CITY COUNCIL AGENDA

City Council Meeting
Tuesday, September 22, 2020
Tom Davies Square - Council Chamber / Electronic Participation

MAYOR BRIAN BIGGER, CHAIR

3:00 p.m. CLOSED SESSION, COMMITTEE ROOM C-12 / ELECTRONIC PARTICIPATION

6:00 p.m. OPEN SESSION, COUNCIL CHAMBER / ELECTRONIC PARTICIPATION

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ROLL CALL

Resolution to move to Closed Session to deal with one (1) Labour Relations / Employee Negotiations item regarding an Interest Arbitration, one (1) Personal Matters (Identifiable Individual(s)) item regarding an employment contract, one (1) Acquisition or Disposition of Land item regarding property on Municipal Road 24, Lively, and one (1) Litigation or Potential Litigation / Solicitor-Client Privilege item regarding collection of user fees in accordance with the *Municipal Act,* 2001, s. 239(2)(b), (c), (d), (e) and (f).
(RESOLUTION PREPARED)

RECESS

MOMENT OF SILENT REFLECTION

ROLL CALL

DECLARATIONS OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF

COMMUNITY DELEGATIONS

1. Vale Canada Limited
   (ELECTRONIC PRESENTATION) (FOR INFORMATION ONLY)

   - Claire Parkinson, Head of Operational Services
   - Lisa Lanteigne, Manager of Environment
   - Brittney Price, Manager of Corporate Affairs & Sustainability

   (Vale will be presenting its proposal to purchase the Meatbird Lake Recreation Area.)

2. Black Lives Matter Sudbury
   (ELECTRONIC PRESENTATION) (FOR INFORMATION ONLY)

   - Ra'anaa Brown, Co-President
   - TiCarra Paquet, Co-President
   - Darius Garneau, Director of Policy and Development

   (Black Lives Matter Sudbury was invited by Councillor McCausland. The presentation will provide information regarding three demands surrounding Education, the Public Sector and Arts, Media and Culture.)

MATTERS ARISING FROM THE CLOSED SESSION

Deputy Mayor Sizer will rise and report on any matters discussed during the Closed Session. Council will then consider any resolution emanating from the Closed Session.

MATTERS ARISING FROM PLANNING COMMITTEE

September 9, 2020

Council will consider, by way of one resolution, resolutions PL2020-93 to PL2020-94 and PL2020-96 to PL2020-105, all of which are found at https://agendasonline.greatersudbury.ca/?pg=agenda&action=navigator&id=1454&lang=en. Any questions regarding the resolutions should be directed to Councillor Cormier, Chair,

Planning Committee.

CONSENT AGENDA

(For the purpose of convenience and for expediting meetings, matters of business of repetitive or routine nature are included in the Consent Agenda, and all such matters of business contained in the Consent Agenda are voted on collectively.

A particular matter of business may be singled out from the Consent Agenda for debate or for a separate vote upon the request of any Councillor. In the case of a separate vote, the excluded matter of business is severed from the Consent Agenda, and only the remaining matters of business contained in the Consent Agenda are voted on collectively.

Each and every matter of business contained in the Consent Agenda is recorded separately in the minutes of the meeting.)

ADOPTING, APPROVING OR RECEIVING ITEMS IN THE CONSENT AGENDA

(RESOLUTION PREPARED FOR ITEMS C-1 TO C-2)

MINUTES

C-1. Special City Council Minutes of August 11, 2020 **14 - 16**
(RESOLUTION PREPARED - MINUTES ADOPTED)

C-2. Finance and Administration Committee Minutes of August 11, 2020 **17 - 22**
(RESOLUTION PREPARED - MINUTES ADOPTED)

REGULAR AGENDA

PRESENTATIONS

1. Report dated August 28, 2020 from the General Manager of Growth and Infrastructure regarding Final Community Energy & Emissions Plan (CEEP). **23 - 240**
(ELECTRONIC PRESENTATION) (RESOLUTION PREPARED)

    - Stephen Monet, Manager of Environmental Planning Initiative

    (This presentation provides a recommendation regarding the Community Energy and Emissions Plan (CEEP) and the community-wide efforts required to meet a net-zero GHG emissions by 2050 target.)

MANAGERS' REPORTS

R-1. COVID-19 Update
(FOR INFORMATION ONLY) (REPORT TO FOLLOW)

(This report provides an update regarding COVID-19 developments.)

R-2. Report dated August 21, 2020 from the General Manager of Community Development regarding Playground Revitalization Update 2020. **241 - 249**
(FOR INFORMATION ONLY)

(This report provides an update regarding the Playground Revitalization Project and the fundraising campaign United Way Centraide North Eastern Ontario (UWCNEO) committed to during the 2018 budget deliberations.)

REFERRED & DEFERRED MATTERS

R-3. Report dated August 31, 2020 from the General Manager of Growth and Infrastructure regarding Commercial Parking Standards - Draft Zoning By-Law. **250 - 298**
(RESOLUTION PREPARED)

(This report provides a recommendation regarding the draft Zoning By-law to implement the findings of the Commercial Parking Standards Study.)

BY-LAWS

Draft by-laws are available for viewing a week prior to the meeting on the City's website at: https://agendasonline.greatersudbury.ca. Approved by-laws are publically posted with the meeting agenda on the day after passage.

The following By-Laws will be read and passed:

2020-148 A By-law of the City of Greater Sudbury to Confirm the Proceedings of Council at its Meeting of September 22nd, 2020

2020-149Z A By-law of the City of Greater Sudbury to Amend By-law 2010-100Z Being the Comprehensive Zoning By-law for the City of Greater Sudbury

Planning Committee Resolution #PL2020-85

(This by-law rezones a southerly and triangular portion of the subject lands in order to prevent a split-zoning, which would result from a conditionally approved consent application (File # B0024/2020) that is intended to facilitate a lot addition to an existing rural waterfront lot having water frontage on Whitson Lake in Val Caron. The rezoning of the southerly and triangular portion of the subject lands would fulfil the rezoning condition related to the provisional consent decision that was issued by the City's Consent Official on June 8, 2020 – Francois Jean Gariepy – 1243 Main Street, Val Caron.)

MEMBERS' MOTIONS

M-1. **Studying a complete renovation of the Sudbury Community Arena**

As Presented by Councillors McCausland and Signoretti:

WHEREAS a local architecture company, 3rd Line Studio, has proposed a plan to renovate the Sudbury Community Arena into a multi-function event centre, and to do so for as little as 60% of the cost of building a new multi-function event centre;

AND WHEREAS the 3rd Line Studio plan, entitled Project Now, also includes an indoor parking facility which could address an identified parking need in Downtown Sudbury;

AND WHEREAS realizing up to 40% savings by renovating the historic Sudbury Community Arena into a multi-function event centre would potentially save up to $40 million that the city could invest in other community recreation and infrastructure projects;

AND WHEREAS it has been proposed that design and engineering work on Project Now could begin immediately and construction could begin quickly without negatively affecting the operations of the Sudbury Wolves and Sudbury Five over a three-year construction period;

THEREFORE BE IT RESOLVED that City of Greater Sudbury Council instruct the City's Large Projects management team to evaluate the Project Now plan and report back to council in the form of a report focusing on answering three questions:

1) Will the Project Now plan result in a multi-function event centre suitable to the city's needs as prescribed in the 2017 PWC report?;

2) Are the timelines associated with the Project Now plan feasible?;

3) Is the cost structure of the Project Now plan reasonable and accurate based on current information?

AND THAT this evaluation include liaising with the Project Now team, and review of previous staff reports on renovating the Sudbury Community Arena;

AND THAT this report be presented to council at the October 6th, 2020 City Council meeting.

M-2. **Request For Review Of Business Licensing By-Law 2004-350 As Amended**

As presented by Councillor McCausland:

WHEREAS Payday Loan Establishments currently operate within the City of Greater Sudbury and the number of those establishments seems to be increasing, particularly in the core of the City;

AND WHEREAS there are concerns that payday loan establishments are "predatory" and take advantage of low-income residents who do not have access to credit and become trapped in debt cycles as a result of exorbitant fees charged by these establishments;

AND WHEREAS payday loan establishments are often located near sensitive land uses where the greatest number of vulnerable citizens live or visit regularly;

AND WHEREAS the Municipal Act, 2001, S.O. 2001, c. 25, as amended, at Section 154.1 states that "despite section 153 and without limiting sections 9, 10 and 11, a local municipality, in a by-law under section 151 with respect to payday loan establishments, may define the area of the municipality in which a payday loan establishment may or may not operate and limit the number of payday loan establishments in any defined area in which they are permitted";

AND WHEREAS By-law 2004-350, as amended, provides for the licensing and regulation of various businesses and has not been substantially reviewed since its

passing;

AND WHEREAS business licensing is in place, in part, to protect the public from fraudulent and/or predatory business practices;

THEREFORE BE IT RESOLVED that the City of Greater Sudbury direct that staff conduct a review of By-law 2004-350 as amended, and bring a report to Council by the end of the third quarter of 2021, which would also consider potential restrictions for payday loan establishments which could regulate the location of those establishments, including minimum separation distances between payday loan establishments and minimum separation distances from various sensitive land uses, including but not limited to social service locations, methadone clinics, group homes, schools, affordable housing units, etc., as well as a maximum number of those establishments per ward.

ADDENDUM

CIVIC PETITIONS

QUESTION PERIOD

ADJOURNMENT

CONSEIL MUNICIPAL
ORDRE DU JOUR

Réunion du Conseil municipal
22 septembre 2020
Place Tom Davies - Salle du Conseil / participation électronique

MAIRE BRIAN BIGGER, PRÉSIDENT(E)

15 h SÉANCE A HUIS CLOS, SALLE DE RÉUNION C-12 / PARTICIPATION ÉLECTRONIQUE

18 h SÉANCE PUBLIQUE, SALLE DU CONSEIL / PARTICIPATION ÉLECTRONIQUE

Les réunions du Conseil de la Ville du Grand Sudbury et de ses comités sont accessibles et sont diffusés publiquement en ligne et à la télévision en temps réel et elles sont enregistrées pour que le public puisse les regarder sur le site Web de la Ville à l'adresse https://agendasonline.greatersudbury.ca.

Sachez que si vous faites une présentation, si vous prenez la parole ou si vous vous présentez sur les lieux d'une réunion pendant qu'elle a lieu, vous, vos commentaires ou votre présentation pourriez être enregistrés et diffusés.

En présentant des renseignements, y compris des renseignements imprimés ou électroniques, au Conseil municipal ou à un de ses comités, vous indiquez que vous avez obtenu le consentement des personnes dont les renseignements personnels sont inclus aux renseignements à communiquer au public

Vos renseignements sont recueillis aux fins de prise de décisions éclairées et de transparence du Conseil municipal en vertu de diverses lois municipales et divers règlements municipaux, et conformément à la *Loi de 2001 sur les municipalités,* à la *Loi sur l'aménagement du territoire,* à la *Loi sur l'accès à l'information municipale et la protection de la vie privée* et au *Règlement de procédure* de la Ville du Grand Sudbury.

Pour obtenir plus de renseignements au sujet de l'accessibilité, de la consignation de vos renseignements personnels ou de la diffusion en continu en direct, veuillez communiquer avec le Bureau de la greffière municipale en composant le 3-1-1 ou en envoyant un courriel à l'adresse clerks@grandsudbury.ca.

APPEL NOMINAL

Résolution de séance à huis clos pour délibérer sur une (1) question de relations du travail/négociations avec les employés concernant un arbitrage de différends, une (1) question personnelle (personne[s] identifiable[s]) concernant un contrat de travail, une (1) question d'acquisition ou de cession de terrain concernant une propriété sur la route municipale 24, à Lively, et une (1) question de litige ou de litige possible/de secret professionnel de l'avocat concernant la collecte de frais d'utilisation conformément à l'art. 239(2)(b), (c), (d), (e) et (f) de la *Loi de 2001 sur les municipalités.*
(RÉSOLUTION PRÉPARÉE)

SUSPENSION DE LA SÉANCE

MOMENT DE SILENCE

APPEL NOMINAL

DÉCLARATION D'INTÉRÊTS PÉCUNIAIRES ET LEUR NATURE GÉNÉRALES

DÉLÉGATION COMMUNAUTAIRES

1. Vale Canada Limited
   (PRÉSENTATION ÉLECTRONIQUE) (A TITRE D'INFORMATION)

   - Claire Parkinson, Responsable des services opérationnels
   - Lisa Lanteigne, Gestionnaire de l'environnement
   - Brittney Price, Gestionnaire des affaires générales et de la durabilité

   (La société Vale présentera sa proposition d'achat de l'aire de loisirs du lac Meatbird.)

2. Les vies noires comptent Sudbury
   (PRÉSENTATION ÉLECTRONIQUE) (A TITRE D'INFORMATION)

   - Ra'anaa Brown, Coprésidente
   - TiCarra Paquet, Coprésidente
   - Darius Garneau, Directeur des politiques et du développement

   (Les vies noires comptent Sudbury ont été invitées par le conseiller McCausland. Cette présentation donne des renseignements sur trois demandes concernant l'éducation, le secteur public et les arts, les médias et la culture.)

QUESTIONS DÉCOULANT DE LA SÉANCE À HUIS CLOS

Maire adjoint Sizer rapportera toutes questions traitées pendant la séance à huis clos. Le Conseil examinera ensuite les résolutions.

QUESTIONS DÉCOULANT DE LA RÉUNION DU COMITÉ DE LA PLANIFICATION

Le 9 septembre 2020

Le Conseil municipal étudiera, par voie d'une résolution, les résolutions PL2020-93 à PL2020-94 et PL2020-96 à PL2020-105, qui se trouve à https://agendasonline.greatersudbury.ca/?pg=agenda&action=navigator&id=1454&lang=en. Toute question concernant ces résolutions devrait être adressée au Conseiller Cormier, president du Comité de la planification.

Order du jour des résolutions

(Par souci de commodité et pour accélérer le déroulement des réunions, les questions d'affaires répétitives ou routinières sont incluses à l'ordre du jour des résolutions, et on vote collectivement pour toutes les questions de ce genre.

À la demande d'un conseiller, on pourra traiter isolément d'une question d'affaires de l'ordre du jour des résolutions par voie de débat ou par vote séparé. Dans le cas d'un vote séparé, la question d'affaires isolée est retirée de l'ordre du jour des résolutions et on ne vote collectivement qu'au sujet des questions à l'ordre du jour des résolutions.

Toutes les questions d'affaires à l'ordre du jour des résolutions sont inscrites séparément au procès-verbal de la réunion.)

ADOPTION, APPROBATION OU RÉCEPTION D'ARTICLES DANS L'ORDRE DU JOUR DES CONSENTEMENTS

(RÉSOLUTION PRÉPARÉE POUR LES ARTICLES DE L'ORDRE DU JOUR DES RÉSOLUTIONS C-1 À C-2)

PROCÈS-VERBAUX

C-1. Procès Verbal du 11 août 2020, Réunion extraordinaire du Conseil municipal **14 - 16**
(RÉSOLUTION PRÉPARÉE - PROCÈS-VERBAL ADOPTÉ)

C-2. Procès Verbal du 11 août, Comité des finances et de l'administration **17 - 22**
(RÉSOLUTION PRÉPARÉE - PROCÈS-VERBAL ADOPTÉ)

Ordre du jour régulier

PRÉSENTATIONS

1. Rapport directeur général, Croissance et Infrastructure , daté du 28 août 2020 portant sur Plan communautaire en matière d'énergie et d'émissions final. **23 - 240**
(PRÉSENTATION ÉLECTRONIQUE) (RÉSOLUTION PRÉPARÉE)

- Stephen Monet, Gestionnaire des initiatives de planification environnementale

(Cette présentation fait une recommandation concernant le Plan communautaire en matière d'énergie et d'émissions et les efforts nécessaires à l'échelle de toute la communauté pour atteindre la cible d'émissions de gaz à effet de serre nulles nettes d'ici 2050.)

RAPPORTS DES GESTIONNAIRES

R-1. Compte rendu de la COVID-19
(A TITRE D'INFORMATION) (LE RAPPORT SUIVRA)

(Ce rapport donne un compte rendu concernant l'évolution de la situation par rapport à la COVID-19.)

R-2. Rapport de la directrice générale des Services de développement communautaire, daté du 21 août 2020 portant sur Compte rendu de la revitalisation des terrains de jeux 2020. **241 - 249**

(A TITRE D'INFORMATION)

(Ce rapport donne un compte rendu du projet de revitalisation des terrains de jeux et de la campagne de financement à laquelle s'est engagé l'organisme United Way Centraide nord-est de l'Ontario (UWCNEO) pendant les délibérations budgétaires 2018.)

QUESTION RAPPORTÉES ET QUESTIONS RENVOYÉES

R-3. Rapport directeur général, Croissance et Infrastructure , daté du 31 août 2020 portant sur Normes de stationnement commercial – projet de règlement municipal de zonage. **250 - 298**
(RÉSOLUTION PRÉPARÉE)

(Ce rapport fait une recommandation concernant le projet de règlement municipal de zonage pour mettre en œuvre les constatations de l'Étude sur les normes de stationnement commercial.)

RÈGLEMENTS

Les membres du public peuvent consulter les projets de règlement municipal une semaine avant la réunion sur le site Web de la Ville à l'adresse https://agendasonline.greatersudbury.ca. Les règlements municipaux approuvés sont affichés publiquement avec l'ordre du jour de la réunion le lendemain de leur adoption.

