development of a custom-built energy, emissions and finance model ([ACS2017-PIE-EDP-0048](#)).

In June 2018, City Council approved a motion to set a short-term corporate target to reduce GHG emissions by 20 per cent below 2012 baseline levels by 2024 ([ACS2018-CCS-ECP-0005](#)).

In March 2019, City Council approved a motion to undertake annual GHG emission inventory reporting ([Motion No 9/6](#)) and approved that any surplus over the Hydro Dividend received in the 2018-2022 Term of Council be directed toward energy efficiency, conservation or renewable energy programs within Ottawa ([Motion No 9/3](#)).

In April 2019, City Council approved a motion to declare a climate emergency ([ACS2019-CCS-ENV-0005](#)) which included the following directions to Council and staff:

1. Officially declare a climate emergency for the purposes of naming, framing, and deepening our commitment to protecting our economy, our eco systems, and our community from climate change;

2. Establish a Council Sponsors Group comprised of representatives from the Standing Committee on Environmental Protection, Water and Waste Management, Planning Committee, Transportation Committee, Transit Commission, the Ottawa Board of Health and the Councillor Liaison of the Environmental Stewardship Advisory Committee;
3. Direct City staff to include the following in the review and update of the Air Quality and Climate Change Management Plan (AQCCMP):
 - a) An analysis of how the AQCCMP's long term target to reduce GHG emissions 80 per cent below 2012 levels by 2050 compares to the IPCC's targets for limiting global warming to 1.5°C;
 - b) Midterm (2030) corporate and community GHG emission reduction targets;
 - c) Climate Change mitigation and adaptation priorities for next five years (2019-2024) to embed climate change considerations across all elements of City business;
4. Direct City staff to include the following in the Energy Evolution Final Report:
 - a) Status update of Energy Evolution Phase 1 actions;
 - b) New concrete actions and resource implications (staff and financial) to achieve GHG emission reduction targets;
 - c) Use an equity and inclusion lens in the prioritization of actions;
 - d) Funding and savings options for the City when implementing emission reductions;
5. Direct City staff to report back, within the 2019 calendar year, on a spending plan for the Hydro Ottawa Dividends Surplus that would help reduce community and corporate GHG emissions beyond the scope of the City's current climate targets while also saving money;
6. Direct City staff to complete a vulnerability assessment and develop a climate resiliency strategy to reduce the impacts of a changing climate;
7. Recognize climate change as a strategic priority in the City's Strategic Plan and accompanying budget directions for the remaining Term of Council; and

8. Work with senior levels of government to accelerate ambition and action to meet the urgency of climate change and provide additional resources for municipalities and the public to reduce their GHG emissions and build resiliency to climate impacts.

In June 2019, City Council approved that any surplus over the 2018 Hydro Dividend budgeted at \$20 million be directed to the tax stabilization fund and be applied to the costs associated with the City's response to the two environmental emergencies experienced to date this year, less \$500,000 already committed by Council through Motion NO EPWWM 01/07 ([Motion 16/2](#)).

In January 2020, Council approved the Climate Change Master Plan, which included setting new short, mid, and long-term GHG emission reduction targets, and received a project status update ([ACS2019-PIE-EDP-0053](#)) on Energy Evolution including the draft energy and emissions model and a draft list of proposed projects to be more developed as part of the Energy Evolution Final Report. Council also directed staff to bring forward the final report for Energy Evolution: Ottawa's Community Energy Transition Strategy in Q2 2020 that includes:

- e. Finalized energy and emissions model;
- f. A financial and affordability analysis of the model to identify the investment required, the net present value, the return on investment, marginal abatement costs, and employment impacts;
- g. Detailed descriptions of the proposed Energy Evolution projects listed in this report including roles and responsibilities, timelines, municipal authorities and barriers to implementation, equity and inclusion considerations, and resourcing needs;
- h. A proposed spending plan for the 2019 Hydro Ottawa dividend surplus once the value of the dividend surplus is known.

In January 2020, Council also directed staff to consider a Climate Impact lens for the template for all Standing Committee reports and that this consideration be referred to the Mid-term Governance Review ([Motion 4/8](#)).

On June 24, 2020, Council received the climate projections for the National Capital Region ([ACS2020-PIE-EDP-0014](#)), which provided a comprehensive analysis of future climate conditions in the National Capital Region to 2100. The report included projected changes in temperature, rainfall, snow, wind and extreme events such as freezing rain,

tornadoes and storms. It is the first phase in a three-phase process. The next phase is to undertake climate vulnerability and risk assessments (Phase 2) followed by the development of an Adaptation and Resiliency Plan (Phase 3). The climate projections will also inform the development of the Official Plan, Master Plans and Asset Management Plans.

On July 15, 2020, Council directed staff to apply to the Federation of Canadian Municipalities (FCM) Green Municipal Fund for funding to launch the proposed Better Homes Loan Program and approve in principle the Better Homes Loan Program Feasibility Study and Program Design. In the event the City is successful with its application, Council also directed staff to report back to the Finance and Economic Development Committee and Council for approval of the Better Homes Loan Program, update the City's current Local Improvement Charge policy to include energy efficiency, renewable energy and water conservation, and secure external financing to launch the program, as required. The City expects to be notified of FCM's decision by the end of 2020.

This report and associated recommendations advance the 2019-2022 Term of Council priority Environmental Stewardship by identifying projects to reduce the City's GHG emissions and embed climate change considerations across all operations. The recommendations of this report aim to strengthen Council's commitment to naming, framing, and deepening Ottawa's commitment to protecting our economy, our ecosystems, and our community from climate change and it helps implement the Climate Change Master Plan.

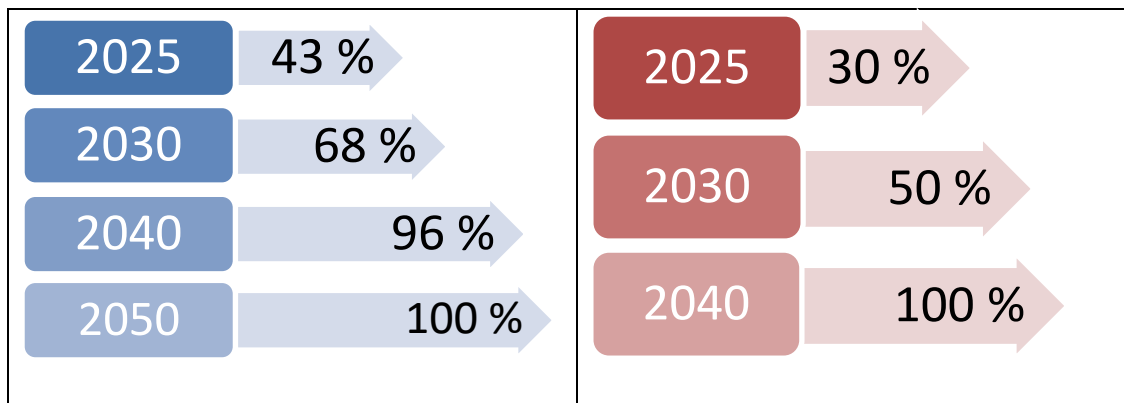
The Energy Evolution final report responds to Council's directive to identify the scale of change and investment required to achieve Council's long-term GHG reduction targets. It acknowledges that achieving these targets will require concerted efforts and collaboration across all sectors of society, and that the scope and scale required is unprecedented in both action and investment. Realizing this action and investment carries many risks including that the strategy is currently under resourced and unfunded and will rely on involvement and funding from all levels of government.