Les règlements suivants seront lus et adoptés :

2020-148 Règlement de la Ville du Grand Sudbury pour confirmer les délibérations du Conseil municipal lors de sa réuion tenue le 22 septembre 2020

2020-149Z Règlement de la Ville du Grand Sudbury modifiant le règlement municipal 2010-100Z étant le règlement municipal de zonage général de la Ville du Grand Sudbury

Résolution no PL2020-85 du Comité de planification

(Ce règlement municipal rezone une partie sud et triangulaire des terres en question afin d'empêcher un zonage multiple qui résulterait d'une demande d'autorisation approuvée sous condition (dossier no B0024/2020) qui a pour but de faciliter l'ajout d'un lot à un lot riverain rural existant donnant sur le lac Whitson à Val Caron. Le rezonage de la partie sud et triangulaire des terres en question remplirait la condition de rezonage en lien avec la décision de consentement provisoire qu'a rendue le responsable des demandes d'autorisation le 8 juin 2020 – François Jean Gariépy – 1243, rue Main, à Val Caron.)

MOTIONS DES MEMBRES

M-1. **Étude d'une rénovation complète de l'Aréna communautaire de Sudbury**

Motion présentée par les conseillers Cormier, McCausland et Signoretti:

ATTENDU QU'UNE société d'architecture locale, appelée 3rd Line Studio, a proposé un plan visant à rénover l'Aréna communautaire de Sudbury pour en faire un centre d'activités polyvalent et à le faire à un coût aussi bas que 60 % du coût de la construction d'un nouveau centre d'activités polyvalent;

ATTENDU QUE le plan du 3rd Line Studio, intitulé Project Now [projet maintenant], comprend aussi une installation intérieure de stationnement qui pourrait aborder un besoin de stationnement cerné au centre-ville de Sudbury;

ATTENDU QUE la réalisation d'économies pouvant atteindre 40 % en rénovant l'Aréna communautaire de Sudbury existant pour en faire un centre d'activités polyvalent pourrait faire économiser jusqu'à 40 millions de dollars que la Ville pourrait alors investir dans d'autres projets de loisirs et d'infrastructure communautaires;

ATTENDU QU'ON a proposé que les travaux de conception et d'ingénierie du Project Now puissent commencer immédiatement et que la construction pourrait débuter rapidement sans nuire aux opérations des Sudbury Wolves et du Sudbury Five pendant une période de construction de trois ans;

PAR CONSÉQUENT, IL EST RÉSOLU QUE le Conseil de la Ville du Grand Sudbury demande à l'équipe de gestion des Grands projets de la Ville d'évaluer le plan du Project Now et d'en présenter un rapport au Conseil municipal qui se concentrer sur la réponse aux trois questions suivantes :

1) Le plan du Project Now produira-t-il un centre d'activités polyvalent qui réponde aux besoins de la ville comme le prescrit le rapport de 2017 de la société PWC?;

2) Les délais associés au plan du Project Now sont-ils faisables?;

3) La structure des coûts du plan du Project Now est-elle raisonnable et juste en se fondant sur les renseignements actuels?

Et que cette évaluation comprenne la liaison avec l'équipe du Project Now ainsi que l'examen des rapports précédents du personnel sur la rénovation de l'Aréna communautaire de Sudbury;

Et que ce rapport soit présenté au Conseil municipal lors de sa réunion prévue pour le 6 octobre 2020.

M-2. **Demande d'examen du règlement municipal sur la délivrance de permis d'entreprises 2004-350 modifié**

Motion présentée par le conseiller McCausland:

ATTENDU QUE des établissements de prêt sur salaire sont en exploitation actuellement dans la Ville du Grand Sudbury et que le nombre de ces établissements semble aller en augmentant, en particulier au cœur de la ville;

ATTENDU QU'IL y a des préoccupations à savoir que les établissements de prêts sur salaire sont « prédateurs » et qu'ils profitent des résidents à faible revenu qui n'ont pas accès au crédit et qui deviennent prisonniers de cycles d'endettement à cause des frais exorbitants exigés par ces établissements;

ATTENDU QUE les établissements de prêt sur salaire sont souvent situés près des utilisations du sol sensibles où le plus grand nombre de citoyens vulnérables vivent ou qu'ils visites régulièrement;

ATTENDU QUE la Loi de 2001 sur les municipalités, L. O., ch. 25, telle qu'elle a été modifiée, à l'article 154.1 stipule que « Malgré l'article 153 et sans préjudice de la portée générale des articles 9, 10 et 11, une municipalité locale peut, dans un règlement municipal adopté en vertu de l'article 151 à l'égard des établissements de prêt sur salaire, définir le secteur de la municipalité dans lequel l'exploitation d'un établissement de prêt sur salaire est permise ou interdite et restreindre le nombre d'établissements de ce genre qu'il peut y avoir dans tout secteur défini où leur exploitation est permise. »

ATTENDU QUE le règlement municipal 2004-350, tel qu'il a été modifié, prévoit la délivrance de permis et la réglementation de diverses entreprises et qu'il n'a pas été examiné en profondeur depuis son adoption;

ATTENDU QUE la délivrance de permis d'entreprises est en place, en partie, pour protéger le public des pratiques commerciales frauduleuses ou prédatrices;

PAR CONSÉQUENT, IL EST RÉSOLU QUE la Ville du Grand Sudbury demande que le personnel mène un examen du règlement municipal 2004-350, tel qu'il a été modifié, et qu'il présente un rapport à ce sujet au Conseil municipal d'ici la fin du troisième trimestre de 2021, qui considérerait aussi les restrictions possibles pour les établissements de prêt sur salaire, ce qui pourrait réglementer l'emplacement de ces établissements, y compris l'écart minimal entre les établissements de prêt sur salaire et l'écart minimal avec diverses utilisations du sol sensibles, y compris, mais non de façon limitative, les emplacements offrant des services sociaux, les cliniques de méthadone, les foyers de groupe, les écoles et les logements abordables, de même que le nombre maximal de ces établissements par quartier.

ADDENDA

PÉTITIONS CIVIQUES

PÉRIODE DE QUESTIONS

LEVÉE DE LA SÉANCE

Minutes

Special City Council Minutes of 8/11/20

Location:	Tom Davies Square - Council Chamber / Electronic Participation
Commencement:	9:01 AM
Adjournment:	10:55 AM

Deputy Mayor Landry-Altmann, In the Chair

Present	Councillors Signoretti, McCausland, Kirwan, Lapierre, Jakubo, McIntosh, Cormier [D 9:10 a.m., A 9:20 a.m.], Leduc [A 9:20 a.m.], Landry-Altmann
City Officials	Ed Archer, Chief Administrative Officer [A 9:44 a.m.]; Kevin Fowke, General Manager of Corporate Services; Eric Labelle, City Solicitor and Clerk; Steve Facey, Manager of Financial Planning and Budgeting; Ron Foster, Auditor General
Others - GSU Directors	Lynne Dupuis, Director, Greater Sudbury Utilities and Subsidiary Companies; Bernie Hughes, Director, Greater Sudbury Utilities and Subsidiary Companies; Gerry Labelle, Director, Greater Sudbury Hydro Inc.; Josh Lilley, Director, Greater Sudbury Hydro Inc.; Mathieu Litalien, Director, Greater Sudbury Hydro Inc.; Kati McCartney, Director, Greater Sudbury Hydro Inc.; Peter McMullen, Director and Treasurer, Greater Sudbury Utilities and Subsidiary Companies; Christina Visser, Director, Greater Sudbury Utilities and Subsidiary Companies
Officials	Frank Kallonen, President and CEO, Greater Sudbury Utilities Inc.; Catherine Huneault, CFO and Vice President of Corporate Services; Dawn Bates, Vice President of Human Resources and Safety; Josey Frescura, Vice President of Agilis Networks; Philip Guido, Vice President of Engineering and Operations; Shannon Restoule, Vice President of Corporate Strategy and Energy Businesses; Wendy Watson, Director of Communications

Closed Session

The following resolution was presented:

CC2020-184 Jakubo/Lapierre: THAT Council for the City of Greater Sudbury move to Closed Session to deal with one (1) Information Supplied In Confidence (Competititve Position/Negotiations) item regarding Greater Sudbury Utilities Inc. in accordance with the *Municipal Act*, 2001, s. 239(2)(i).

Rules of Procedure

A Recorded Vote was held:

YEAS: Councillors Signoretti, McCausland, Kirwan, Lapierre, Jakubo, McIntosh, Cormier, Landry-Altmann
CARRIED

At 9:04 a.m., Council moved into closed session

Recess — At 9:48 a.m., Council recessed.

Reconvene — At 10:05 a.m., Council commenced the Open Session in the Council Chamber / Electronic Participation.

Deputy Mayor Landry-Altmann, In the Chair

Present — Councillors Signoretti, McCausland, Kirwan, Lapierre, Jakubo, McIntosh, Cormier, Landry-Altmann

City Officials — Ed Stankiewicz, Executive Director of Finance, Assets and Fleet; Ron Foster, Auditor General; Kelly Gravelle, Deputy City Solicitor; Christine Hodgins, Deputy City Clerk; Anessa Gravelle, Clerk's Services Assistant; Patrick Beaudry, Clerk's Services Assistant

DECLARATIONS OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF

None declared.

Matters Arising from the Closed Session

Deputy Mayor Landry-Altmann, Chair of the Closed Session, reported that Council met in Closed Session to deal with one (1) Information Supplied In Confidence (Competitive Position/Negotiations) item regarding Greater Sudbury Utilities Inc. in accordance with the *Municipal Act*, 2001 s. 239(2)(i). No resolutions or directions emanated from this meeting.

Rules of Procedure

CC2020-185 Signoretti/Lapierre: THAT the City of Greater Sudbury temporarily suspend the rules of procedure of the City of Greater Sudbury Procedure By-law 2019-50 for the portion of the Special City Council meeting of August 11, 2020 that relates to those matters on the Greater Sudbury Utilities Inc. portion of the agenda.

Rules of Procedure

A Recorded Vote was held:

YEAS: Councillors Signoretti, McCausland, Kirwan, Lapierre, Jakubo, McIntosh, Cormier, Landry-Altmann

CARRIED BY TWO-THIRDS MAJORITY

Greater Sudbury Utilities Inc. Annual General Meeting

Mark Signoretti, Board Chair, presided over the Greater Sudbury Utilities Inc. Annual General Meeting.

Adjournment

Automatic adjournment at 10:55 a.m. due to loss of quorum.

Deputy Mayor Landry-Altmann, Chair

Christine Hodgins, Deputy City Clerk

Minutes

Finance and Administration Committee Minutes of 8/11/20

Location:	Tom Davies Square - Council Chamber
Commencement:	11:32 AM
Adjournment:	5:07 PM

Councillor Jakubo, In the Chair

Present — Councillors McCausland, Kirwan, Lapierre, Jakubo, Sizer, McIntosh, Cormier, Leduc, Landry-Altmann [A 11:42 a.m.], Mayor Bigger

City Officials — Eric Labelle, City Solicitor and Clerk; Melissa Zanette, Chief of Staff

Closed Session — The following resolution was presented:

FA2020-35 Sizer/Kirwan: THAT the City of Greater Sudbury move to Closed Session to deal with one (1) Personal Matters (Identifiable Individual(s)) regarding a performance review in accordance with the Municipal Act, 2001, s. 239(2)(b).
CARRIED

At 11:35 a.m., the Finance and Administration Committee moved into closed session.

Recess — At 12:11 p.m. the Finance and Administration Committee recessed.

Reconvene — At 1:04 p.m. the Finance and Administration Committee commenced the Open Session in Council Chamber / Electronic Presentation

Councillor Jakubo, In the Chair

Present — Councillors Signoretti [A 1:14 p.m.], Montpellier, McCausland, Kirwan, Lapierre [A 1:14 p.m., D 5:00 p.m.], Jakubo, Sizer, McIntosh, Cormier [D 3:00 p.m.], Leduc, Landry-Altmann, Mayor Bigger

City Officials — Ed Archer, Chief Administrative Officer; Kevin Fowke, General Manager of Corporate Services; Ed Stankiewicz, Executive Director of Finance, Assets and Fleet; Steve Jacques, General Manager of Community Development; Ian Wood, Executive Director of Strategic Initiatives, Communication and Citizen Services; Joseph Nicholls, General Manager of Community Safety; Marie Litalien, Acting Director of Communications & Community Engagements; Meredith Armstrong, Acting Director of Economic Development; Joanne Kelly, Director of Human Resources and Organizational Development; Kelly Gravelle, Deputy City Solicitor; Ron Foster, Auditor General; Tyler Campbell, Director of Social Services; Barbara Dubois, Director of Housing Operations; Jeff Pafford, Director of Leisure Services; Steve Facey, Manager of Financial Planning and Budgeting; Nick Najdenov, Capital Projects Coordinator; Eric Labelle, City Solicitor and Clerk; Lisa Locken, Clerk's Services Assistant; Anessa Gravelle,Clerk's Services Assistant

DECLARATIONS OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF

None declared.

Matters Arising from the Closed Meeting

Councillor McIntosh reported that the Committee met in Closed Session to deal with one (1) Personal Matters (Identifiable Individuals(s)). Direction was given to staff regarding the matter.

At 1:14 p.m. Councillors Signoretti and Lapierre arrived.

Presentations

1 Long Term Financial Plan Update

Report dated July 30, 2020 from the General Manager of Corporate Services regarding Long Term Financial Plan Update.

Kevin Fowke, General Manager of Corporate Services, provided an electronic presentation regarding Long Term Financial Plan Update for information only.

2 2021 Budget Direction and Two Year Financial Forecast

Report dated May 2, 2018 from the General Manager of Corporate Services regarding 2019 Budget Direction and 2019-2020 Two Year Financial Forecast.

Ed Archer, Chief Administrative Officer, provided an electronic presentation regarding 2021 Budget Direction and Two Year Financial Forecast.

At 3:00 p.m., Councillor Cormier departed.

The following resolutions were presented:

Resolution One:

THAT the City of Greater Sudbury directs staff to prepare a 2021 Business Plan, as outlined

in the report entitled "2021 Budget Direction and Two Year Financial Forecast", from the General Manager of Corporate Services presented at the Finance and Administration Committee meeting on August 11, 2020, that includes an operating budget for all tax supported services and considers:

a. The cost of providing provincially mandated and cost shared programs;

b. The cost associated with growth in infrastructure that is operated and maintained by the City;

c. An estimate in assessment growth;

d. Recommendations for changes to service levels and/or non-tax revenues so that the level of taxation in 2021 produces no more than a 3.9% property tax increase over 2020 taxation levels, in accordance with the Long-Term Financial Plan.

Rules of Procedure

Councillor Leduc presented the following amendment:

FA2020-36-A1 Leduc/Lapierre: THAT resolution 1 be amended by the addition of:

With options for property tax increases of 3% and 2.2%, that, among other measure, considers attrition.

Rules of Procedure

A Written Recorded Vote was held:

YEAS: Councillors Signoretti, McCausland, Kirwan, Lapierre, Sizer, McIntosh, Leduc, Landry-Altmann, Jakubo, Mayor Bigger

NAYS: Councillor Montpellier
CARRIED

Proceed Past 4:04 p.m.

The following resolution was presented:

FA2020-37 McCausland/Leduc: THAT this meeting proceeds past the hour of 4:04 p.m.

Rules of Procedure

A Written Recorded Vote was held:

YEAS: Councillors Signoretti, Montpellier, McCausland, Kirwan, Lapierre, Sizer, McIntosh, Leduc, Landry-Altmann, Jakubo, Mayor Bigger
CARRIED BY TWO-THIRDS MAJORITY

Motion for Deferral

Councillor Kirwan moved to defer this item to the Finance Administrative meeting of November 3, 2020

Rules of Procedure

A Written Recorded Vote was held:

YEAS: Councillors Montpellier, McCausland, Kirwan, Lapierre, Sizer, McIntosh, Leduc,

Landry-Altmann, Jakubo, Mayor Bigger

NAYS: Councillor Signoretti
DEFERRED

Managers' Reports

R-1 2020 Operating Budget Variance Report - June

Report dated April 21, 2020 from the General Manager of Corporate Services regarding Financial Implications Associated with the Corporation's COVID-19 Response.

For Information Only.

R-2 Sudbury Community Arena Roof Repairs

Report dated July 27, 2020 from the General Manager of Corporate Services regarding Sudbury Community Arena Roof Repairs.

The following resolution was presented:

FA2020-38 Kirwan/Leduc: THAT the City of Greater Sudbury directs staff to proceed with the roof replacement and interior repairs at the Sudbury Community Arena in the amount of $359,500 from the Capital General Holding Account Reserve, as outlined in the report entitled "Sudbury Community Arena Roof Repairs", from the General Manager of Community Development presented at the Finance and Administration Committee meeting on August 11, 2020.

Rules of Procedure

A Written Recorded Vote was held:

YEAS: Councillors Signoretti, Montpellier, McCausland, Kirwan, Sizer, McIntosh, Leduc, Landry-Altmann, Jakubo, Mayor Bigger
CARRIED

R-3 Non Competitive Procurement Greater Sudbury Housing Corporation (GSHC) Security Services

Report dated July 27, 2020 from the General Manager of Community Development regarding Non Competitive Procurement Greater Sudbury Housing Corporation (GSHC) Security Services.

The following resolution was presented:

FA2020-39 Landry-Altmann/Signoretti: THAT the City of Greater Sudbury in its capacity as Shareholder and Board of Directors for the Greater Sudbury Housing Corporation (GSHC) approves the Single Source purchase of security services as outlined in the report entitled "Non Competitive Procurement Greater Sudbury Housing Corporation (GSHC) Security Services" from the General Manager of Community Development presented at the Finance and Administration Committee meeting on August 11, 2020.

Rules of Procedure

A Written Recorded Vote was held:

YEAS: Councillors Signoretti, McCausland, Kirwan, Lapierre, Sizer, McIntosh, Leduc, Landry-Altmann, Jakubo, Mayor Bigger

NAYS: Councillor Montpellier
CARRIED

Members' Motion

Motion to Define 2021 Budget Preparation Methodology

Motion for Deferral

Councillor Landry-Altman moved to defer this motion to the next Finance and Administration Committee meeting to provide Councillor Vagnini the opportunity to present it.

Rules of Procedure

A Written Recorded Vote was held:

YEAS: Councillors Signoretti, Montpellier, McCausland, Kirwan, McIntosh, Leduc, Landry-Altmann, Mayor Bigger

NAYS: Councillors Lapierre, Sizer, Jakubo
DEFERRED

Correspondence for Information Only

I-1 Development Charges - Treasurer's Annual Statement

Report dated May 21, 2019 from the General Manager of Corporate Services regarding Development Charges - Treasurer's Annual Statement.

For Information Only.

I-2 Payment-In-Lieu of Parkland (Parks Reserve Fund) - Treasurer's Annual Financial Statement

Report dated May 15, 2019 from the General Manager of Corporate Services regarding Payment-In-Lieu of Parkland (Parks Reserve Fund) - Treasurer's Annual Financial Statement.

For Information Only.

Addendum

No Addendum was presented.

Civic Petitions

No Civic Petitions were submitted.

Question Period

Please visit:
https://agendasonline.greatersudbury.ca/?pg=agenda&action=navigator&id=1513&lang=en to view the questions asked.

Adjournment

FA2020-40 Jakubo/McIntosh: THAT this meeting does now adjourn. Time 5:07 p.m.
CARRIED

Eric Labelle, City Solicitor and Clerk

Presented To:	City Council
Presented:	Tuesday, Sep 22, 2020
Report Date	Friday, Aug 28, 2020
Type:	Presentations

Request for Decision

Final Community Energy & Emissions Plan (CEEP)

Resolution

THAT the City of Greater Sudbury approves the Greater Sudbury Community Energy and Emissions Plan (CEEP) and authorizes staff to proceed with the next steps in the implementation of the CEEP, as outlined in the report entitled "Final Community Energy & Emissions Plan (CEEP)", from the General Manager of Growth and Infrastructure, presented at the City Council meeting on September 22, 2020."

Relationship to the Strategic Plan / Health Impact Assessment

The CEEP is strongly aligned with the CGS 2019-2027 Strategic Plan. It directly meets Objective 3.2 (Develop and Strengthen Strategies and Policies to Mitigate Impact of Climate Change) under the "Climate Change" strategic priority by providing opportunities to reduce Greenhouse Gas emissions within our community. The changes and improvements to the physical infrastructure, such as the Paris-Notre Dame Bikeway, will touch upon the service excellence, business attraction, climate change mitigation and adaptation, while encouraging a healthier and more vibrant community. New policies and opportunities for retrofits and energy efficient buildings will help with economic capacity and investment readiness while improving housing affordability and suitability, especially for vulnerable populations.

Signed By

Report Prepared By
Stephen Monet
Manager of Environmental Planning Initiatives
Digitally Signed Aug 31, 20

Manager Review
Stephen Monet
Manager of Environmental Planning Initiatives
Digitally Signed Aug 31, 20

Division Review
Jason Ferrigan
Director of Planning Services
Digitally Signed Aug 31, 20

Financial Implications
Apryl Lukezic
Co-ordinator of Budgets
Digitally Signed Sep 4, 20

Recommended by the Department
Tony Cecutti
General Manager of Growth and Infrastructure
Digitally Signed Sep 8, 20

Recommended by the C.A.O.
Ed Archer
Chief Administrative Officer
Digitally Signed Sep 9, 20

Report Summary

In June of 2017, the City of Greater Sudbury directed staff to develop a Community Energy and Emissions Plan (CEEP) pending securement of funds from higher levels of government to cover the majority of the costs of plan development. Having secured the funds, a CEEP was under preparation in 2018 and 2019 with input from local energy stakeholders and the public. In addition to assessing local energy and greenhouse gas (GHG) emission profiles from the various sectors, the CEEP outlines the actions needed to reach Council's stated target of net zero GHG emissions by 2050, as expressed in Council's climate emergency declaration of May, 2019. The CEEP was finalized following

public input on the draft CEEP presented to Council on November 12, 2019. The final CEEP is presented in Appendix 1.

Financial Implications

There are no financial implications at this time. Municipal projects resulting from the implementation of the CEEP will be considered individually through future Budget processes.

PURPOSE

This report responds to the direction by the City of Greater Sudbury to:

CC2019-334

a) engage the community to obtain feedback on the draft CEEP from the public and energy stakeholders as described in the report entitled "Greater Sudbury Community Energy and Emissions Plan" from the General Manager of Growth and Infrastructure, presented at the City Council Meeting on November 12, 2019;

b) finalize the CEEP for Council's consideration no later than the end of the second quarter of 2020; and,

c) prepare a CEEP Implementation Strategy – Phase One (i.e., the first five years) no later than the end of 2020.

COMMUNITY ENGAGEMENT – DRAFT CEEP (CC2019-334)

Status: Completed

Staff facilitated a stakeholder workshop session on November 21, 2019 (25 attendees) and a public engagement session on November 28 (24 attendees) to obtain feedback on the draft CEEP. In addition, staff placed the draft CEEP on the City's public engagement online platform "Over to You", resulting in over 200 visitors to the site in late 2019. In total from January 2018 to December 2019, the Over to You site attracted 1500 visitors from which 19 comments were received. Finally, in order to better gauge sentiment on matters relating to climate change and greenhouse gas emissions from the broader local public, staff commissioned a public opinion telephone survey from a professional polling firm. To ensure a statistically meaningful sample size, 525 people from various communities in Greater Sudbury were surveyed.

Given the ambitious target of net-zero GHG emissions by 2050, community support of the CEEP is critical to its implementation. The community engagement efforts reveal that climate change resonates strongly with local citizens and organizations. The telephone survey showed that 82% of participants are concerned about climate change and 79% support the City's Climate Emergency Declaration.

Several community stakeholders have provided letters of support, demonstrating their leadership and commitment to helping Greater Sudbury achieve net-zero emissions by 2050 (see Appendix 2).

CEEP FINALIZATION (CC2019-334)

Status: Completed

In late 2019, the City of Greater Sudbury finalized the CEEP after receiving feedback from the public, stakeholders and members of City Council. The CEEP identifies the community-wide

efforts required to meet a net-zero GHG emissions by 2050 target. The modeling and cost analyses outlined in the CEEP demonstrate that, while the target is very ambitious, the actions and goals presented are technically feasible and economically beneficial for the entire community.

The CEEP identifies eight strategy sectors:

1. Compact, complete communities;
2. Energy efficient buildings;
3. Water, wastewater, and solid waste;
4. Low-carbon transportation;
5. Industrial efficiency;
6. Local clean energy generation;
7. Low-carbon energy procurement; and,
8. Carbon sequestration.

The CEEP also identifies a total of 18 recommended goals tied to the strategy sectors. The goals must be achieved for the target of net-zero GHG emissions by 2050 to be attained. Goals include those over which the municipality has considerable control during implementation, such as achieve net-zero emission in City buildings by 2040 (Goal 4), electrify 100% of City transit and fleet by 2035 (Goal 9), and increase the reforestation efforts of the Regreening Program (Goal 18). The CEEP also includes goals over which the municipality has far less control, such as increasing industrial energy efficiency 35% by 2040 (Goal 11) and 100% of new vehicle sales being electric by 2030 (Goal 10). Achieving these goals relies on coordinated efforts among stakeholders, upper level government incentives, innovation, education and awareness moving forward.

CEEP IMPLEMENTATION STRATEGY – PHASE ONE (CC2019-334)

Status: On schedule for completion by end of 2020.

Concerns over the spread of COVID-19 resulted in the declaration of a State of Emergency in Ontario and the City, which set new priorities for Council's immediate consideration. Notwithstanding the pandemic and declarations, work on the CEEP and its associated Phase One Implementation Plan continues and is on track for completion by the end of 2020 as per Resolution CC201-334.

Thus far, staff have undertaken the following actions related to the CEEP Implementation Strategy – Phase One:

- Identification of municipal CEEP-related actions, in collaboration with individual City Directors, which could be implemented within the first five years. These actions have been discussed at a July, 2020, Business Leadership Group (BLG) meeting with input from the Executive Leadership Team (ELT) and will be refined in the fall of 2020.

- Identification of municipal projects (e.g., street light retrofit to LED) that staff from various divisions are currently undertaking that are helping to implement the CEEP.
- Securement of letters of support for the CEEP and its implementation from several CEEP stakeholders (see Appendix 2).
- Discussions with numerous individual stakeholders to strengthen support for the CEEP's implementation and better understand stakeholders' energy projects whether already completed or to be initiated in the near-term.
- In August, City staff submitted to the Federation of Canadian Municipalities (FCM) preliminary information in support of a feasibility study for local Property Assessed Clean Energy (PACE) financing. Such financing may be the most important means of advancing the CEEP's goal of 50% increased energy efficiency by 2040 of the existing building stock (i.e., mostly private residences). FCM informed the City that the project meets the criteria for FCM's Community Efficiency Financing funds. City staff intend to submit a formal application to FCM to support a feasibility study for PACE financing.
- Discussions with staff of other municipalities and organizations on strategies and measures taken in implementing their CEEP or CEP (Community Energy Plan).

CEEP IMPLEMENTATION - CONSIDERATIONS

The finalization of Greater Sudbury's CEEP is an important step in becoming a net-zero community by 2050. The CEEP sets ambitious goals in each of the eight strategic sectors that must be achieved to attain the net-zero target within 30 years. Now, the Greater Sudbury community must face the daunting task of implementing the CEEP.

Important considerations in the CEEP's implementation include:

- Dealing with uncertainties associated with a 30-year implementation timeframe;
- Greater Sudbury is one of many municipalities world-wide faced with implementing plans to reduce GHG emissions;
- GHG reduction opportunities related to COVID-19 recovery;
- Community-based implementation through collaboration;
- Tracking and reporting implementation achievements; and,
- Adopting a climate lens in decision-making.

Dealing with Uncertainties

The CEEP's model and implementation framework is based on assumptions, which may be perfectly valid today but not so in 10 years, let alone 30 years. The longer the timeframe, the greater the influence of uncertainty on factors determining future realities and forecasting systemic change is difficult to predict beyond 10 years with any accuracy due to developments in three key areas: technology, policy and society.

Given these inherent uncertainties, especially over a 30-year timeframe, the approach recommended by staff is to adopt an incremental approach to the CEEP and its implementation. As such, the CEEP will be reviewed and updated on a 5-year basis. Its model will be applied every five years to ascertain whether the CEEP objectives are being met and, if not, determine where areas of additional focus should lie. The CEEP Implementation Strategy – Phase One outlines actions to be undertaken from 2021 to 2025, the first 5 years of CEEP implementation.

Greater Sudbury is Not Alone in its Efforts to Reduce GHG Emissions

Climate change affects everyone and reducing GHG emissions is a shared responsibility. We are all in this together. Greater Sudbury is joining the ranks of thousands of municipalities around the world taking action to reduce energy and emissions and stimulate a green economy. While each municipality faces its own unique set of challenges, CGS staff will follow Council's lead in continuing to strengthen relationships with other municipalities to discuss best practices, common barriers and solutions, future initiatives and potential collaborations. Local stakeholders will also maintain a shared experience in climate-related initiatives with peers in other jurisdictions.

GHG Reduction Opportunities Related to COVID-19 Recovery

Government responses to the COVID-19 pandemic have significantly changed patterns of energy demand around the world. It has been estimated that the daily global CO_2 emissions were reduced by 17% by early April 2020 compared with the mean 2019 levels, just under half from changes in surface transportation (Nature, 2020). As the world begins planning for a post-pandemic recovery, the United Nations is calling on governments to green their recovery plans and shape the 21st century economy in ways that are clean, green, healthy, safe and more resilient (United Nation, 2020).

City staff estimate that with 22% of the Greater Sudbury municipal workforce working from home for at least some of the time between April 4 and July 18, 2020 (75 work days), GHG emissions were reduced by about 117 tonnes. Annually, this translates into a potential reduction of 407 tonnes from the over 2 million kilometers that would not need to be traveled to get to and from work. Of course, this is a rough estimate based on a number of assumptions, but it does demonstrate what could be achieved through relatively simple changes to the structure of work (i.e., work from home option for some employees). Scaling up a 'work from home' policy to an equivalent portion of the entire Greater Sudbury workforce (i.e., 22%) could result in a reduction of nearly 12,000 tonnes of GHG per year.

A Framework for Collaborative Implementation

As previously stated, attaining net-zero GHG emissions by 2050 will require everyone's participation. As such, implementation of the CEEP is dependent on close collaboration not only between municipal divisions but also with a variety of local stakeholders, including residents. Development of a framework for collaboration will be a key action to be completed within the first year of the Phase One implementation period and will be established and maintained through the active participation of local stakeholders.

Tracking Change, Assessing Implementation Success, and Reporting

Successful implementation of the CEEP will depend on the ability to accurately track, assess and report on changes in energy use in various sectors through metering or fuel sales. GHG emissions in turn are estimated from the energy use based on modeling. All of the actions initiated to meet one of more goals of the CEEP are expected to lead to either energy reductions or GHG reductions, often both. While the status of all CEEP actions can be monitored and reported, not all actions will lead to direct and measurable energy reductions. Some actions will entail the development of policies, education campaigns, or incentive programs that may influence energy use but in themselves do not lead to directly measurable energy reductions. Active transportation infrastructure, for example, can lead to fewer trips by private vehicle but its use is highly dependent on weather, time of year, social acceptance and willingness to personally adopt new transportation routines. Other actions lead to energy reductions that can not only be measured directly but can also be reliably predicted through modeling. Street light conversion to LED technology, for example, leads to predictable outcomes in terms of reduced electricity use and concomitant reductions in GHG emissions.

The development of robust and relevant means of tracking, assessing and reporting change in energy use and GHG emissions will be another key action to be accomplished within the first two years of the Phase One implementation period. These methods will be developed through the collaborative efforts of local stakeholders.

Wherever possible, CEEP actions will be assessed by directly measuring their impact on energy use and resulting GHG emissions. Where direct energy measurement is not possible, the actions' influence on energy will be estimated based on modeling and related assumptions. Where energy measurement can neither be directly measured nor estimated, an action's influence on energy will be inferred through energy or other data related to the action. For example, the influence of active transportation infrastructure on energy use and GHG emissions will, in the end, only be reflected by annual liquid fuel sales in the City, which of course could also be influenced by other factors, such as wider adoption of electric vehicles.

Climate Lens

The United Nations calls climate change the defining issue of our time. As such, the decisions we all need to take, whether mundane or of strategic importance, should wherever possible be weighed and evaluated in relation to their influence on energy and GHG emissions. A few

municipalities and other organizations have begun discussions on the notion of a climate lens through which options for particular decisions can be assessed in terms of climate influences. A climate lens would need to consider not only influences on GHG emissions, but also potential cost and energy reductions, as well as climate adaptation implications. For example, a decision may not have significant implications for GHG reductions if the energy used is electricity since Ontario's electricity supply mix has a relatively low GHG emissions profile. But the decision could lead to large reductions in electricity use that lead to significant cost savings. These savings, in turn, could be used to make changes in other areas of the municipal operations that result in significant GHG reductions. The development of a climate lens will be yet another key project to be undertaken early in the first phase of CEEP implementation.

NEXT STEPS: CEEP IMPLEMENTATION STRATEGY – PHASE ONE (2021 to 2025)

The City's EarthCare Sudbury program will coordinate the implementation of the CEEP during at least the Phase One period (i.e., 2021 to 2025). For over two decades, EarthCare Sudbury has been working with various municipal divisions, with community stakeholders and with the public on sustainability and climate change initiatives. As such, it is well-positioned to initially play a coordinating role in the CEEP implementation. Many of the tasks related to coordination, such as hosting meetings and workshops for stakeholders and the public, community engagement through various channels, including social media, and reporting to the community can be undertaken within the existing operating budget. EarthCare Sudbury's nine sustainability focus areas allow considerable flexibility in budget allocation in any given year.

Over the fall of 2020, staff will refine divisional projects aimed at reducing energy use and GHG emissions during the early stage of CEEP implementation. Project briefs will be included in the CEEP Implementation Strategy – Phase One for reference and funding requirements for individual projects will be addressed during the annual budget process by relevant divisions. Staff will collaborate to ensure that the capital prioritization tool includes a climate-related ranking criterion.

Although the CEEP Implementation Strategy – Phase One will focus on City operations and projected actions, there are many community-focused goals within the CEEP including a) achieving 35% active mobility transportation mode share by 2050, b) increasing industrial energy efficiency 35% by 2040 and c) 100% of new vehicle sales being electric by 2030. Achieving these goals will rely on community groups, upper level government incentives, innovation, education and awareness moving forward and will benefit from the development of a practical framework for collaborative implementation.