DISCUSSION

Worldwide, climate scientists agree that the fast-rising global temperature has created a climate crisis³. In 2018, the Intergovernmental Panel on Climate Change (IPCC) released the [Special Report on Global Warming of 1.5°C](#) advocating for the need to limit global warming to 1.5°C to avoid catastrophic impacts⁴. Scientists estimate that global warming is likely to reach 1.5°C as early as 2030⁵. Limiting global warming to 1.5°C is possible, but it will “require rapid, far reaching and unprecedented changes in all aspects of society”⁶.

While the current climate trends are alarming, the technological solutions, skills and knowledge exist to transition away from fossil fuels to clean, renewable energy sources. According to the IPCC and international scientific consensus, there are about 10 years to make significant change if average global temperature increase is to be limited to 1.5°C.⁷

In January 2020, Council approved the Climate Change Master Plan and adopted new short, mid and long-term community targets to reduce GHG emissions 100 per cent by 2050 and corporate targets to reduce GHG emissions 100 per cent by 2040.



³ Carrington, D. (2019) Climate Crisis: 11,000 scientists warn of ‘untold suffering’, *The Guardian*, 5 Nov. <https://www.theguardian.com/environment/2019/nov/05/climate-crisis-11000-scientists-warn-of-untold-suffering>

⁴ IPCC Press Release. Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments. October 8, 2018. https://www.ipcc.ch/site/assets/uploads/2018/11/pr_181008_P48_spm_en.pdf

⁵ ibid

⁶ ibid

⁷ IPCC Press Release. Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments. October 8, 2018. https://www.ipcc.ch/site/assets/uploads/2018/11/pr_181008_P48_spm_en.pdf

Figure 1: Short, Mid and Long-term Community Targets to Reach 100% by 2050 Target	Figure 2: Short, Mid and Long-term Corporate Targets to Reach 100% by 2040 Target
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The Climate Change Master Plan is the framework for how Ottawa will mitigate and adapt to climate change over the next three decades. Its vision is to take unprecedented, collective action that transitions Ottawa to a clean, renewable and resilient city by 2050 and sets eight priority actions for the next five years (2020-2025) that can be embedded into City business. The implementation of Energy Evolution is one of the eight priority actions.

The first three recommendations in this staff report describe what Energy Evolution entails and how it will be implemented in the short-term. The fourth recommendation identifies a proposed spending plan to support implementation of Energy Evolution through the Hydro Ottawa dividend surplus.

Recommendation #1: Receive the final report for Energy Evolution: Ottawa’s Community Energy Transition Strategy and supporting documents attached as Document 1 through Document 9 and summarized in this report;

Recommendation #2: Receive the list of projects identified in Documents 7 and 8 to be more developed by staff and brought before Standing Committee and Council for approval, where required;

Recommendation #3: Direct staff leading new or updates to City plans, strategies and policies to take into consideration the energy emissions model and the City’s GHG reduction targets in the development of such plans, strategies and policies.

Energy Evolution sets the framework for what it will take for Ottawa to achieve the Council approved GHG emission reduction targets that are in line with what the IPCC calls for. It is a community energy transition strategy designed to manage energy consumption, promote the use of renewable energy and advance local economic development opportunities in Ottawa. Developed in collaboration with more than 40 City staff representing six departments, almost 200 public and private stakeholders representing more than 90 organizations, and the Climate Change Council Sponsors Group, Energy Evolution is a community-wide initiative with a vision to transform Ottawa into a thriving city powered by clean, renewable energy.

This strategy responds to Council’s directive to identify the scale of change and investment required to achieve Council’s long-term GHG reduction targets. It

acknowledges that achieving these targets will require concerted efforts and collaboration across all sectors of society, and that the scope and scale required is unprecedented in both action and investment. Realizing this action and investment carries many risks including that the strategy is currently under resourced and unfunded and will rely on involvement and funding from all levels of government. These risks are described in more detail in the risks to implementation section below.

Energy and Emissions Model

At the core of Energy Evolution is a comprehensive, custom-built energy, emissions and finance model (refer to the technical report in Document 4 for full details). The model incorporates growth, land use, buildings, transportation, and waste data with energy conservation, efficiency, and renewable energy pathway studies and presents two GHG emission scenarios:

- A Business-As-Planned scenario (BAP scenario).
- A 100 per cent by 2050 target scenario (100 per cent scenario).

The model projects that Ottawa's emissions will remain relatively flat for the next 30 years under the BAP scenario, far from achieving the long-term target to reduce emissions by 100 per cent by 2050. In order to achieve the 100 per cent scenario, the model identifies the need to greatly reduce energy demand through conservation and efficiency and projects that:

- All fossil fuels will have to be phased out.
- Heating and transportation systems will have to be nearly fully electrified or transition to zero emission.
- Waste heat utilization and renewable natural gas production will have to be added.
- Sufficient renewable electricity (mostly wind and solar) generation and electricity storage will be required to meet demand and offset emissions on the provincial grid.

Benefits of a Community Energy Transition Strategy

There are many co-benefits that can be achieved through a community energy transition to low-carbon energy sources, including:

- Local Economic Development, including job creation, access to funding, and local energy dollar creation.
- Improvements to Public Health.
- Equity and Inclusion.
- Energy Resiliency and Security.
- Mitigating Future Risks.

Achieving the 100 per cent Scenario

The model projects what outcomes are required to meet the 100 per cent scenario in five key sectors: Land Use and Growth Management, Buildings (New and Existing), Transportation, Waste and Renewable Natural Gas, and Electricity. It will require implementation of the municipality's ongoing and planned actions, implementation of new actions that the municipality has not yet approved, and action and investment from all segments of society. Tables 1 through 7 and Figure 3 provide a summary of the projected GHG emission reductions and proposed projects by sector to achieve the 100 per cent scenario.

Table 1 identifies the projected emissions reduction by sector to achieve the 100 per cent scenario. According to the model, the buildings and transportation sectors are projected to account for roughly 75 per cent of cumulative emission reductions from now until 2050. The remaining 25 per cent is projected to come from the waste and renewable natural gas, and electricity sectors.

Table 1: Projected emission reductions by sector to achieve the 100 per cent scenario

Sector	Percentage (%) of Total Projected GHG Emission Reductions	
	2030	2050
Land Use and Growth Management	Embedded in other actions	Embedded in other actions
Buildings (New and Existing)	37.1%	38.0%

Transportation	29.9%	36.7%
Waste and Renewable Natural Gas	26.1%	16.9%
Electricity	6.5%	8.5%

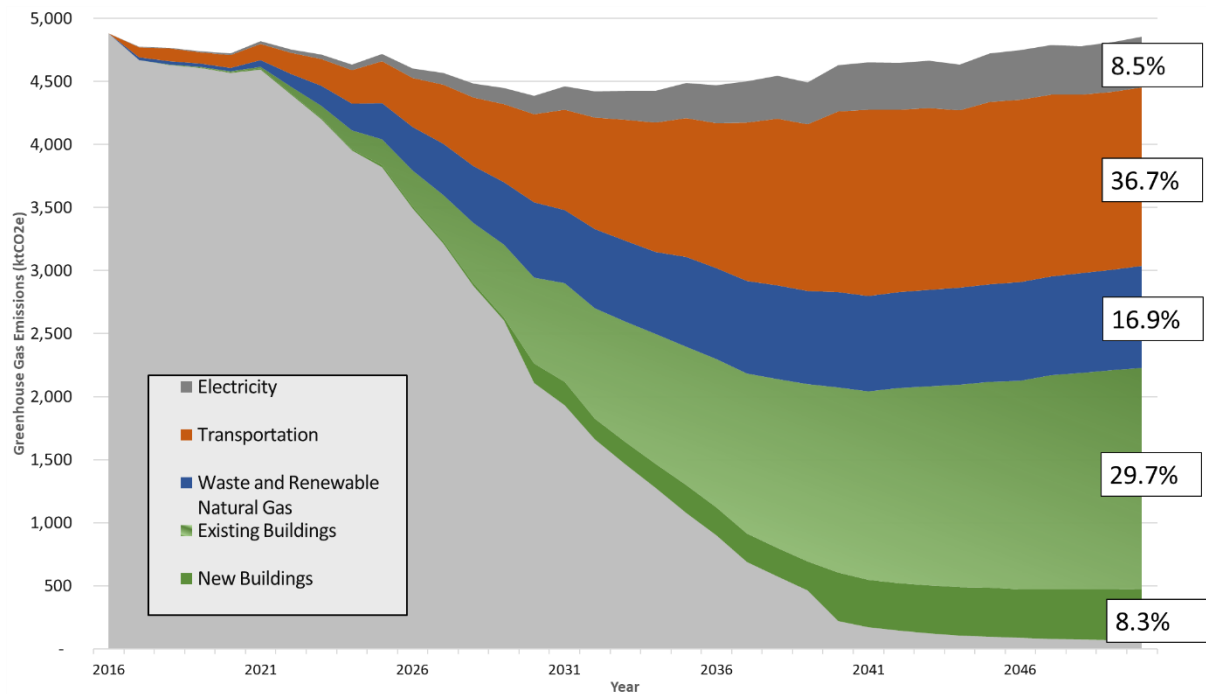


Figure 3: Projected community-wide GHG emission reduction by sector, 2016-2050

Within those sectors, 39 actions have been identified to achieve the 100 per cent scenario. Table 2 identifies the top five actions, which combine for roughly 80 per cent of projected cumulative GHG emission reductions required.

Table 2: Projected top five actions from the energy and emissions model by 2050

Actions	Cumulative GHG Reductions by 2050 (per cent)
1. Electrify personal vehicles	22.7%
2. Retrofit residential buildings ⁸	17.9%
3. Divert organics and create renewable natural gas ⁹	17.2%
4. Retrofit commercial buildings ¹⁰	15.1%
5. Transition to zero emission commercial fleets	8.3%

Priority Projects

A total of 20 projects over the next five years (2020-2025) have been identified to accelerate and scale action and investment to achieve the 100 per cent scenario. Actions identified in earlier phases of Energy Evolution have been incorporated into the 20 projects (refer to Document 10 to see how these projects were incorporated).

The projects identified in the final Energy Evolution strategy were selected based on their direct GHG reduction potential or ability to enable GHG reductions in order to meet the requirements under the energy and emissions model. More work is required in each of the projects to identify the specific actions associated with the projects and then prioritize them with equity and inclusion considerations. **Error! Reference source not found.** Most of the projects identified are to be led by the municipality and are to be undertaken in collaboration with community partners. The Energy Evolution project team will work with staff, stakeholders, and the public to further develop the projects and identify technical, operational, financial, staffing, advocacy and equity and inclusion considerations, as appropriate, prior to going to Standing Committee and Council for approval.

⁸ Includes retrofitting pre and post-1980 homes, low rise residential and apartment building heat pumps

⁹⁹ Includes waste diversion and RNG production, rural biogas generation, waste heat, and power to gas

¹⁰ Includes retrofitting commercial, offices, and residential buildings, and commercial building heat pumps

For equity and inclusion considerations, staff will apply the City’s equity and inclusion lens and consult with equity seeking groups in the development of projects, where applicable. To support these efforts, the Energy Evolution project team will make use of the Energy Poverty and Equity Explorer tool¹¹ developed by Canadian Urban Sustainability Practitioners (CUSP) and continue to work with municipal colleagues across the country to share information, best practices, and lessons learned.

All projects require further development and are contingent on future Standing Committee and Council approval as well as future staff and budget (capital and operating) pressures. To achieve the GHG reductions required in the 100 per cent scenario, some projects may evaluate options beyond what’s been identified prior to going to Standing Committee and Council.

Tables 3 through 8 provide an overview of the 20 projects. Document 7 provides additional detail on each of the projects including which Standing Committee the project will report to, a project description, co-benefits, risks, project metrics, key departments, key community partners, project milestones, resources, delivery mechanisms, investment profiles and projected emissions reduction profiles. Document 8 summarizes the 20 projects.

Table 3: Projects to be undertaken in the land use and growth management sector (2020-2025)

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
<p>Integration of energy and climate mitigation policies into the new Official Plan and supporting master plans to address multiple challenges being faced by the city over the next 25 years, climate change being one of the most critical. The Official Plan and supporting master plans will be guided by the Climate</p>	<p>Energy and climate mitigation policies embedded in new Official Plan and supporting Master Plans</p>	<p>Enabler</p>

¹¹ The Energy Poverty and Equity Explorer tool, developed by Canadian Urban Sustainability Practitioners (CUSP), offers municipalities access to relevant data so they can better understand energy poverty, and other equity and affordability challenges in their communities. The resource is designed to help municipal staff develop equitable and inclusive clean energy programs to meet residents’ needs (<https://energypoverty.ca/>).