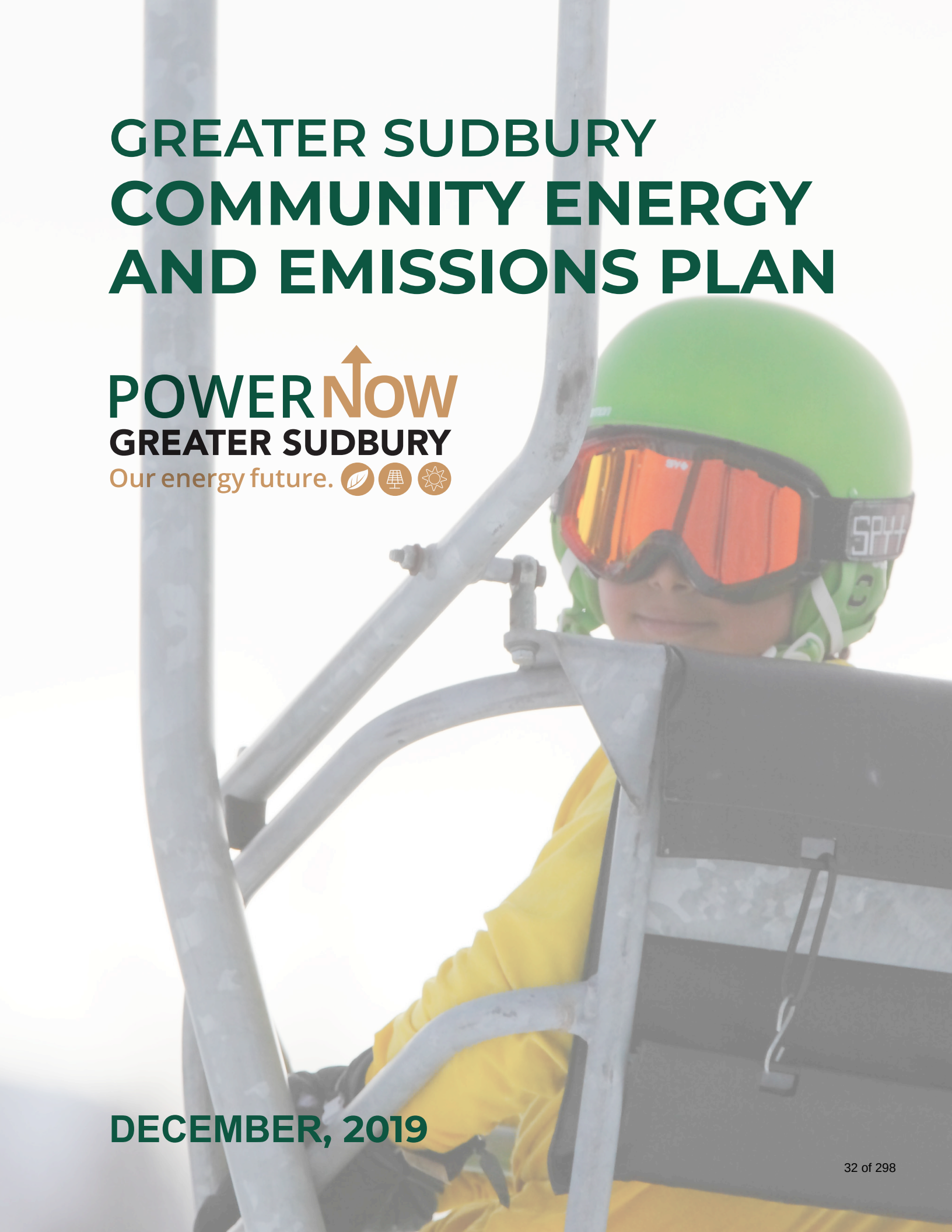
Over the fall of 2020, staff will also be hosting two stakeholder working sessions that will serve to directly inform the development of the CEEP Implementation Strategy – Phase One. In particular, the workshops will focus on such projects as 1) framework for collaborative

implementation, 2) tracking change, evaluating implementation success and reporting, and 3) climate lens. These projects are foundational to the CEEP implementation and will benefit greatly from community input.

It is anticipated that the implementation of the CEEP will adapt to changing policy, financial, social and technological circumstances. Opportunities will arise in some areas and constraints will appear in others. Adapting to these changes will be ongoing and will involve sustained stakeholder collaboration and public engagement.

GREATER SUDBURY
COMMUNITY ENERGY AND EMISSIONS PLAN

POWER NOW
GREATER SUDBURY
Our energy future.



DECEMBER, 2019

Contents

Figures

Acknowledgements

Greater Sudbury's Community Energy and Emissions Plan (CEEP) development took place over almost two years. We thankfully acknowledge the following individuals and organizations in the CEEP's preparation.

Lead City Staff

Stephen Monet, Ph.D., Manager, Environmental Planning Initiatives
Jennifer Babin-Fenske, Ph.D., Coordinator of EarthCare Sudbury
Sajeev Shivshankaran, P.Eng., CEM, Energy & Facilities Engineer

Stakeholder Working Group Invitees

Greater Sudbury Utilities
Union Gas
NORCAT
Vale
United Way Centraide North East Ontario
reThink Green/Green Economy North
Laurentian University
Cambrian College
College Boreal
Wahnapitae First Nation
Glencore
Hydro One
Greater Sudbury Chamber of Commerce
Electric Vehicle Society – Greater Sudbury
Rainbow District School Board
Atikameksheng Anishnawbek First Nation
Conseil scolaire public du Grand Nord de l'Ontario
Conseil scolaire catholique du Nouvel-Ontario
Sudbury Catholic District School Board
Greater Sudbury Housing Corporation
CGS Economic Development Division
City of Greater Sudbury - Water/Wastewater Division
Dalron/Sudbury and District Home Builders Association
Ontario Ministry of Natural Resources and Forestry
New Sudbury Centre

Funding Partners

The preparation of this plan was carried out with assistance from the Government of Canada and the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.

Project funding support provided by the Government of Ontario.

CEEP Preparation

SSG SUSTAINABILITY SOLUTIONSGROUP

Greater Sudbury by the Numbers

		% change over 2016
Population, 2016 (Adjusted for student population)	176,435	
Population, 2050 (Adjusted for expected student population)	184,080	+4.3%
New dwellings, 2016-2050	5,153	+7.4%
New non-residential floor space, 2016-2050	379,118 m^2	+9.5%
2016 total GHG emissions	1,303,900 tCO_2e	
2050 total GHG emissions under current trajectory	1,163,000 tCO_2e	-11%
2050 total GHG emissions under CEEP implementation	0 tCO_2e	-100%
2016 per capita GHG emissions	7.4 tCO_2e	
2016 per capita net emissions under current trajectory	6.2 tCO_2e	-14%
2050 per capita net emissions under CEEP implementation	0 tCO_2e	-100%
2016 total energy consumption	26.9 million GJ	
2050 total energy consumption under current trajectory	24.6 million GJ	-9%
2050 total energy consumption under CEEP implementation	10.6 million GJ	-61%
2016 total energy costs	$776M	
2050 total energy costs under current trajectory	$901M	+17%
2050 total energy costs under CEEP implementation	$393M	-49%
Person years employment generated by the CEEP, 2020-2050	40,000	

Executive Summary

Greater Sudbury's Community Energy and Emissions Plan (CEEP) follows from decades of energy and emissions reduction initiatives in the community and responds to City Council's May 28, 2019 Climate Emergency declaration. A climate change mitigation plan, it parallels the City's climate change adaptation planning efforts. The CEEP uses energy, emissions, land-use, and financial modelling to determine the community-wide efforts required to meet a 2050 net-zero emissions target. This target requires the reduction of 1.2 million tonnes of emissions in the target year of 2050. The Plan also describes the efforts required to meet an 80% of 2016 emissions levels reduction target by 2050 for comparison.

The CEEP employs three key concepts in determining its recommended actions:

1. The Reduce-Improve-Switch paradigm (reduce energy use, improve efficiency, and switch to low-carbon energy sources);
2. Community energy planning prioritization; and
3. Infrastructure, mechanical, and energy systems turnover.

These concepts are applied to energy and emissions actions in 8 strategy sectors, in which there are 18 CEEP goals:

STRATEGY SECTOR		GOAL
1.	COMPACT, COMPLETE COMMUNITIES	**Goal 1: Achieve energy efficiency and emissions reductions by creating compact, complete communities through infill developments, decreasing dwelling size through an increase in multi-family buildings, and increasing building type mix.**
2.	EFFICIENT BUILDINGS	**Goal 2: Periodically increase the energy efficiency of new buildings until all new buildings in 2030 onward are Passive House energy efficiency compliant.** **Goal 3: The existing building stock is retrofit for 50% increased energy efficiency by 2040 and large buildings are routinely recommissioned** **Goal 4: Achieve net-zero emissions in City buildings by 2040.**

STRATEGY SECTOR		GOAL
3.	WATER, WASTEWATER, AND SOLID WASTE	Goal 5: Decrease energy use in the potable water treatment and distribution system by up to 60% by 2050. Goal 6: Achieve 90% solid waste diversion by 2050. An organics and biosolids anaerobic digestion facility is operational by 2030.
4.	LOW-CARBON TRANSPORTATION	Goal 7: Enhance transit service to increase transit mode share to 25% by 2050. Goal 8: Achieve 35% active mobility transportation mode share by 2050. Goal 9: Electrify 100% of transit and City fleet by 2035. Goal 10: 100% of new vehicle sales are electric by 2030.
5.	INDUSTRIAL EFFICIENCY	Goal 11: Increase industrial energy efficiency 50% by 2040.
6.	LOCAL CLEAN ENERGY GENERATION	Goal 12: Establish a renewable energy cooperative (REC) to advance solar energy systems and other renewable energy efforts of the CEEP. Goal 13: Install 10 MW of ground mount solar PV each year, starting in 2022. Goal 14: Install net metered solar photovoltaic (PV) systems on 90% of new buildings and 80% of existing buildings, supplying 50% of their electric load. Goal 15: Expand the downtown district energy system to 23 MW capacity. Goal 16: Install 50 MW of renewable energy storage.
7.	LOW-CARBON ENERGY PROCUREMENT	Goal 17: Procure 100% of community-wide grid electricity and 75% of natural gas demand from renewable sources by 2050.
8.	CARBON SEQUESTRATION	Goal 18: Increase the reforestation efforts of the Regreening Program.

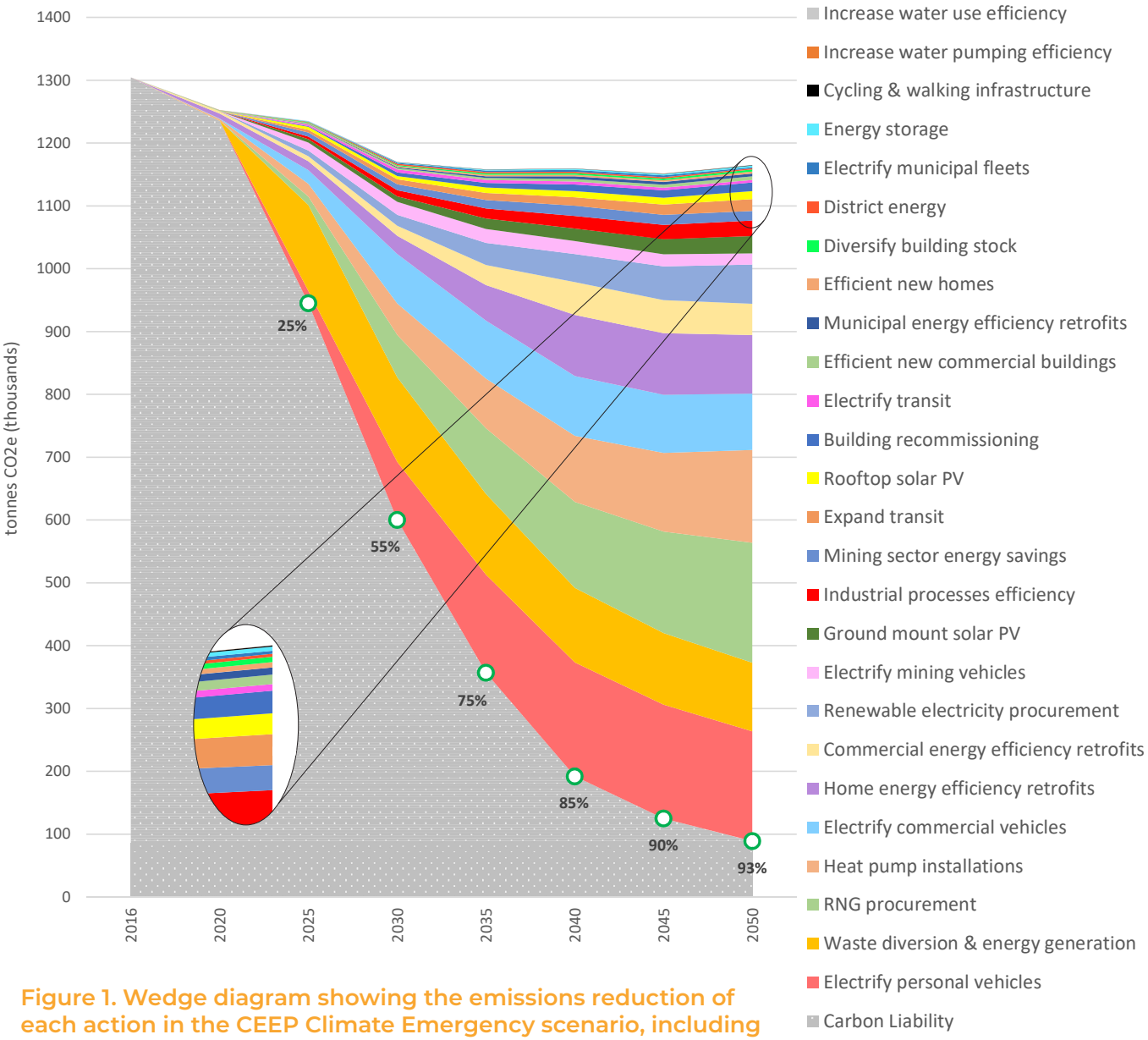


Figure 1. Wedge diagram showing the emissions reduction of each action in the CEEP Climate Emergency scenario, including emissions reduction percentage targets (of 2016 emissions levels). Note that although water use efficiency and water pumping efficiency actions save energy, their emissions saving is negligible and does not display on this graph.

Figure 1 shows the emissions reductions effects of the best action options to achieve the 18 goals, and thus the 2050 net-zero emissions target. The top line of the graph indicates emissions under a business as usual scenario (i.e. accounting for current trends and plans). Energy efficiency, energy generation, and vehicle electrification actions will achieve the majority of emissions reductions. A variety of smaller actions are critical for achieving the remainder of reductions. These actions reduce 93% of 2016 emissions levels in the year 2050 (1.1 million tonnes CO2e), leaving 100,000 tonnes of carbon dioxide equivalent (tCO_2e) present in that year.

The final 100,000 tCO_2e in 2050 could be completely reduced to meet the net-zero goal through some combination of approaches including:

- Increasing RNG use from the current goal of 75% natural gas replacement to 100% replacement, including in district energy systems;
- Operating all industrial activities on biofuels or renewable electricity;
- Expanding gas capture to all landfill and wastewater operations; and
- Carbon sequestration.

Carbon sequestration is a promising option, as Greater Sudbury's Regreening Program has already proven to be a successful reforestation effort with sizeable sequestration results.

Financial modelling of CEEP actions determined their high-level costs and savings between 2020 and 2050 (Figure 2) as compared to expected costs and savings under a business as usual scenario. The costs and savings will be community-wide (i.e. not solely incurred by the City). Costs are incurred by energy generation infrastructure provision, transition to electric vehicles, building energy efficiency retrofits, etc. Savings are made through reduced vehicle and equipment operations and maintenance, avoided carbon tax payments, energy use cost savings, and revenues from local energy generation. By 2050 cumulative CEEP implementation costs total $6.5B with a present value of $4.3B (at a discount rate of 3%). Total net savings reach $14.6B. Financial modelling also estimates that 40,000 person years of employment will be generated by CEEP actions between 2020 and 2050.

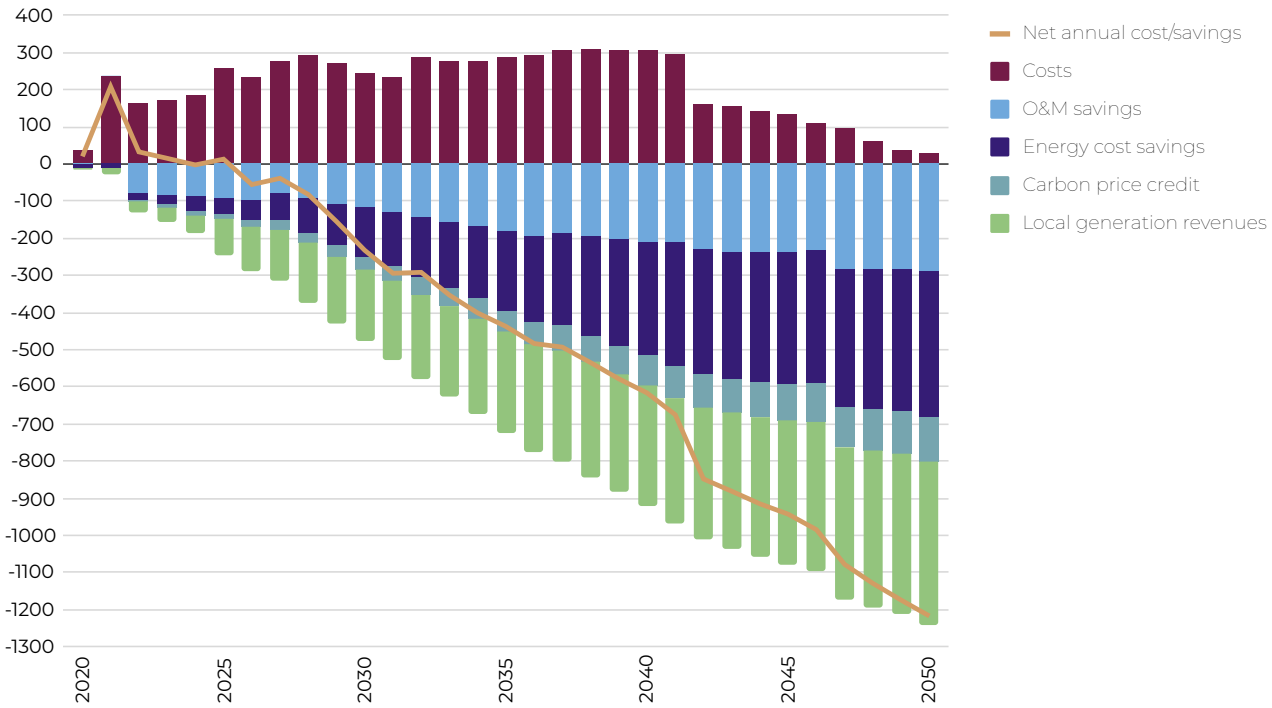


Figure 2. Summary of annual CEEP costs (above x-axis) and savings (below x-axis) relative to the BAU scenario.

Combining the energy and emissions actions analysis with the financial analysis yields the Marginal Abatement Cost (MAC) curve (Figure 3). The MAC curve provides an at-a-glance summary of the financial cost or savings per tonne of emissions reduced for each action. All CEEP actions except electricity procurement generate savings for every tonne of emissions reduced.