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
Change Master Plan with Council approved targets to reduce GHG's by 2050.		

Table 4: Projects to be undertaken in the buildings sector (2020-2025)

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
Residential Building Retrofit Accelerator Program to accelerate residential, multi-unit residential, and commercial and institutional building retrofits through marketing, information and financial mechanisms	<ul style="list-style-type: none"> • 17% of existing residential buildings renovated or replaced • 20% of existing residential buildings transition to heat pumps • 10% of domestic hot water heating transitions to non-emitting sources 	22% (222 kt CO ₂ e)

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
<p>Commercial Building Retrofit Accelerator Program to accelerate multi-unit residential, commercial, industrial, and institutional building retrofits through marketing, information and financial mechanisms</p>	<ul style="list-style-type: none"> • 15% of existing commercial buildings renovated or replaced • 20% of existing commercial buildings transition to heat pumps • 10% of domestic hot water heating transition to non-emitting sources 	18% (175 kt CO ₂ e)
<p>Building Retrofits through Local Improvement Charge Program to accelerate and finance deep energy retrofits of buildings through the local improvement charge mechanism</p>	Embedded within the Residential and Commercial Retrofits Accelerator Programs	
<p>Energy Community Improvement Plans to incentivize superior energy performance and deep energy retrofits using tax grants.</p>	Embedded within the Residential and Commercial Retrofits Accelerator Programs	
<p>Community Building Heating Strategy to address infrastructure and utility requirements for new ways of heating buildings</p>	30% drop in GHG intensity of federal district energy system	9% (92 kt CO ₂ e)

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
Municipal Buildings Renewal and Program to achieve higher building energy performance improvements in municipally owned buildings	Ramping towards having 27% of municipal buildings net zero by 2030	1% (12 kt CO2e)
Update Municipal Green Building Policy to align with corporate GHG reduction targets	Embedded within the Municipal Buildings Renovation and Retrofit Program	
High-Performance Development Standard to improve building design and construction across the community and support an industry-wide transition of new buildings to net zero emissions ready by 2030.	Ramping towards all new buildings being net zero energy by 2030	6% (59 kt CO2e)

Table 5: Projects to be undertaken in the transportation sector (2020-2025)

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
Personal Vehicles Electrification Strategy to enable and encourage personal electric vehicle adoption.	7% of personal vehicle sales are EVs in 2025	5% (49 kt CO2e)
Zero Emissions Commercial Vehicles Strategy to enable and encourage commercial electric vehicle adoption.	18% of commercial fleet is electric by 2025	6% (63 kt CO2e)
Municipal Green Fleet Plan Update considering corporate GHG reduction targets.	Progress towards the 2030 target	<1% (<10kt CO2e)

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
Alternative Energy Sources for Transit Project to build a 100% zero emissions Concept Transit Network ¹² by 2030.	48% of OC Transpo's passenger fleet is zero emission by 2025	6% (63 kt CO2e)
Transportation Mode Shift to reduce the reliance on personal vehicles in favour of sustainable modes including public transit, walking, cycling and carpooling.	Steady progress towards the 2030 mode share targets	3% (33 kt CO2e)

Table 6: Projects to be undertaken in the waste and renewable natural gas sector (2020-2025)

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
Organics Resource Recovery Strategy to reduce emissions associated with managing waste and enable energy from waste. ¹³	Significant increase in organics diversion starting in 2023	7% (73 kt CO2e)
Renewable Natural Gas Strategy to supply GHG neutral gas and other heating to the community.	Initial renewable natural gas production in the community starting in 2022	12% (122 kt CO2e)

Table 7: Projects to be undertaken in the electricity sector (2020-2025)

¹² The Concept Transit Network refers to the 2013 Transportation Master Plan rapid transit 2031 network concept.

¹³ This will be considered for residential waste management through the municipal Solid Waste Master Plan (SWMP), expected to be complete by the end of Q2 2022. The SWMP will determine the direction and goals for residential solid waste management, diversion, and reduction over the next 30 years.

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
<p>Electricity Resource Strategy to develop local or regional renewable electricity supplies and advocate for zero-emission generation at the provincial level.</p>	<p>Install:</p> <ul style="list-style-type: none"> • 150 MW Solar • 20 MW Wind • 20 MW Hydro • 20 MW Electricity Storage 	<p>7% total, comprised of:</p> <ul style="list-style-type: none"> • Solar: 57 kt CO2e • Wind: 4 kt CO2e • Hydro: 10 kt CO2e

Table 8: Enabling projects to support meeting the 100% scenario (2020-2025)

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
<p>Climate Ambassadors Network to engage commercial and institutional champions to meet long term GHG reduction targets</p>	<ul style="list-style-type: none"> • Reduced barriers to implementation • Increased funding to support implementation 	<p>Enabler</p>
<p>Climate Change Education and Outreach Program to engage the public in collective private action to meet long term GHG reduction targets</p>	<ul style="list-style-type: none"> • Increased awareness and action 	<p>Enabler</p>

Project Description	Project Metrics	Cumulative GHG Reduction Requirements
Fund the Evolution to further assess potential sources of municipal funding	<ul style="list-style-type: none"> Increased funding to support implementation 	Enabler

Multiple City plans and strategies are in the process of being developed or updated that directly relate to Energy Evolution, including the new Official Plan, the Transportation Master Plan Update, the Solid Waste Master Plan, the Alternative Energy Sources for Transit Project, and the Municipal Green Fleet Plan. Recommendations that come out of these plans and programs will have direct impacts on Ottawa's GHG emissions and affect Ottawa's ability to meet Council's approved GHG emission reduction targets. Given their significance, each of these plans and programs have been captured within the 20 projects in the Energy Evolution strategy (Document 7). The results of the Energy Evolution modelling exercise have been shared with City staff and consultants working on these plans to facilitate knowledge and data sharing and align work plans and consultation activities where possible.

As these plans will come forward after Energy Evolution, it should be understood that:

- These plans will evaluate a range of options to achieve each respective plan's goals and targets, and outcomes may differ than what has been identified in this report and Document 1.
- It is expected that the range of options will include one or more scenarios that achieve the GHG reductions required in the 100 per cent scenario, but those scenario(s) may not ultimately be recommended.
- Data provided by City departments to inform the model was based on the best available data at the time and may differ from the data used to inform the plans and programs.
- Different models may be used to do a more detailed and sector specific assessment of the projected GHG implications, providing a level of granularity not available in Energy Evolution model.
- The model includes aggressive implementation timelines which may not account for City processes that typically take several years prior to project implementation, including Council direction, capital budget approval, planning, consultation, approvals, design, construction, and commissioning. It also may not account for provincial or federal approval processes that are out of the City's control.
- All plans are contingent on future Standing Committee and Council approval as well as future staff and budget (capital and operating) pressures.

As the strategy is implemented, new City plans and policies may also be proposed and others will be updated including the Asset Management Plans, the Long-Range Financial Plan and other plans as appropriate. The results of the Energy Evolution modelling exercise can provide detailed information, assumptions and projections on energy, fuel, emissions, and financials that should be considered to achieve Council's GHG emission reduction targets.

Staff recognize that while development of the energy and emissions model started in 2017, the final energy and emissions model is only being received by Committee and Council in October 2020 and it is understood that there will be challenges in meeting some of the project start dates. The timelines were designed to present the most cost-effective path forward for each action based on the model, but it is acknowledged that these will be difficult to achieve given the many risks to implementation identified

below. Delaying start times could result in the project being more expensive to achieve as well as stranded assets (i.e.; a natural gas boiler that needs to be replaced with an electric one to meet targets, but before the useful life of the natural gas one is done). In addition, some projects have revised their timelines for project completion in recent months due to external circumstances. This is particularly true for the expected completion dates of the Solid Waste Master Plan and the Transportation Master Plan Update, which are Q2 2022 and fall 2023, respectively. Since projects that are contingent on the completion of these master plans cannot commence for several years, this poses a significant risk to meeting the projected GHG emission reduction requirements over the short-term (up to 2030) and beyond. Achieving the target reductions is still possible if project implementation starts later than projected as long as the completion dates are realized.

Financial Analysis

A community-wide financial analysis was undertaken to analyze those Energy Evolution actions that have financial impacts. The analysis represents investments required by and potential savings for everyone in Ottawa including the municipality, residents, businesses, institutions, and organizations.

All financial information presented represents high level estimates that are currently uncommitted and unfunded capital and operational needs. The analysis is intended to:

- Identify the magnitude of funding required to implement Energy Evolution for the municipality and community partners, including senior levels of government.
- Assess which potential funding sources, financial mechanisms or delivery mechanisms may be most appropriate for implementing Energy Evolution actions.
- Inform strategic discussions, policy direction, annual budget cycles and the Long-Term Financial Plan.

The analysis is not intended to provide sufficiently accurate financial information to make decisions and does not commit the municipality or any partners to any financial decisions or provide direction on how to address funding gaps. This level of detail will be brought forward to Standing Committee and Council when approval is sought on priority projects.

The financial analysis projects that, in order to meet the 100 per cent scenario, cumulative community-wide investment from 2020 to 2050 will total \$57.4 billion with a

present value of \$31.8 billion. All costs and net returns projected for the 100 per cent scenario are incremental, above and beyond the BAP scenario. In the short term, annual community-wide capital costs are higher up-front as investments in public infrastructure, buildings, vehicles, energy-related equipment and renewables are made that could lead to long-term savings.

Starting in 2032, there is a projected net financial benefit to society when the net annual savings and potential revenues could exceed the annual investments. Investments made by 2050 could accrue a community-wide net return of \$87.7 billion (\$12.4 billion when discounted to 2020\$) over the life expectancy of the asset¹⁴. In the year 2050, the community will have accrued a potential net return of \$28.4 billion, (\$2.7 billion in 2020\$). Table 8 shows how the net return could accumulate to 2050 and beyond based on the life expectancies of the investments made.

Table 9: Financial net value to society for achieving the 100 per cent scenario, 2020 - 2050

Capital Investments and Savings	Undiscounted (\$Billion)	Present value (4.5% discount rate) (\$Billion)
Capital investments	(\$57.4)	(\$31.8)
Operations and maintenance savings	\$22.6	\$9.0
Energy savings	\$70.9	\$18.1
Carbon price savings	\$13.4	\$4.0
Revenue from local generation	\$38.2	\$13.1
Community-Wide Net Return	\$87.7	\$12.4

Annual incremental community-wide investments of approximately \$1.6 billion per year net present value would be required for the next decade (2020-2030) to achieve GHG reductions in line with the model and the 100% scenario. Of this, \$581 million per year net present value would be required (2020-2030) for transit and active transportation

¹⁴ The life expectancy of some assets may extend beyond 2050. The end date for Sustainable Solution Group and whatIf Technology Inc's financial analysis is 2094.

infrastructure and \$41 million per year net present value would be required (2020-2030) for municipal building retrofits, zero emission non-transit municipal fleet, sewer heat capture, and renewable natural gas generation at wastewater, solid waste or agricultural facilities. Annual incremental community-wide investments drop to around \$782 million per year from 2031-2050. During this period, net returns are expected to be much higher primarily due to saved energy costs and earned revenues from local energy generation. A breakdown of the actions bundled into each of the sectors is provided in Table 9.

Table 10: Breakdown of net costs and returns by sector (Net Present Value 2020\$, in billions)

Sector	Estimated Net Costs (\$Billions)	Estimated Net Returns by 2050 (\$Billions)	Estimated Net Returns over Life of Investment (\$Billions)
Land Use and Growth Management	\$0	\$0	\$0
Buildings (New and Existing)	(\$17.7)	(\$6.0)	\$0.4
Transportation	(\$7.9)	\$3.9	\$4.8
Waste and Renewable Natural Gas	(\$0.2)	\$0.01	\$0.02
Electricity	(\$6.0)	\$4.8	\$7.2
Total	(\$31.8)	\$2.7	\$12.4

It is recognized that the municipality alone will not be able to accomplish the scale of investment required. Future year funding commitments by the municipality, combined with revenue streams, private capital sources, and funding from senior levels of government will ultimately influence the City's success in achieving emissions reductions. Approval of future municipal annual incremental operating requests will be critical to expanding the staffing and resource capacity of departments who are leading projects to advance Energy Evolution. This funding would enable program optimization

and improve the likelihood of leveraging capital from external sources, including federal grants and infrastructure monies.

Risks to Implementation

The scope and scale required to achieve the 100 per cent scenario is unprecedented in both action and investment. Realizing this action and investment carries many risks.