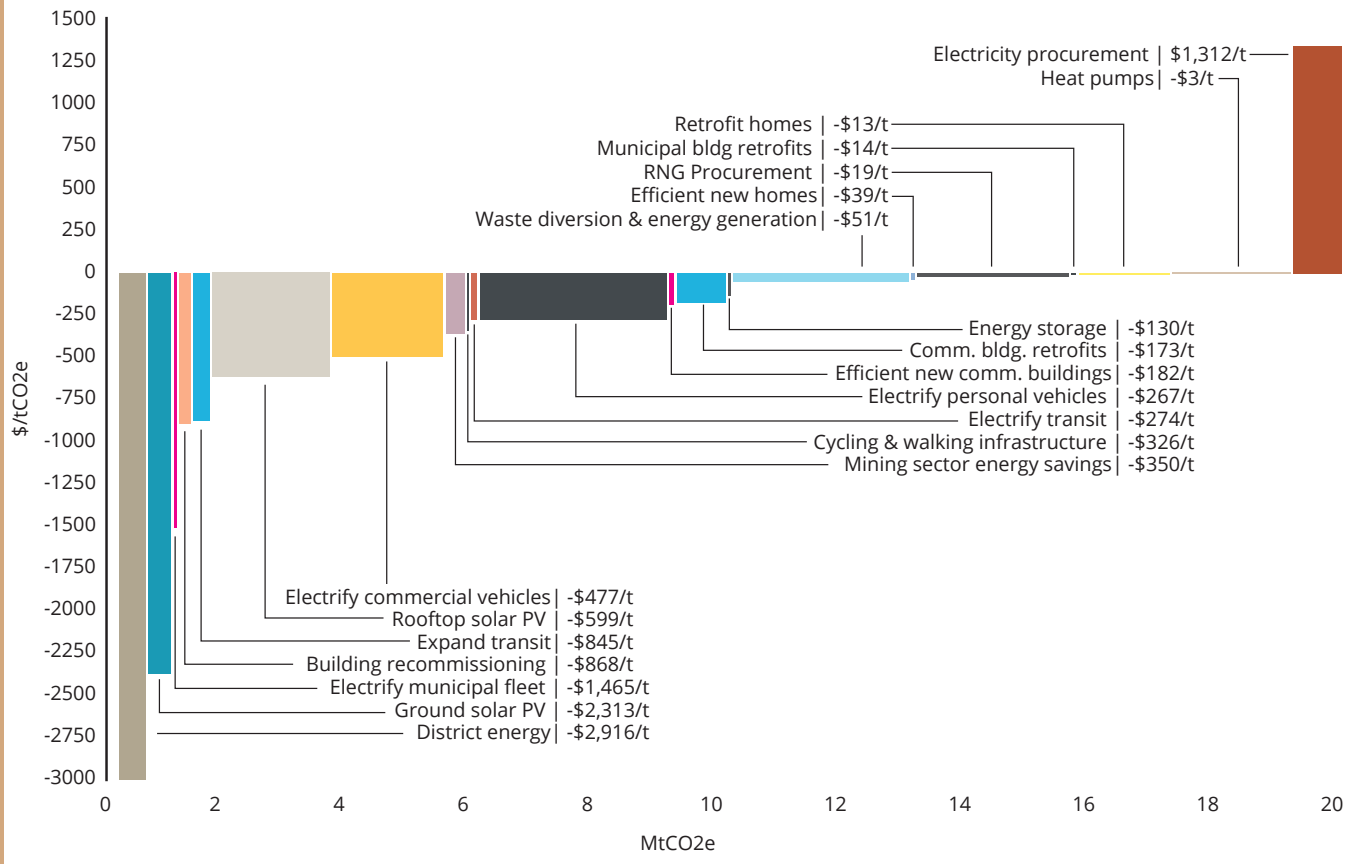


Figure 3. CEEP marginal abatement cost (MAC) curve, showing the cost/savings per tonne of emissions reduced by action. Horizontal axis: megatonnes CO_2e reduced by the action (wider bars = greater reductions). Vertical axis: net financial cost/savings of the action (taller bars = greater cost/savings). Positive numbers are costs, negative numbers are savings.

The CEEP illustrates what is required to achieve a 2050 net-zero emissions target in Greater Sudbury. Although substantial effort is required to reduce energy use and transition from fossil fuel supplied energy, the environmental, financial, and community benefits indicate that the endeavour is worthwhile.

Part 1: Introduction

A Global and Local Imperative

The Community Energy and Emissions Plan is a proactive program that addresses energy use, emissions production, and climate change issues and opportunities in Greater Sudbury. It acknowledges the global scientific consensus that identifies present and increasing ecosystems and climate impacts caused by increased greenhouse gas (GHG) emissions from fossil fuel burning activities currently required to live our day-to-day lives.[1] Global climate functions are changing as a result, with large-scale changes to weather patterns, including increases in storms, droughts, extreme weather events, as well as an overall increase in the average global temperature.[2] These changes are impacting our infrastructure, buildings, crops, and ecosystems.

The Intergovernmental Panel on Climate Change (IPCC) estimates that human activities have caused approximately 1.0°C of global warming above pre-industrial levels, which is likely to reach 1.5°C sometime between 2030 and 2052. Limiting warming to 1.5°C requires reaching net zero carbon dioxide (CO_2) emissions globally around 2050, with concurrent deep reductions in emissions of non-CO_2 forcers, particularly methane (CH4).[3]

On May 28, 2019, the City of Greater Sudbury joined other Canadian and global municipalities in their declarations of a climate emergency. The Community Energy and Emissions Plan (CEEP), whose process began in summer 2017, was directed to respond to the climate emergency declaration by creating an action and policy pathway to achieve net-zero emissions community-wide by 2050.

Canada's International Commitments

Canada is a signatory to the Paris Agreement (2015), under which it has committed to achieving a 30% reduction in emissions below 2005 levels by 2030, and 80% below 2005 levels by 2050. The Paris Agreement aims to strengthen the global climate change response by keeping the global temperature rise this century well below 2.0°C relative to pre-industrial levels, and to pursue efforts to limit temperature increase even further to 1.5°C, to avoid the severe climate change impacts projected to occur if 1.5°C of warming is surpassed. Many Canadian local governments are using these directions for their own emissions reduction goals.

1 More details on the relationship between climate change and greenhouse gases at: www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter01_FINAL.pdf

2 Ibid.

3 2018: Technical Summary. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. https://www.ipcc.ch/sr15/technical-summary

The Pan-Canadian Framework (2016)[4] summarizes Canada's approach to GHG emissions reduction by 2030, providing climate action direction to provinces and cities. It is under this framework that carbon pricing is effected. Federal carbon pricing is currently at $20 per tonne of emissions, rising to $50 per tonne by 2022.

Cities' Efforts

Approximately 70% of global emissions are under the direct or indirect control or influence of municipal governments.[5] This points to municipalities as some of the world's strongest climate action champions. With bold vision and tenacity, cities are taking action and enacting policy to reduce greenhouse gas emissions within their borders, contributing to the worldwide action required to avoid climate catastrophe.

Many cities have already started to act. More than a dozen municipalities across Canada have adopted 100% renewable energy by 2050 targets, representing over 2.2 million Canadians. Dozens more have declared climate emergencies, identifying climate change impact mitigation as a critical, top priority issue.

A Brief History of Climate Planning in Greater Sudbury

The former Regional Municipality of Sudbury's Strategic Energy Plan (1995) initiated the region's energy and emissions planning, focusing on municipal building energy efficiency. The municipality joined the Cities for Climate Protection Program organized by the International Council for Local Environmental Initiatives (ICLEI) in 1997. The following year it joined the Partners for Climate Protection (PCP) program, a joint initiative of ICLEI and the Federation of Canadian Municipalities (FCM). ICLEI produced Sudbury's first GHG inventory, meeting PCP's first of five milestones.

EarthCare Sudbury (a municipal program) was established shortly after the region's 2000 amalgamation, in part to engage community partners (initially 38 businesses, institutions and non-government organizations) in setting emissions reduction targets and developing a Local Action Plan (PCP milestones 2 and 3).

The EarthCare Sudbury Local Action Plan was released in 2003 and received the FCM-CH2M Hill Sustainable Community Award. It was updated in 2010 with the support of what is now 150 partner organizations. EarthCare Sudbury's

4 Government of Canada. Pan-Canadian Framework on Clean Growth and Climate Change: http://publications.gc.ca/collections/collection_2017/eccc/En4-294-2016-eng.pdf

5 C40 website: https://www.c40.org/why_cities

sustainability messaging continues to have broad community reach through its partners' employee programs, its annual Green Living magazine (published in partnership with Northern Life), and its weekly 'EarthCare Minute' developed and televised in partnership with CTV. EarthCare Sudbury also delivers programming through its education-based partners: four local school boards, two colleges and one university.

Energy use reduction efforts too numerous to list have been proceeding in Greater Sudbury for decades. Notable instances include home insulation programs, "green" schools, and energy-related business process changes. Vale's $1 billion Clean AER (Atmospheric Emissions Reduction) project is anticipated to reduce smelter emissions by 40%. Other energy-related projects – large and small – will continue in many businesses, institutions, and organizations throughout Greater Sudbury and within the City's divisions.

Other notable climate efforts in Greater Sudbury include (chronological, incomplete list):

- 2000: a 5 MW district energy cogeneration system was installed, providing heating, cooling and electricity to some downtown buildings.
- 2000: Greater Sudbury Utilities (GSU) was incorporated, including four affiliate companies: Greater Sudbury Hydro Inc., @home Energy, Agilis Networks, and ConverGen (responsible for the Landfill Gas Generation Facility). Sudbury has always been an energy leader in Ontario. In January 1897, Sudbury became the first community in the province to own and operate an electricity generation facility. Greater Sudbury Hydro Inc. is the descendant of that first effort, and today distributes electricity to over 47,500 customers in Greater Sudbury and West Nipissing.
- 2002: The Ontario office of the Canadian Climate Impacts and Adaptation Research Network (C-CIARN) was formed, hosted at Laurentian University. It was funded by the Government of Canada through the Federal Impacts and Adaptation Research Program, and the Ontario Ministry of the Environment.
- 2006: Coalition for a Liveable Sudbury (CLS) is established and now grown to over 850 citizens and 34 community groups. CLS's actions help address various environmental and social issues including GHG reductions.
- 2006: EarthCare Sudbury launched the Efficient Sudbury campaign with dozens of local retail businesses and utilities to promote energy efficiency and conservation. The campaign received an ENERGY STAR® Market Transformation Award in 2007.
- 2006 and 2007: Greater Sudbury was a participant in a Laurentian University project funded by Natural Resources Canada (NRCAN): "*Promoting community sustainability through adaptive responses to socio-economic and risk assessments of the potential impact of climate change scenarios in*

a natural resource-based, mid-sized Canadian Shield Community: Greater Sudbury."

- 2007: C-CIARN Ontario transitioned to the Ontario Centre for Climate Adaptation Resources (OCCIAR), now the Climate Risk Institute. The City and OCCIAR have worked collaboratively on a variety of climate projects.
- 2007 and 2008: Greater Sudbury was a key participant in an NRCAN and Engineers Canada study entitled "*Adapting to Climate Change – Canada's First National Engineering Vulnerability Assessment*" (2008). A City report outlined the application of the Public Infrastructure Engineering Vulnerability Committee (PIEVC) Engineering Protocol for Climate Change Infrastructure Assessment (Appendix B-4 in the NRCAN and Engineers Canada Final Report).
- 2007: reThink Green was established as a local not-for-profit organization administering energy and emissions reductions programs such as the annual low-carbon transportation Commuter Challenge program (formerly City-administered), the Earth Festival, and the Green Economy North program (2016-).
- 2007: Greater Sudbury Utilities' 1.5 MW Landfill Gas Generation System was completed. It converts landfill methane into electricity, powering the equivalent of over a thousand homes.
- 2008: The City participates in the Climate Adaptation Guidebook Pilot Project organized by ICLEI-Canada. Through NRCAN, this effort led to developing the '*Changing Climate, Changing Communities: guide and workbook for municipal climate adaptation*'.
- 2009: Through EarthCare Sudbury, the City was a key partner of the Greater Sudbury Climate Change Consortium, initiated by the Nickel District Conservation Authority, which delivered climate change public awareness and education campaigns.
- 2012: Greater Sudbury's Hot Weather Response Plan was a case study for "*Climate Change Planning: Case Studies from Canadian Communities*", a document developed by NRCan and the Canadian Institute of Planners.
- 2012: The City created a permanent position for a Certified Energy Manager, who rapidly implemented several energy efficiency retrofit projects, such as lighting, HVAC, heating and pumping, saving 7.7 million kilowatt hours of energy use to date.
- 2013-2014: GSU initiates and maintains planning sessions and discussions on the development of a community energy plan with a group of key stakeholders.
- 2014: A 10 MW solar PV array was installed in Capreol, feeding electricity into the grid managed by the Ontario Power Authority.

- 2015: The City prepared a Conservation and Demand Management Plan for its facilities.
- 2016: Two 245 kilowatt solar rooftop projects were installed on City buildings.
- 2016: The City initiated several subwatershed studies that will integrate climate change adaptation scenarios.
- 2016 and 2017: Through EarthCare Sudbury, the City was chosen to participate in the Great Lakes Climate Change Adaptation Project led by ICLEI-Canada and supported by the Ontario Ministry of Environment and Climate Change. The Train-the-Trainer initiative built municipal staff capacity to undertake adaptation planning.
- 2018: The City performed a climate change adaptation risk and vulnerability assessment with CGS divisional input and community engagement. The city was deemed either high risk or high vulnerability to several climate change impacts.
- 2019: Phase One of the City's Official Plan Review was approved by the Province. It now integrates many new plan policies linked directly to climate change mitigation and adaptation.

Greater Sudbury's Community Energy and Emissions Plan

Greater Sudbury Policy Precedents

The CEEP follows from a collection of past City efforts and policy documents. Many of these documents inform the CEEP, establishing goals and objectives for Greater Sudbury's environmental and sustainability performance.

Strategic Documents	» 2019-2027 City of Greater Sudbury Strategic Plan » Official Plan » Community Economic Development Strategic Plan » Downtown Community Improvement Plan (2017)
Ecosystems and Sustainability Focus	» EarthCare Sudbury Local Action Plan (2010) » Greater Sudbury Biodiversity Action Plan (2009) » International Cities for Climate Protection Program (1997)
Transportation Focus	» Transportation Master Plan (2016) » Transportation Demand Management Plan (2018) » Complete Streets Policy (2018) » Transit Action Plan (2019)
Water, Wastewater, and Waste Focus	» Facilities Master Plan » Water and Wastewater Master Plan
Energy and Emissions Focus	» Strategic Energy Plan (1995) » Partners in Climate Protection Program (1995) » Efficient Sudbury campaign (2006) » Community energy plan discussions led by GSU (2013-2015)
Buildings Focus	» Building Bylaw » Ontario Building Code

Drawing from these precedents, Greater Sudbury's CEEP provides a realistic action plan that responds to the City's climate emergency declaration. It provides a path to a low-carbon future for the community with actions to reduce energy use and greenhouse gas (GHG) emissions over the next 30 years while developing a low-carbon economy that saves on energy costs and creates green jobs.

The CEEP will operate in coordination with existing City plans and strategies that govern land-use, transportation, housing, waste, and energy. Some of these plans are statutory documents while others provide policy and action guidance. The CEEP provides recommendations to address a variety of civic and community elements simultaneously, ensuring they are all working toward the same outcomes. The CEEP's major application will be to initiate new energy actions and policies, while informing and fortifying existing City policies.

There are even more CEEP-related areas in which action can be taken that aren't addressed in the current CEEP. Two topics that may play important roles within the community may be green asset management and sustainable local agriculture and food choices. With the release of the EAT-Lancet report[6] and with more funding and opportunities for green asset management training within Canada, these two topics may be further examined in other plans and projects.

6 https://eatforum.org/eat-lancet-commission/eat-lancet-commission-summary-report

An Engagement-fortified Plan

A plan for the whole community of Greater Sudbury, the CEEP is strengthened by public and stakeholder inputs through the PowerNow! Engagement program. The program had four streams:

1. In-person public events;
2. Online public engagement;
3. Stakeholder Working Group (SWG) meetings; and
4. Interviews and meetings with City Directors.

Two public sessions with over 40 people each contributed to the actions considered in the CEEP and the emissions reduction target level of ambition. Online contributions indicated priority issues and actions for the public. Members of the Stakeholder Working Group (listed in the Acknowledgements section) contributed valuable inputs on potential energy and emissions actions details and their application, ensuring the CEEP's realistic implementation.
City Directors contributed valuable background information and provided direction on realistic considerations for the CEEP's actions and their implementation.

The PowerNow! program was successful in engaging interested and concerned parties in the CEEP's development, setting its direction and content. The CEEP's successful implementation will depend on continued strong support and participation from the City, its stakeholders, and the public. A summary of public engagement efforts for this project can be found in the Appendices.

POWERNOW
GREATER SUDBURY
Our energy future.