These risks may include:

- Insufficient financial support from different levels of government and the private sector to meet the budgetary and staffing needs of the 20 Energy Evolution projects and beyond.
- Higher capital and operating costs, as well as lower than expected saving and revenues, beyond what's currently estimated for project implementation and municipal operations.
- Regulatory barriers and compliance issues that impede the municipality from action and innovation, either by impeding the municipality directly through its own operations or impeding how the municipality can enact change in the community.
- Lack of uptake or buy-in from residents, businesses, industry or the municipality that impacts the viability of a new program or new standard.
- Diverging interpretations between stakeholders on how best to achieve the 100 per cent scenario.
- Competing Council priorities or processes associated with other projects across the corporation.
- Competing departmental priorities including current operational mandates of impacted services, and how their mandates will need to change in order to work to achieve the emissions reductions in Energy Evolution.
- Lack of alignment between what the Energy Evolution model calls for and recommendations that come forward for plans and strategies that directly relate to Energy Evolution. Note that although it is expected that the range of options evaluated will include one or more scenarios that achieve the GHG reductions required in the 100 per cent scenario, those scenario(s) may not ultimately be recommended.

- Aggressive implementation timelines which may not account for typical City processes including capital budget approval, long-range financial plan, planning, consultation, approvals, design, construction, and commissioning or account for provincial or federal approval processes that are out of the City's control.
- Changes in behavior, policy, and best practices related to COVID-19.

To mitigate these risks, the Energy Evolution project team will continue to work with city staff at all levels across the corporation, community partners and the public to build out Energy Evolution projects, and act as a resource or provide technical advice on related projects. Information and recommendations to support project implementation will be shared with a Tiger Team comprised of all General Managers, the Chief Financial Officer, the City Manager's Office and Ottawa Health, the Climate Change Council Sponsors Group, the Environmental Stewardship Advisory Committee, and community partners to align and coordinate priorities, work plans, annual budgets, communications and advocacy efforts. The Energy Evolution project team will also continue to work with municipal colleagues across the country through organizations like the Canadian Urban Sustainability Practitioners network, Clean Air Partnership and Low Carbon Cities Canada to share information, best practices, and lessons learned.

Climate change and COVID-19

COVID-19 has demonstrated the potential to mobilize significant resources and take widespread, decisive action based on scientific evidence. Climate change requires a similar scale of response although the actions required, the time frame to complete them and the social impacts are markedly different. COVID-19 has had global, national, and local impacts on all aspects of society, impacting everything from personal commutes to the amount of energy consumed in buildings to manufacturing of goods.

While these impacts resulted in a small decline in GHG emissions, the decline in emissions is temporary and the most acute effects are expected over the next five years. The decline in emissions is not expected to have a significant impact on the scale or scope of what's required to achieve the 100 per cent scenario over the next 30 years. Additionally, the World Health Organization states that while the pandemic is a public health emergency of international concern, climate change is a gradually increasing stress that may be the defining public health threat of the century¹⁵.

¹⁵ The World Health Organization. 2020. *Q&A Climate Change and COVID-19*. Accessed September 2020. <https://www.who.int/news-room/q-a-detail/q-a-on-climate-change-and-covid-19>

The energy and emissions model was developed prior to the pandemic and has not been updated since. Staff recognize that there are a number of current trends that could impact the model and financial analysis, including reduced transit ridership and changes in energy usage in residential and commercial buildings, and will continue to monitor trends and consider these impacts. Staff will also continue to monitor, advocate for, and provide input into potential provincial and federal stimulus funding that supports recovery efforts and advance climate change initiatives.

COVID-19 implications will be assessed for individual projects as part of future recommendation that will go to Standing Committee and Council for consideration, along with additional information about capital, operational, technical, financial and equity and inclusion considerations.

Next Steps and Reporting

Subject to Council approval, all 20 projects will be further developed with input from staff, stakeholders, and the public as required. In some cases, working groups comprised of staff and community partners will be established to help advance projects. Once projects are fully developed, staff will bring projects to the appropriate Standing Committee and Council for approval, where required.

To aid in the success of these projects, staff will:

- Develop a 10-year spending plan that can be considered in annual municipal budget processes and feed into the City's Long-Range Financial Plan. The next Long-Range Financial Plans will be updated within this term of Council and at the beginning of the 2022-2026 term of Council. Budget and staffing requirements would be brought forward as part of the annual budget process.
- Continue to engage with and provide training to staff and the public to embed climate considerations more broadly across the corporation and the community. As the City's center of expertise for climate change and resiliency, the Climate Change and Resiliency team will also continue to provide technical expertise on corporate projects and support community initiatives.
- Prepare department-specific presentations on Energy Evolution starting in Q1 2021 to ensure that staff across the corporation are aware of, can align with, and continue to make use of relevant information. Presentations will include an overview of Council's approved GHG emission reduction targets, relevant aspects of the energy and emissions model, priority projects, departmental

implications, and next steps. They will be delivered to Departmental Leadership Teams and offered to appropriate service area, branch or units teams to support ongoing alignment of priorities, work plans, and budgets.

To keep the model relevant, staff on the Energy Evolution project team are planning to be trained by the consultants on how to use the model in-house. This is expected to reduce costs and increase the value of the model over the long-term. Training will be explored for staff in other teams as well as external stakeholders who may also be interested in being trained on how to use the model so it can be used to support the development of plans, policies, projects and programs to meet the long-term GHG emission reduction targets. Staff intend to rerun the energy and emissions model every five years to assess how the City and the community are tracking towards achieving the 100 per cent scenario and to determine what actions should be prioritized in the short-term. Subject to capacity and budget, staff may run parts of the Energy Evolution model before five years if it is helpful to evaluate the GHG implications of significant City plans such as the new Official Plan, Transportation Master Plan Update and Solid Waste Master Plan.

A status update on the Climate Change Master Plan will be provided on an annual basis. As part of the annual status, staff will:

- Include annual corporate and community GHG inventories to help gauge Ottawa's progress towards GHG emission reduction targets.
- Provide a status update on the Energy Evolution projects.
- Provide recommendations to advance the projects as required.

The next annual Climate Change Master Plan update is scheduled to be brought forward to the Standing Committee on Environmental Protection, Water, and Waste Management in December 2020. This update will also include a proposed governance structure and potential working groups to support Energy Evolution project implementation. A full review and update of the Climate Change Master Plan will be completed in 2025. Simultaneously, Energy Evolution and the future Climate Resiliency Strategy will be reviewed to see whether the three standalone documents can be merged into one.

Recommendation # 4: Approve that the 2019 Hydro Ottawa dividend surplus of \$2.6M be used to fund the proposed spending plan attached as Document 11 and summarized in this report.

In 2018, Council approved a one-time budget of \$633,000 to fund Energy Evolution projects through the 2017 Hydro Ottawa dividend surplus.

In 2019, Council approved that the Hydro Ottawa dividend surplus received in the 2018-2022 Term of Council be directed toward energy efficiency, conservation or renewable energy programs. Specific projects are to be recommended by staff and approved by the Standing Committee on Environmental Protection, Water and Waste Management and Council once the specific dollar amount is known.