Trends Overview

Climate leadership, energy systems, and energy technologies are changing rapidly, creating opportunities and challenges for municipalities. Examples of key trends include:

- **Governments increasingly support low or zero carbon energy options**: Federal and provincial policies are increasingly adopting low or zero carbon energy system approaches. This results in a shift from fossil fuel industry subsidy and investment to support for renewable energy and conservation.
- **Costing carbon creates new opportunities**: There is a growing market for carbon reductions, with economic opportunities provided by carbon pricing.
- **Renewable energy is more accessible than ever**: It is becoming easier for cities, households, and businesses to generate their own energy. Net-metering arrangements with power providers and the declining costs of renewable energy systems are creating opportunities for small to large-scale renewable energy projects.
- **Energy storage technologies are changing the grid**: Technologies like large lithium-ion batteries are already available for houses and businesses. Installations will increase rapidly as their costs continue to decline.
- **New models of electric vehicles are available every day**: Electric vehicle sales are increasing quickly across the country. EV ranges are increasing and charging options are more common, creating consumer security. As EV prices continue to decline and more models become available, EVs will increasingly displace internal combustion engine vehicles.
- **Heating systems remain a challenge, but new options are coming online**: Heat pumps continue to improve in efficiency and more models than ever are available. District energy is gaining traction as an efficient system for providing heating and cooling to communities, with the flexibility to add or subtract energy sources as required.
- **New financing strategies are increasing participation**: Municipalities and financial institutions are offering mechanisms to reduce financial barriers to energy retrofits and renewable technologies. Property-assessed Clean Energy (PACE) programs are a good example. Municipalities around the world are creating innovative policies and strategies to support or engage with these trends while advancing local priorities such as reducing air pollution, stimulating economic development and new employment opportunities, increasing the livability of the community, and improving affordability.

The CEEP applies these trends in its actions and their proposed implementation.

Creating the CEEP

Tracking Emissions

The CEEP follows the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC Protocol), a global framework describing how municipalities can estimate and report local GHG emissions, enabling them to benchmark emissions trends and reduction progress against their peers. Consistently applied, the framework also allows the aggregation of municipal emissions inventories for provincial emissions totals, and provincial aggregations for national-level emissions totals (which federal governments use to report to the UNFCCC). The GPC defines three 'scopes' of emissions, as illustrated in Figure 4.

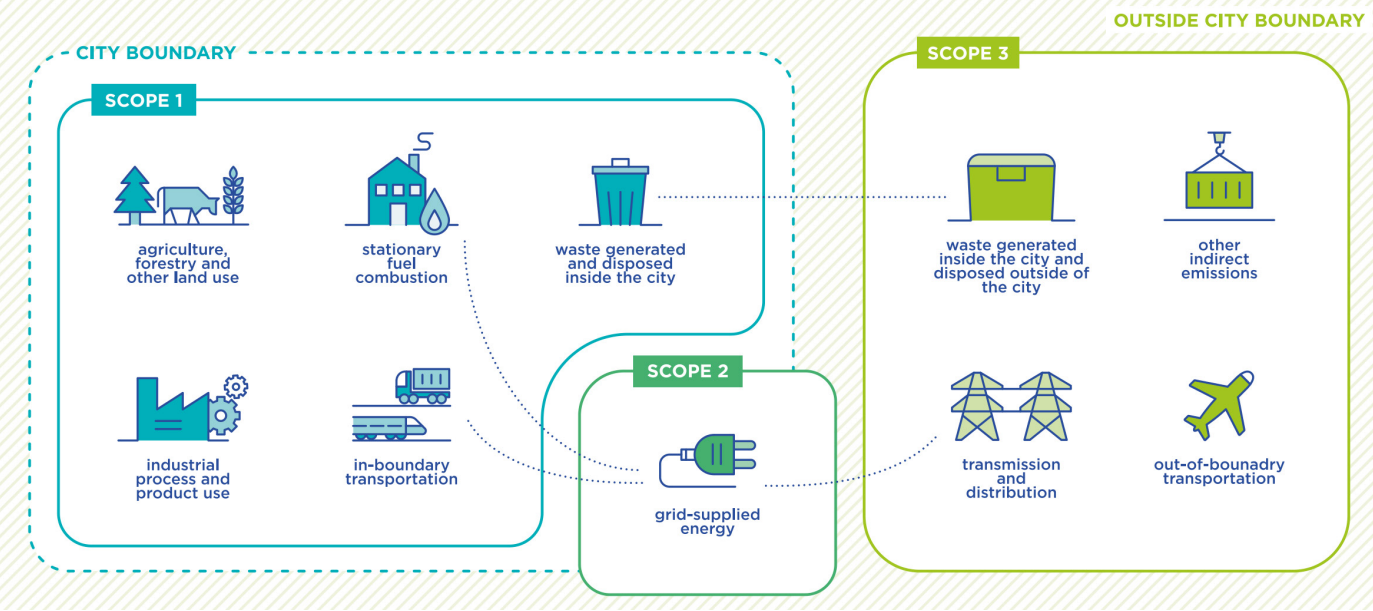


Figure 4. Emissions scopes as they relate to geographic and inventory boundaries.[7]

Charting a Low-carbon Future

The creation of Greater Sudbury's CEEP followed four steps.

1. Current and Expected Energy and Emissions

The CEEP begins in the baseline year 2016 – a federal census year for which there is accurate demographic, energy, and emissions data. Quantitative modelling analysis details what is likely to happen with Greater Sudbury's energy use and GHG emissions production if no additional policies are introduced between now

7 Image source: Consumption-Based Inventories of C40 Cities. https://www.c40.org/researches/consumption-based-emissions

and the target year 2050. This is the business as usual scenario (BAU). Modelling for the 2016 baseline year and 2050 BAU scenario was completed using CityInSight, a comprehensive energy, GHG emissions, land-use, and finances model developed by SSG and whatIf? Technologies Inc. that uses the GPC Protocol Framework. This report uses a GPC BASIC inventory approach, which includes GHG inventories and modelling of the following elements:

- Residential buildings;
- Commercial, municipal, and institutional buildings and infrastructure;
- Fugitive emissions from upstream oil and natural gas systems;
- On-road resident and visitor transportation;
- Solid waste disposal; and
- Wastewater treatment.

2. Actions Development

Dozens of energy and emissions actions in the energy efficiency, energy generation, transportation, and buildings sectors were considered for the CEEP. Public and stakeholder engagement events were held to discuss actions and the appetite for levels of ambition for their implementation. Study, assessment and vetting by City staff, stakeholders, and the consulting team determined a final slate of actions to consider for modelling in low-carbon scenarios.

3. Scenario Exploration

After presenting the results of a 65% emissions reduction scenario to the public and City Directors, two energy and emissions scenarios were refined in which the determined actions were tested to varying extents: an 80% emissions reduction from 2016 levels by 2050 and a climate emergency 100% emissions reduction. The energy and emissions impacts of each action were modelled from the baseline year to the target year (2016-2050) using CityInSight.

4. Recommendations and Implementation Framework Development

Based on the scenario modelling, final actions were refined by City staff, stakeholders, and the consulting team. An implementation framework provides guidance on how each action can be implemented.

Greater Sudbury's Energy and Emissions Future

The city's baseline energy and emissions information describes where energy is currently sourced and how it is used, as well as the GHG emissions associated with its use. The BAU forecast uses sound assumptions about future buildings, transportation, waste, and energy generation and use circumstances to forecast the city's expected energy and GHG emissions profile in 2050.

Although Greater Sudbury's population is expected to increase slightly, overall energy use and GHG emissions are expected to decrease in the BAU scenario. The decreases are a long way from achieving national and international GHG emissions reduction targets, but it is at least a positive trend. The following sections explore where Greater Sudbury's energy and emissions trends are currently headed.

Governmental greenhouse gas inventories typically track carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4) emissions—the three main types of greenhouse gases that governments can most control. Gases are measured in tonnes released into the atmosphere and are converted into tonnes of carbon dioxide equivalents (tCO_2e). This conversion allows comparison of each gas' greenhouse effect (global warming potential, GWP) relative to one unit of CO_2. It is calculated by multiplying the greenhouse gas' emissions by its 100-year global warming potential.

GREENHOUSE GAS	LIFETIME IN ATMOSPHERE (YEARS)	GWP VALUE	
		OVER 20 YEARS	OVER 100 YEARS
CARBON DIOXIDE (CO_2)	30-95	1	1
METHANE (CH_4)	12.4	86	34
NITROUS OXIDE (N_2O)	121.0	268	298

For more information on GHGs and FCM's Partners for Climate Protection GHG inventories, refer to www.fcm.ca/Documents/reports/PCP/Developing_Inventories_for_Greenhouse_Gas_Emissions_and_Energy_Consumption_EN.pdf

Climate Considerations

Climate analysis by Laurentian University shows that the local average annual temperature has increased by 1.6°C, and average annual precipitation has increased by 10% between 1955 and 2010.* Spring precipitation has increased by 25%. These trends increase the risk of flooding, greater periods of freezing rain in winter, more dry summers with increased chance of forest fires, and periods of extreme heat. Greater Sudbury's building heating and cooling energy demand depends on outside temperatures.

Between 2000 and 2018, the average yearly cooling degree days (CDD, number of degrees that a day's average temperature is above 18°C, requiring building cooling) was 163, while the average heating degree days (HDD, number of degrees that a day's average temperature is below 18°C, requiring heating) was 4,868. The Climate Atlas of Canada anticipates that these values will increase to 384 CDD and decrease to 4,189 HDD due to a warming climate (Figure 5). Lower HDD reduces building heating requirements and thus natural gas use. Increasing CDD increases air conditioning, creating higher electricity loads in the summer. Forecasted degree day changes are considered in the CEEP scenario modelling.

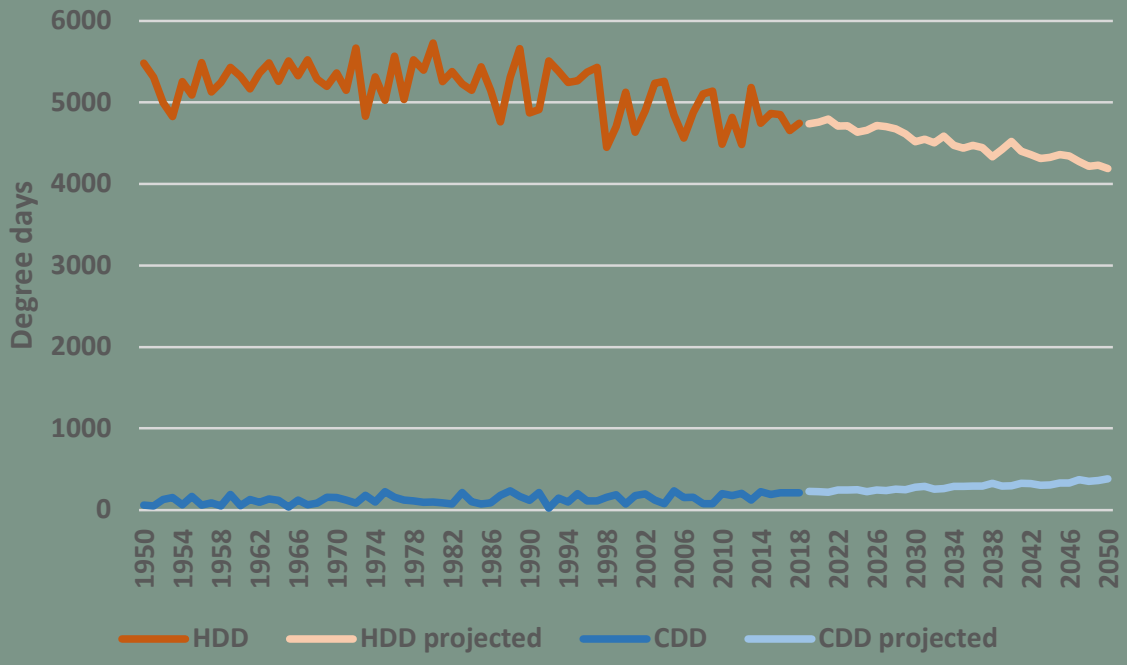


Figure 5. Historical and forecasted heating and cooling degree days in Greater Sudbury, 1950-2050.

* Climate Change and the Official Plan. Presentation to Planning Committee, Manager's Report. City of Greater Sudbury. Feb. 25, 2013.

Energy and Emissions Baseline and Forecast

Demographic Changes

It is estimated that there will be some increase in population, employment, housing, and vehicle ownership over the next 30 years. 2016 National Census (performed every 5 years) data provides population, employment, and housing baseline information and projections. Population numbers used here are adjusted for current and expected student populations. Greater Sudbury's population is projected to increase by 7,650 people by 2051, with 10,370 additional jobs, and 5,150 more homes (Figure 6). This demographic information helps establish the community's energy and GHG emissions baseline and trends.

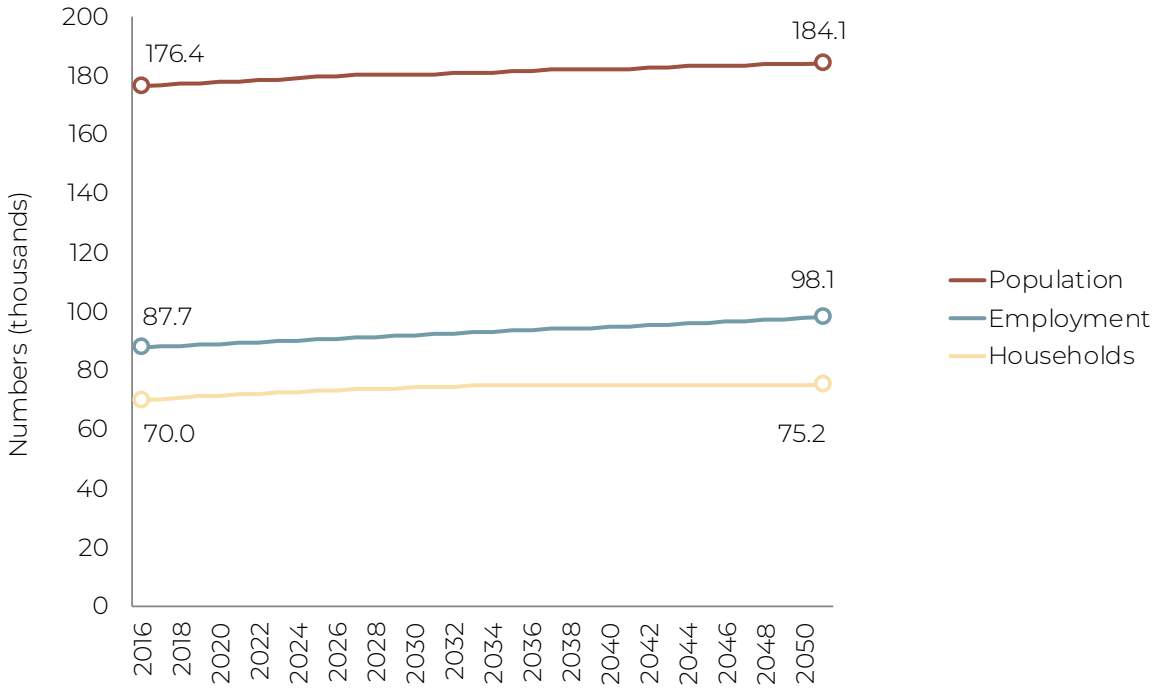


Figure 6. Forecasted population, employment and dwelling units, 2016-2050.

Greater Sudbury's Present and Projected Total Energy Use

Total Energy Demand

Total community energy use includes all energy used by buildings, transportation, and infrastructure. Under the BAU scenario (in which no major energy and emissions interventions are made), energy use is expected to decline 9% by 2050 (Figure 7). Although total energy use generally scales with increased population, there are some expected energy efficiency advances in buildings, fuel efficiencies, electrification of vehicles (electricity is more efficient than gasoline), and reduced building heating demand due to decreased heating degree days.

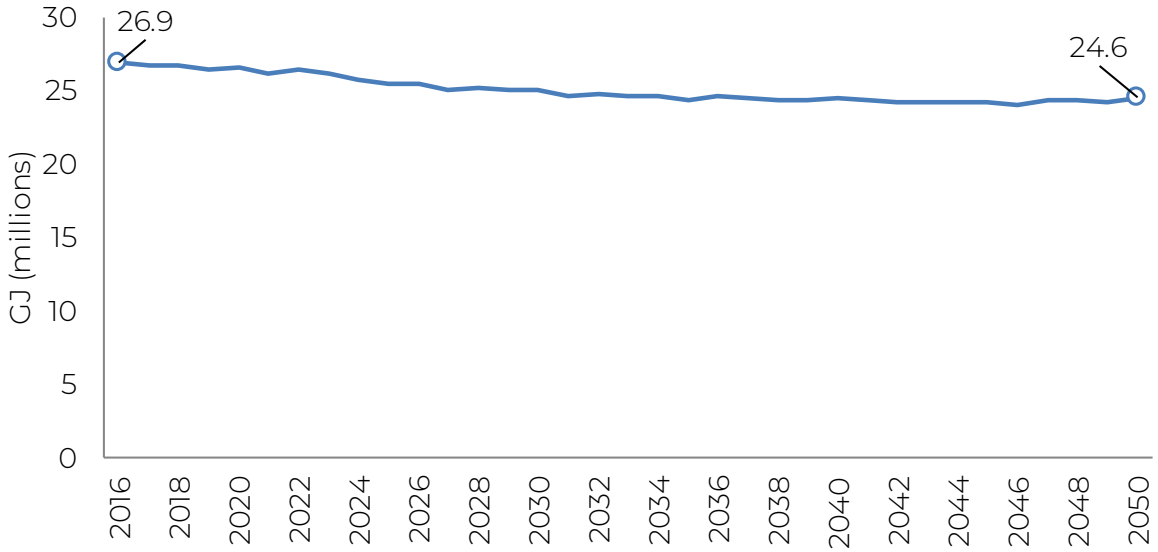


Figure 7. Forecasted total community energy use, 2016-2050.

Where Energy Comes From

Gasoline (vehicles), natural gas (space and water heating), and electricity provide most of Greater Sudbury's energy (Figure 8). Gasoline use declines by 2050 as vehicles become more fuel efficient and electrify. Natural gas is also projected to decrease slightly as heating demand decreases. Gasoline, natural gas, and electricity remain areas of focus for efficiency and shifting to clean electricity sources in 2050.

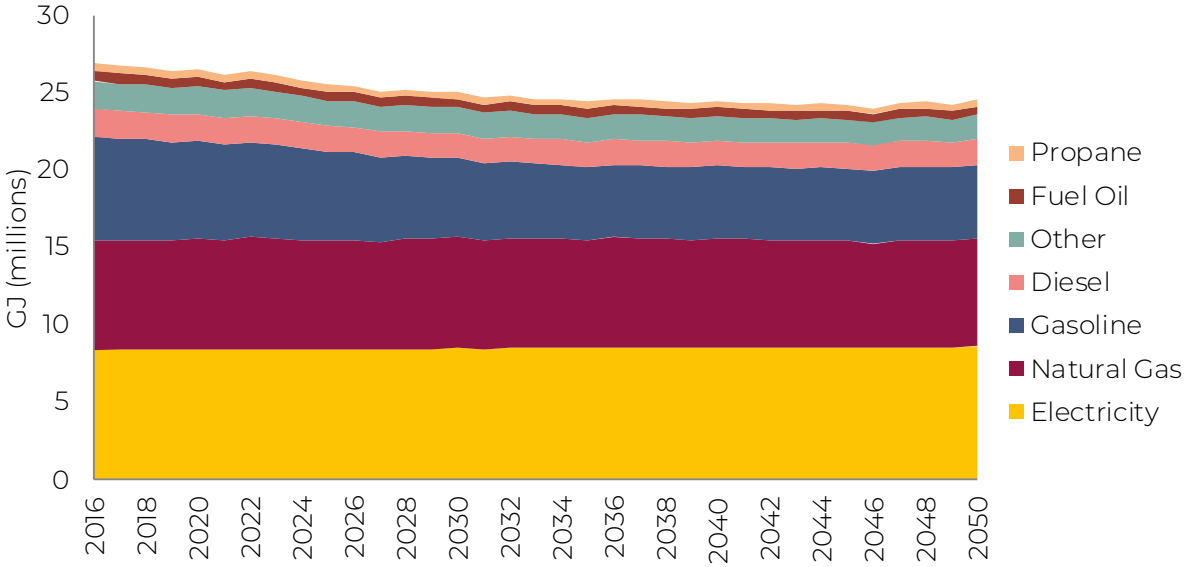


Figure 8. Forecasted community energy use by energy source, 2016-2050.

Where Energy is Used

Now and in 2050, the majority of energy is used in the transportation and residential sectors (Figure 9). While the transportation sector is expected to see some decline in energy use over the time period, the buildings sectors remain relatively consistent. In the BAU scenario, energy used in the commercial sector is expected to decline slightly (-4%) while energy used in the residential sector increases slightly (+3%) between 2016 and 2050. There is potential for energy efficiency improvements in all sectors; the largest opportunity being with residential buildings.

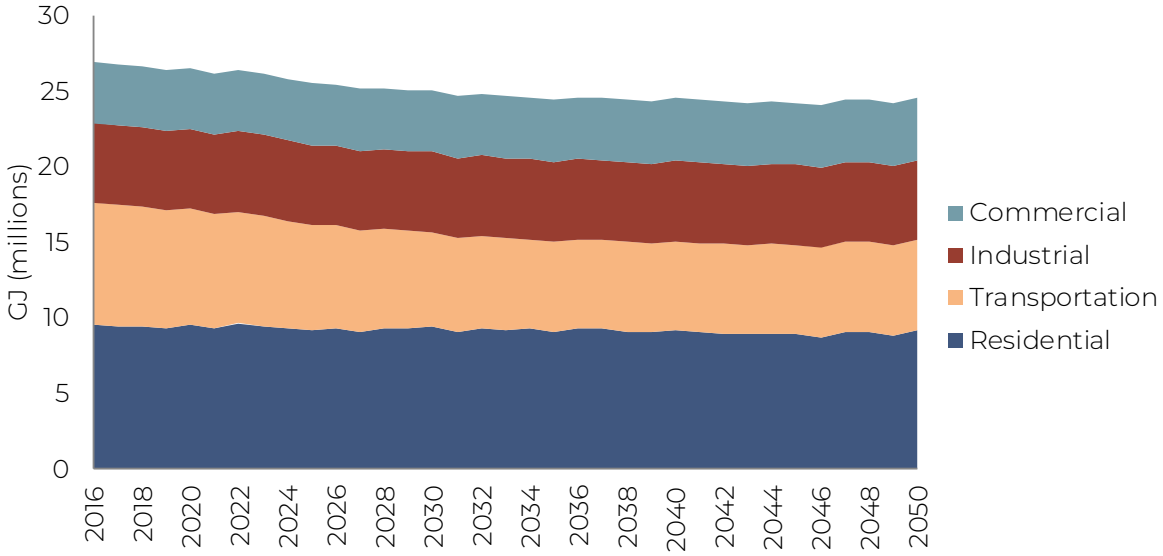


Figure 9. Forecasted community energy use by sector, 2016-2050.

How Energy is Used

Figure 10 shows energy use by end use. Transportation and space heating account for the majority of energy use in 2016 through 2050. Space heating demands decrease by 7% over the time period. Population increases drive increased energy use in water heating, major appliances, and plug loads. Transportation energy consumption decreases over the time period due to improved fuel efficiency standards in vehicles and an incremental uptake of electric vehicles (which contributes to increased electricity consumption).

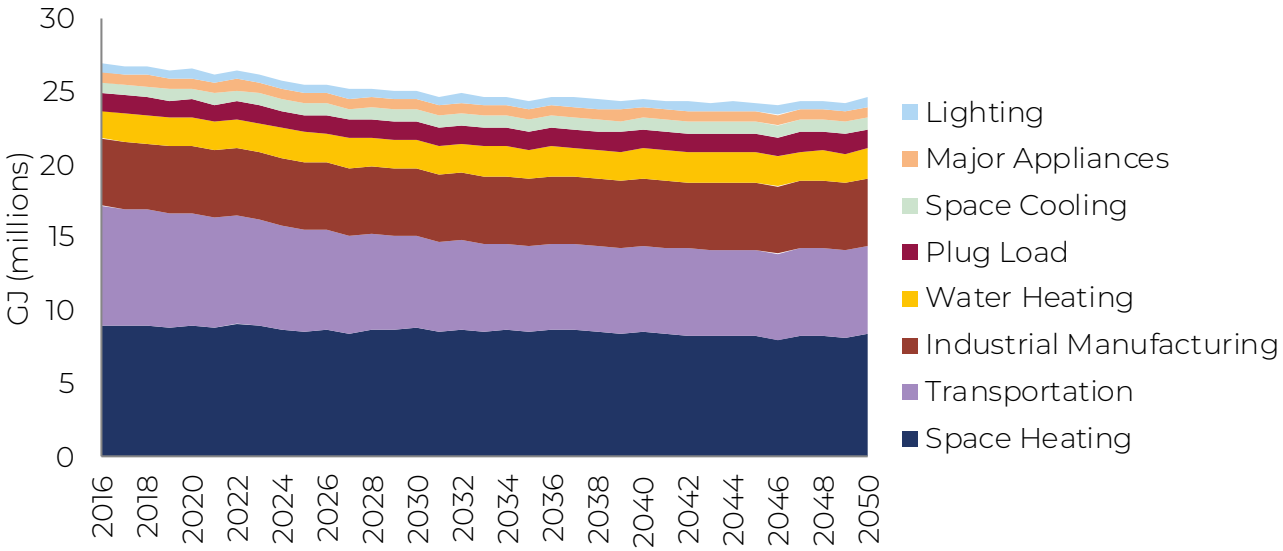


Figure 10. Forecasted community energy use by end use, 2016-2050.

Energy Flows

The Sankey diagram below depicts the flow of all energy across the entire city, from its source (left) to its end use sector (middle). Sums of total energy used and lost are on the right. The height of each bar indicates how much energy is supplied, used, or lost.

The diagram demonstrates that burning gasoline and diesel in vehicles is not very efficient – much of the fuel is wasted. Natural gas use in buildings is more efficient, although a substantial portion of it is also lost. The ratio of useful energy to conversion losses in 2016 is 1:1.53 (i.e. for every gigajoule of energy used, 1.53 gigajoules are lost).

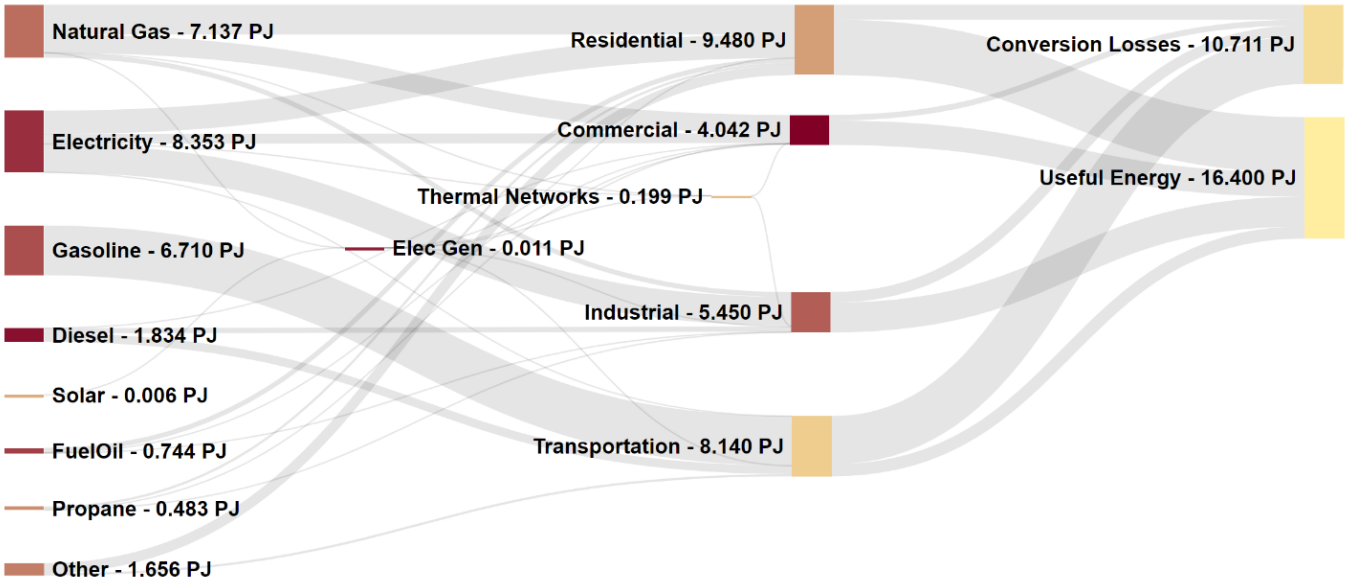


Figure 11. BAU Sankey diagram of energy sources, uses, and use/losses, 2050.

Present and Projected Total GHG Emissions

Total GHG Emissions

In 2016, Greater Sudbury's energy use in buildings, transportation, and infrastructure resulted in 1.3 million tonnes of carbon dioxide equivalent ($MtCO_2e$) emissions. In the BAU scenario, total projected GHG emissions decrease by 11% from 425 to 292 $ktCO_2e$ by 2050 (Figure 12). This is consistent with the forecasted reduction in energy use, with savings in natural gas and gasoline being the primary drivers of emissions reductions in the BAU scenario.

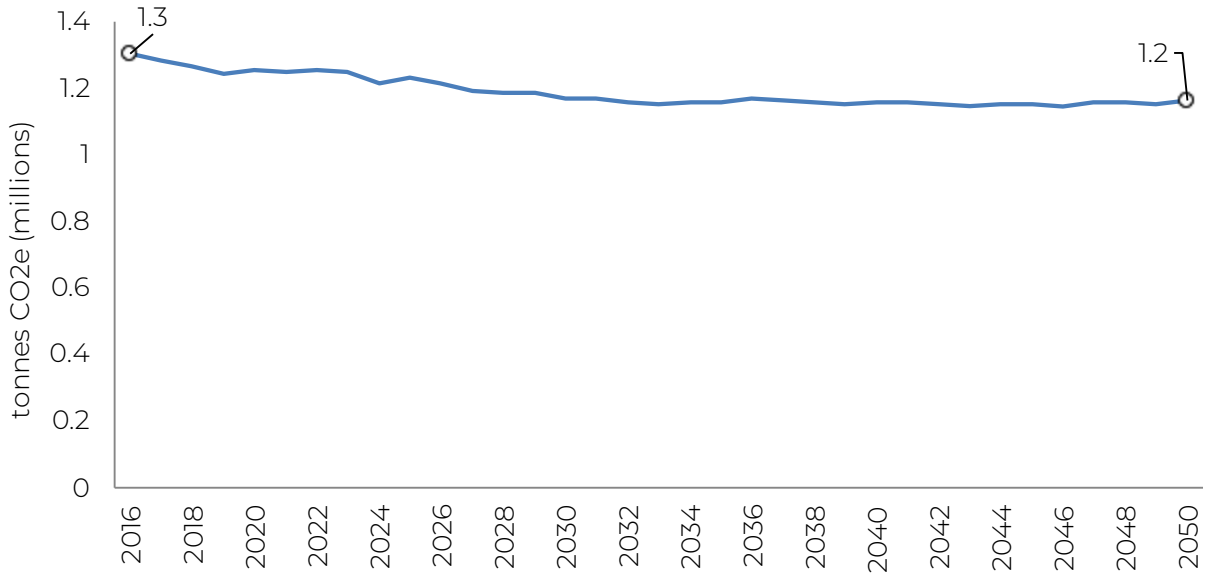


Figure 12. Forecasted total community emissions, 2016-2050.

The emissions baseline (2016) and projections (2050) indicate the magnitude of the net-zero emissions target. By 2050, emissions must be reduced by 1.3 million tonnes from the baseline level of 2016, and by 1.2 million tonnes from the target year level of 2050.

Emissions from Energy Sources

In 2016, the highest emitting energy source was gasoline, with 37% of total emissions (Figure 13). Diesel use was responsible for 10% of emissions. Natural gas use was responsible for 27% while waste constituted another 10%.

By 2050, gasoline and diesel emissions are forecasted to decrease by 29% and 11%, respectively, due to improved fuel emissions standards, vehicle fuel efficiency, and EV uptake. Fuel oil emissions are expected to decline as its use decreases. Natural gas emissions remain roughly the same. Waste emissions scale with the expected additional population, increasing by 6%. Electricity related emissions are expected to increase 33% by 2050 as more natural gas electricity production facilities are added to the grid to meet increasing province-wide demand.

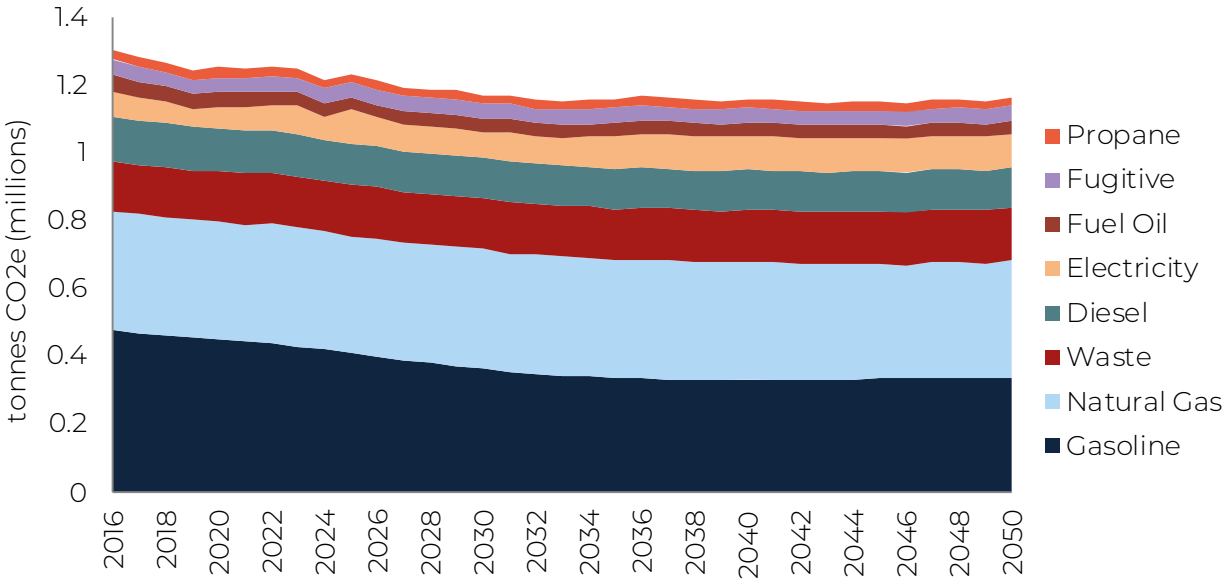


Figure 13. Forecasted GHG emissions by energy source, 2016-2050. Fugitive emissions are those attributable to losses in energy transmission (e.g. natural gas escape).

Where Emissions are Produced

As the largest users of fossil fuels, it is no surprise that transportation and residences are responsible for the majority of Greater Sudbury's emissions, with 43% and 22% of total 2016 GHG emissions, respectively (Figure 14). Emissions decreases are forecasted in these sectors by 2050 as fossil fuel use decreases.