In 2020, Council approved a budget of \$210,000 to fund Energy Evolution projects through the 2018 Hydro Ottawa dividend surplus. Document 10 provides a status update on projects funded through the 2017 Hydro Ottawa and 2018 Hydro Ottawa dividend surplus.

In an August 2020 memorandum to Council, the City's Chief Financial Officer confirmed that the 2019 Hydro Ottawa dividend surplus of \$2.6 million will be allocated in support of Energy Evolution.

Document 11 proposes a spending plan for the 2019 Hydro Ottawa dividend surplus. The spending plan proposes funding to support Energy Evolution priority projects, leverage federal and provincial funds where possible, and implement energy efficiency, conservation and renewable energy generation projects. Projects include, but are not limited to, municipal energy conservation, efficiency and fuel switching projects, energy projects at ROPEC, electrical work, upgrades and infrastructure to support the electrification of vehicles, and communication, education and engagement programs that support Energy Evolution objectives. The funding is for all project related costs including feasibility and design studies, pilots, construction, and equipment acquisition or installation.

RURAL IMPLICATIONS

Revenue generation and employment opportunities associated with biogas, biomass and large-scale solar energy generation facilities are anticipated for Ottawa's rural area. The cost of personal transportation for rural residents may decrease as electric vehicles and charging infrastructure are more widespread.

CONSULTATION

Energy Evolution was developed with input from City staff and key stakeholders through targeted corporate and community consultation. To facilitate collaboration between the municipality and community partners on Energy Evolution, the project team worked with City staff from across the corporation, a Sounding Board, general and technical working groups, three Council Sponsors Groups, the Environmental Stewardship Advisory Committee and the public. Details about consultation with each of these stakeholder groups is described below.

Between 2016 and 2020, the project hosted over 45 meetings with more than 200 key stakeholders representing approximately 90 organizations in Ottawa. Inputs from these stakeholders, as well as consultants engaged to provide background information and technical analysis, has been critical in guiding and informing the development of the energy and emissions model, the strategy and supporting documents.

Input from stakeholders has been considered in Energy Evolution's name, vision, goals, pathway studies, the energy and emissions model, financial analysis and financial model, and project overviews.

Ongoing engagement with staff, councillors, community partners and the public will be crucial to implementing Energy Evolution. A governance structure to support implementation will be developed under the Climate Change Master Plan.

City Staff

Staff from across the corporation have been involved since the beginning of the project through an initial scoping advisory board, the Sounding Board, technical working groups, and countless individual consultations and meetings with the Energy Evolution project team. Staff provided input on project scope, emission targets, pathway studies, the energy and emissions model, financial analysis and financial model, project overviews, and proposed spending plan for the Hydro Ottawa dividend surplus.

An Interdepartmental Working Group was established in 2018 with representatives from six departments, Ottawa Public Health, and the City Manager's Office to provide input into the development of the Climate Change Master Plan and Energy Evolution. Staff have presented to the Interdepartmental Working Group four times since May 2019. Since November 2019, the Interdepartmental Working Group has provided three rounds of feedback on the Energy Evolution strategy and supporting documents with more than 40 key staff providing comment and feedback.

Details of the energy and emissions model have also been provided to staff and consultants working on the Official Plan and supporting master plans to facilitate knowledge and data sharing and align work plans and consultation activities where possible. The project team also hosted a City staff lunch and learn in August to raise awareness amongst staff not already engaged in the project.

Staff presented the Climate Change Master Plan and Energy Evolution to key General Managers and their Departmental Leadership Teams including Planning, Infrastructure, and Economic Development, Public Works and Environmental Services, Transportation Services, and Ottawa Public Health. One-on-one follow up meetings and presentations have been offered to all departments.

Staff presented to the City's Senior Leadership Team, comprised of all General Managers at the City of Ottawa, and the City Manager's Office in July 2020. A Climate Change Tiger Team comprised of General Managers, the Chief Financial Officer, the City Manager's Office, and Ottawa Public Health was established to champion and support implementation of the Climate Change Master Plan, including Energy Evolution. The kickoff meeting for the Climate Change Tiger Team was held September 10, 2020. One more meeting is planned for 2020. Going forward, the Tiger Team intends to meet four times a year.

Sounding Board

In 2016, a Sounding Board consisting of representatives from City departments, utilities, the federal government, the development industry, institutions, academia, the non-profit sector, and the private sector was established to facilitate collaboration. The Sounding Board has met six times since the beginning of the project. Updates at key milestones have also been provided to the Sounding Board throughout the project.

In August 2020, the Draft Strategy was shared with the Sounding Board and the Environmental Stewardship Advisory Committee for comment and feedback. Two consultation sessions were held where staff presented a detailed overview of the Draft Energy Evolution Strategy, the financial analysis and the proposed projects and answered more than 60 unique questions from the group. The feedback received during these sessions, as well as through written comments submitted afterwards, was used to make final revisions to the strategy and supporting documents.

Working Groups

Over the course of the project, nine working groups were established to facilitate discussion on specific aspects of Energy Evolution including: a long-term vision, communication and engagement, new buildings, existing buildings, transportation, energy supply and distribution, waste and renewable natural gas, funding and governance. Working groups included staff, some Sounding Board members, and technical experts in their respective fields.

Working groups met more than 40 times over the course of the project. Supported by staff and consultants (Leidos Canada, Sustainable Solutions Group and whatlf? Technologies Inc), working groups provided input and feedback on specific energy technologies, pathway studies, business cases, policy opportunities, the energy and emissions model, financial analysis and associated cost catalogues, and project overviews. Throughout the process it was evident that one of the significant values of undertaking Energy Evolution was the forum and match-making that enabled the collaboration and coordination for the road forward. In meeting and speaking with other working group members about opportunities to advance projects, community partners also built ideas and made business contacts with each other which made their value propositions much stronger.

This resulted in many follow up meetings and presentations to organizations associated with the Sounding Board or working groups including, but not limited to: Hydro Ottawa and their subsidiaries, Envari and Portage Power; Hydro One; Ottawa Carleton District School Board; Development Review Sub-Committee; Enbridge Gas Distribution; Ottawa Regional Society of Architects; Canada Green Building Council; the Ontario Energy Board; the Independent Electricity System Operator; the Greater Ottawa Home Builders Association; and the Ottawa Climate Action Fund.

Council Sponsors Groups

In both this and the previous Term of Council, Council Sponsors Groups have played an important role in guiding, positioning, and championing the project with stakeholders, residents and other levels of government.

Staff met four times with a Renewable Energy Strategy Council Sponsors Group between April 2016 and February 2017. Staff also provided two updates to a Buildings Sponsors Group about Energy Evolution in 2016.

On August 13, 2019, staff convened the inaugural meeting of a new Climate Change Council Sponsors Group established through Council's Declaration of a Climate Emergency. This Climate Change Council Sponsors Group is comprised of representatives from the Standing Committee on Environmental Protection, Water and Waste Management, Planning Committee, Transportation Committee, Transit Commission, the Ottawa Board of Health and the Councillor Liaison of the Environmental Stewardship Advisory Committee. Staff have met with the Climate Change Council Sponsors Group five times on Energy Evolution, most recently on September 29, 2020.

Environmental Stewardship Advisory Committee

Staff have presented to the Environmental Stewardship Advisory Committee seven times since the beginning of the project in 2016.

On June 27, 2019, staff provided an overview of the review and update of the Climate Change Master Plan and Energy Evolution to the Environmental Stewardship Advisory Committee. On October 24, 2019, staff provided a more detailed overview of Energy Evolution and supporting projects. In August 2020, the Draft Strategy was shared with the Sounding Board and the Environmental Stewardship Advisory Committee for comment and feedback. This was followed by two consultation sessions where staff presented a detailed overview of the Draft Energy Evolution Strategy, the financial analysis and the proposed projects and answered more than 60 unique questions from the group. The feedback received was used to make final revisions to the strategy and supporting documents. On September 17, 2020, staff recirculated materials for Environmental Stewardship Advisory Committee members to review and staff attended the September 24, 2020 meeting to answer outstanding questions.

Public Engagement

Throughout the project, staff have participated in key stakeholder meetings, parallel City consultations, and community events, as requested. Examples include but are not limited to Climate Action Week, Ottawa EV Days, ward meetings and community associations meetings.

The project team participated in five public consultations related to how Climate Change is being embedded in the new Official Plan. Staff presented twice to key stakeholders calling themselves the People's Plan for the Official Plan and attended a Climate Solutions Workshop hosted by the People's Plan for the Official Plan. The project team

also presented to the Official Plan's Ambassador Working Group in September to seek input from the City's identified equity and inclusion groups.

Public engagement on the final strategy commenced in August 2020, with the launch of the Engage Ottawa webpage which is used to inform residents about Energy Evolution and to gain high level feedback (engage.ottawa.ca/energy-evolution). A survey was conducted throughout the month of August to collect input from residents about the challenges they face when taking action to reduce GHG emissions in key areas. To date, the survey has received over 150 responses; data collected will be used to inform the development and implementation of the community projects.

Two virtual public information sessions were held in August 2020. A high-level overview of the Energy Evolution was presented as well as details on the proposed projects. The sessions attracted over 360 registrants and over 250 unique questions were answered during the question and answer period.

COMMENTS BY THE WARD COUNCILLOR(S)

This is a City-wide report – not applicable.

ADVISORY COMMITTEES COMMENTS

On June 27, 2019, the Environmental Stewardship Advisory Committee carried the following motion regarding the Council's declaration of a climate emergency:

WHEREAS the City of Ottawa has declared a climate emergency,
and;

WHEREAS almost all greenhouse gas (GHG) emissions are due to
individual acts;

THEREFORE BE IT RESOLVED THAT staff be requested to
provide additional details on the immediate actions that the City of
Ottawa will be taking to raise the awareness of actions by Ottawa
residents on this emergency.

On October 24, 2019, staff provided a more detailed overview Energy Evolution to the Environmental Stewardship Advisory Committee.

The Draft Energy Evolution Strategy and supporting documents were shared with members of Environmental Stewardship Advisory Committee in August 2020 for their

review and feedback. On September 17, staff recirculated materials for members to review and staff attended the September 24 meeting to answer outstanding questions. .

LEGAL IMPLICATIONS

There are no legal impediments to Committee and Council's approval of the recommendations of this report.

RISK MANAGEMENT IMPLICATIONS

There are risk implications as described in this report.

ASSET MANAGEMENT IMPLICATIONS

At a high level, the recommendations documented in this report are consistent with the City's [Comprehensive Asset Management \(CAM\) Program](#) objectives by providing a vision for forward looking decision making, focused on risk management and asset resiliency. The implementation of the Comprehensive Asset Management program enables the City to effectively manage existing and new infrastructure to maximize benefits, reduce risk, and provide safe and reliable levels of service to community users. This is done in a socially, culturally, environmentally, and economically conscious manner.

Asset management implications for specific elements will be assessed as part of ongoing project development and future reports to the appropriate standing committee before implementation. Ongoing project development and future reports can be used to inform the CAM Program.

FINANCIAL IMPLICATIONS

Recommendations #1 – #3: There are no direct financial implications.

Recommendation #4: Funds are available from the 2019 Hydro Ottawa dividend surplus. Pending Council approval, a new internal order will be established with budget authority of \$2.6 million, 100 per cent funded from the 2019 Hydro Ottawa dividend surplus.

ACCESSIBILITY IMPACTS

Accessibility impacts will be assessed as part of the development of the 20 projects in support of Energy Evolution.

ENVIRONMENTAL IMPLICATIONS

Energy Evolution sets the framework for what it would take for Ottawa to reduce emissions by 100 per cent by 2050. It is a renewable energy strategy designed to manage energy consumption, promote the use of renewable energy and advance local economic development opportunities in Ottawa.

TERM OF COUNCIL PRIORITIES

Energy Evolution aligns with the current 2019-2022 Term of Council priority, Environmental Stewardship, to grow and protect a healthy, beautiful, and vibrant city that can adapt to change. Identified outcomes in support of this priority include:

- The City has climate change mitigation and adaptation plans in place
- The City is a leader in energy management and in conserving, recycling and reusing resources
- The City's long-term plan for solid waste includes more diversion from landfills
- The City reduces its greenhouse gas output and embeds climate change considerations across all operations.

SUPPORTING DOCUMENTATION

Document 1 Energy Evolution: Ottawa's Community Energy Transition Strategy

Document 2 Appendix A: Data, Methodologies, and Assumptions Manual

Document 3 Appendix B: Business as Planned Scenario Report

Document 4 Appendix C: Pathway Studies

Document 5 Appendix D: Technical Report

Document 6 Appendix E: Modelling Ottawa's Greenhouse Gas Emissions to 2050: Summary of Results

Document 7 Appendix F: Project Overviews

Document 8 Appendix G: Summary of Energy Evolution Projects (2020-2025)

Document 9 Appendix H: Cost Catalogue

Document 10 Project Updates on Phase 1 of Energy Evolution and 2017 and 2018 Hydro Ottawa Dividend Surplus

Document 11 Proposed Spending Plan for 2019 Hydro Ottawa Dividend Surplus

DISPOSITION

Planning, Infrastructure and Economic Development Department will coordinate the Climate Change Master Plan including Energy Evolution, with support from various departments to implement the eight priority actions under the Climate Change Master Plan including the and 20 proposed projects under Energy Evolution.