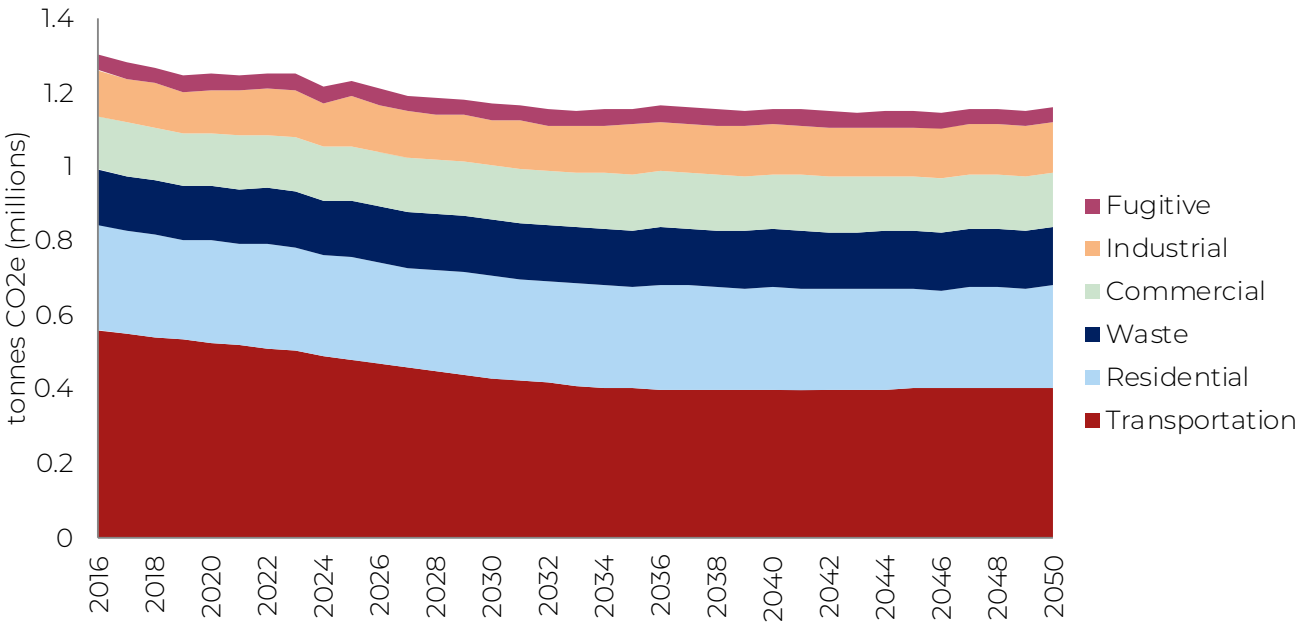


Figure 14. Forecasted GHG emissions by sector use, 2016-2050.

Transportation Fuel Emissions

Greater Sudbury's light trucks (pickup trucks, vans, and SUVs) are responsible for the majority of vehicle emissions, now and in 2050. Although EVs and fuel emissions standards reduce transportation emissions substantially by 2050 (mostly in cars), expected increases in car ownership (light trucks especially) and number of trips result in the levelling off and slight increase in emissions after 2035.

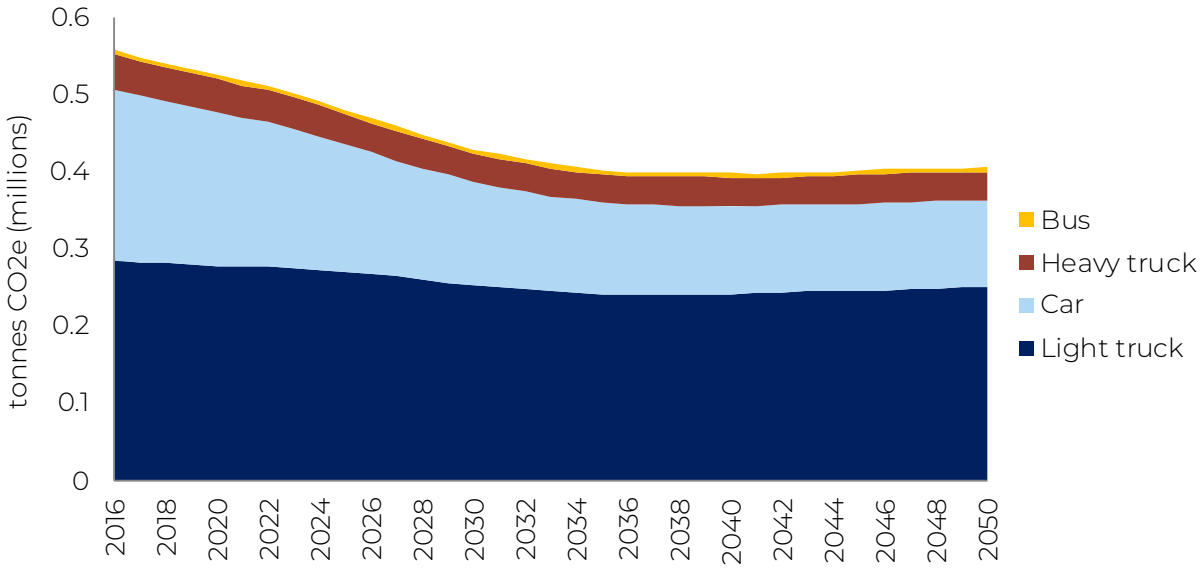


Figure 15. Forecasted transportation sector emissions by vehicle type, 2016-2050.

Buildings Emissions Sources

Space and water heating (largely with natural gas) account for 65% of buildings emissions in 2016. Space heating emissions are expected to decline 7.5% as fewer heating degree days reduce heating demand. Space cooling related emissions are expected to increase as cooling degree days rise. Water heating emissions are expected to increase 12.5% as the population increases. Lighting, appliance, and plug load demands all increase with population as well, with their associated emissions following suit. These expected changes in emissions by building end use result in very little difference in total annual building sector emissions between 2016 and 2050.

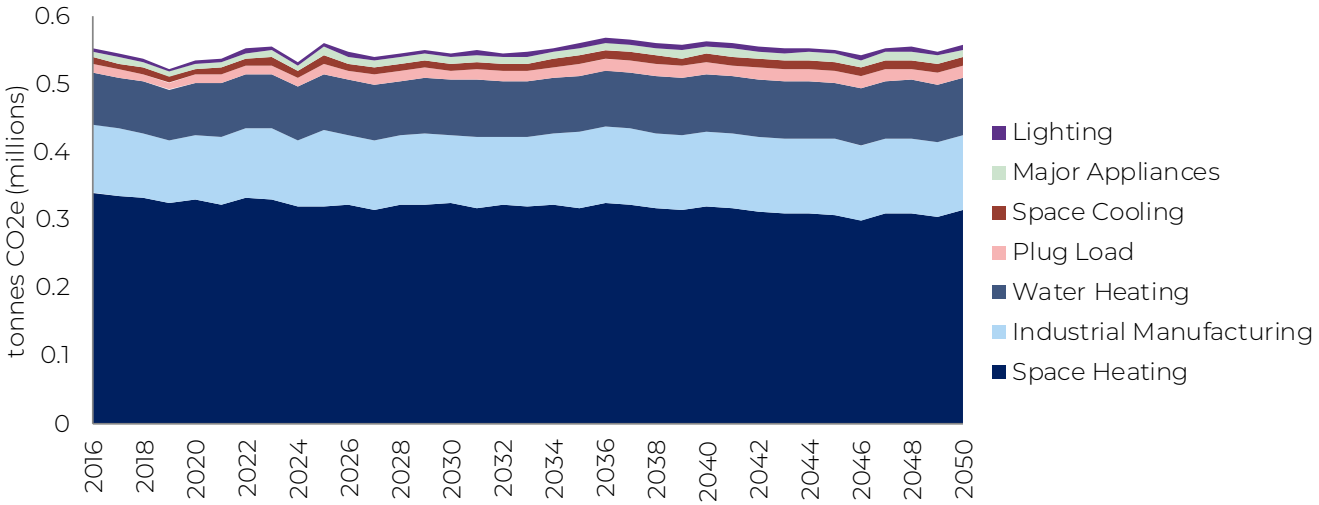


Figure 16. Forecasted building sector emissions by end use, 2016-2050.

Current Energy and Emissions Outlook

Mostly thanks to current Federal transportation direction on vehicle fuel efficiency, fuel emissions factors, and EV incentives, Greater Sudbury's energy and emissions future is expected to improve slightly over today's conditions. Total energy use and emissions are expected to decrease only slightly over the 2016-2050 time period. Sudbury's 2016 (baseline year) emissions levels were 1.3 $MtCO_2e$. Reducing Greater Sudbury's annual emissions by 80% of 2016 levels by 2050 means bringing emissions down to 260,000 tCO_2e in that year. This translates to avoiding over 1 $MtCO_2e$ in that year – a very large decrease.

Total GHG emissions in the BAU scenario are forecasted to be 1.1 million tonnes of CO_2e, leaving a gap of 900,000 tonnes of CO_2e reductions to bridge in order to meet an 80% emissions reduction target.

In the climate emergency scenario in which global average warming is limited to +1.5°C, global emissions must be net-zero by 2050. For Greater Sudbury to achieve this target, all 1.1 $MtCO_2e$ of emissions in 2050 would have to be addressed through reduction efforts and, likely, offsetting through renewable energy production and carbon sequestration (e.g. afforestation).

Part 2: Charting a Path for the CEEP

Transitioning a community to clean, low-carbon energy sources requires minimizing energy use and shifting from decades-entrenched fossil fuel-based energy use to renewable energy sources. Shifting from fossil fuel power to electricity—electrification—provides flexibility in how power is generated, delivered, and used. Electrification can easily reduce community emissions in places where the electric grid is powered by renewable energy – Ontario's grid has relatively low emissions factors compared to other provinces that rely more on coal and natural gas generation.

Three key concepts are used in the CEEP to help navigate low-carbon community planning:

- The Reduce-Improve-Switch paradigm;
- Community energy planning prioritization; and
- Infrastructure, mechanical, and energy systems turnover.

The Reduce-Improve-Switch Paradigm

Low-carbon community planning considers a wide variety of actions in the transportation, buildings, industrial activity, energy use and generation, waste, and land-use sectors. The actions can be classified under one or more categories of Reduce, Improve, and Switch: reducing energy consumption, improving the efficiency of the energy system (supply and demand), and fuel switching to low-carbon renewable sources.

The most effective approach in transitioning to a low-carbon community is to first reduce the amount of energy needed as much as possible through energy efficiency and conservation, and then to switch to low carbon fuel sources to supply the remaining demand. The sequence of the approach is important: by avoiding energy consumption (Reduce), retrofit requirements (Improve) and the need to generate renewable energy (Switch) are both reduced.

Table 1. Sample Reduce-Improve-Switch actions.

	BUILDINGS	TRANSPORTATION	WASTE
REDUCE Reduce energy consumption and optimize energy demand.	Build efficient and low-carbon new buildings.	Build compact, complete communities and transit-oriented development.	Implement strategies to prevent the creation of waste.
IMPROVE Increase energy use efficiency.	Upgrade to energy efficient lighting systems. Perform energy retrofits for existing buildings.	Improve vehicle fuel efficiency.	Improve the efficiency of waste collection practices.
SWITCH Shift to low carbon energy sources.	Source energy from renewable sources.	Switch to electric vehicles that use renewable energy sources.	Collect landfill fugitive emissions for use as renewable natural gas.

Community Energy Planning Prioritization

The actions can also be categorized broadly as applying to new infrastructure or existing infrastructure. Infrastructure is the first priority in community energy planning as it locks communities into its use for decades. The second planning priority is to address major production processes, transportation modes, and building design. The final priority is making energy-using equipment efficient. This prioritization hierarchy concentrates actions where the options to intervene in the future will be fewest.

Infrastructure, Mechanical, and Energy Systems Turnover

There are cyclical opportunities to address existing infrastructure, such as the natural transition at the end of serviceable life, between now and 2050. Different types of infrastructure have different degrees of longevity, for example building HVAC systems (moderate longevity) versus their envelopes (high longevity). Increased energy efficiency can be realized by investing in appropriate upgrades during cycles of infrastructure maintenance and renewal.

CEEP Scenarios

Through technical analysis, research, and public, stakeholder, and City staff input, dozens of energy and emissions actions were vetted. The actions were modelled in CityInSight and two final suites of actions were determined for modelling in scenarios. The actions are grouped into eight general strategy sectors:

1. **Compact, complete communities.** Historical neighbourhood and city design and development has led to high energy use and high emissions lifestyles. Energy efficient land-use approaches achieve great emissions reductions along with a variety of socio-economic co-benefits.
2. **Efficient buildings.** This strategy involves making deep energy efficiency retrofits to all buildings in the community and ensuring that new buildings are built to superior energy standards.
3. **Water, Wastewater, and Solid Waste.** Education, awareness and incentive programs coupled with upgrades to the water distribution, wastewater treatment, and solid waste diversion systems aim to achieve energy efficiencies and emissions reductions in these sectors.
4. **Low-carbon transportation.** This strategy focuses on vehicle electrification, increasing and improving public transit services, and making more trips by walking, cycling and other means of active transportation.
5. **Industrial efficiency.** Local natural resource industries are already researching options for increasing energy efficiency and decreasing energy use costs. Vehicle electrification and increasing the efficiency of industrial processes will achieve emissions reductions while benefitting the industrial bottom line.
6. **Local clean energy generation.** Energy for buildings and vehicles can be produced locally. Solar photovoltaic systems are a central approach to achieve this, renewable natural gas from waste is another. This strategy includes actions to divert waste from landfills, generate energy from landfill gas, and minimize fugitive emissions.
7. **Low-carbon energy procurement.** It is challenging to provide all Greater Sudbury's energy needs locally. The energy demand that remains after energy efficiencies are maximized may not be met by local generation alone. Procuring low-carbon energy from outside the city's boundaries bridges the renewable energy and emissions reduction gap.
8. **Carbon sequestration.** Afforestation efforts can provide trees to sequester enough carbon to bridge the emissions gap remaining after Reduce-Improve-Switch actions have been taken.

Scenario Assumptions

The BAU, 80% Reduction, and Climate Emergency scenarios were modelled using CityInSight with varying actions assumptions, summarized in the following table. Unless otherwise noted, all actions are taken by and/or scaled up to the year 2050. The suite of CEEP actions under the 80% Reduction and the Climate Emergency scenario changes Greater Sudbury's 2050 energy and emissions outlook as compared to the BAU scenario. The actions under the 80% Reduction scenario are ambitious, while those under the Climate Emergency scenario are very ambitious. All actions are considered to an extent determined to be attainable by the City, community, business, and industry, albeit with substantial effort in some cases.

Table 2. Scenario assumptions.

	BASELINE/BAU	80% REDUCTION	CLIMATE EMERGENCY
DEMOGRAPHICS			
Population (people)	176,435 (2016) – 184,000 (2050)	Projections held constant	
Employment (jobs)	87,714 (2016) – 98,080 (2050)	Projections held constant	
COMPACT, COMPLETE COMMUNITIES			
Spatial distribution	Continue current development patterns.	80% of new development is in urban centres or adjacent to existing or new transit services, starting in 2025.	
Dwelling size	Same as baseline sizes.	Average home size decreases 20% due to more multi-family buildings.	
Building type mix	Same as baseline building mixes.	The share of new homes that is single-family decreases to 10%.	
EFFICIENT BUILDINGS			
Efficient new homes	New homes are 5% more efficient every 5 years.	+15% more efficient every 5 years starting in 2020.	Passive House Standard efficient starting in 2030.
Efficient new commercial buildings	New construction is 5% more efficient every 5 years.	+15% more efficient every 5 years starting in 2020.	Passive House Standard efficient starting in 2030.

	BASELINE/BAU	80% REDUCTION	CLIMATE EMERGENCY
Retrofit homes	Minimal retrofit instances.	Achieve 50% thermal savings and 30% electrical savings in 80% of existing dwellings by 2050 starting in 2020.	Achieve 50% thermal savings and 50% electrical savings in 100% of existing dwellings by 2040 starting in 2020.
Retrofits commercial buildings	Minimal retrofit instances.	50% thermal savings and 30% electrical savings in 80% of existing buildings by 2050.	50% thermal savings and 50% electrical savings in 100% of existing buildings by 2040.
Recommissioning	Standard recommissioning instances.	Recommission all buildings over 200,000 ft^2 and 40% of buildings over 25,000 ft^2 every 10 years for 10% energy savings.	
City retrofits	Same as current efficiencies.	100% of City buildings are retrofit to net zero emissions by 2040.	
Heat pump installations	Current instances of heat pump use are extrapolated.	40% and 30% of homes have air source and geothermal heat pumps, respectively. 75% of space heating and 100% of space cooling is electric in commercial buildings.	70% and 30% of homes have air source and geothermal heat pumps, respectively. 75% of space heating and 100% of space cooling is electric in commercial buildings.
WATER, WASTEWATER, AND SOLID WASTE			
Water pumping efficiency	Current efficiency held constant.	Decrease energy used in pumping by 2%/year.	
Water use efficiency	Current efficiency held constant.	Decrease water volume use by 2%/year.	
Solid waste diversion and wastewater treatment	Baseline generation and diversion rates extrapolated from current.	90% of residential and industrial, commercial, institutional (ICI) waste diverted by 2050. Installation of anaerobic digestion facility for wastewater and organics treatment with biogas capture for use as RNG.	

	BASELINE/BAU	80% REDUCTION	CLIMATE EMERGENCY
LOW-CARBON TRANSPORTATION			
Expand transit	Follows the Transit Action Plan.	10-minute frequency on high-demand routes, 20-minute frequency on medium demand routes, 7 days/week service. Transit mode share increases to 25%.	
Electrify transit	Current fuel mix held constant.	100% new vehicles electric and right-sized fleet by 2040.	100% new vehicles electric and right-sized fleet by 2035.
Cycling & walking infrastructure	Current mode shares held constant.	20% of trips are walking (<2km) and cycling (<5km).	35% of trips are walking (<2km) and cycling (<5km).
Electrify city fleets	None.	100% electric by 2035.	100% electric by 2035.
Electrify personal vehicles	3% of personal vehicles are EVs by 2040.	100% of all new sales are EVs by 2035.	100% of all new sales are EVs by 2030.
Electrify commercial vehicles	Current mix held constant.	Scales up to 100% electric of all new sales by 2030.	Scales up to 100% electric of all new sales by 2030.
INDUSTRIAL EFFICIENCY			
Electrify mining vehicles	Scales up to 100% electric of all new sales by 2040.	Scales up to 100% electric of all new sales by 2030.	Scales up to 100% electric of all new sales by 2030.
Industry efficiency	No change.	Increase process motors and energy efficiency by 50%.	
Mining industry	Continue current energy and emissions trajectories.	Include suggested initiatives (e.g. superstack replacement) and reduce overall energy use 25% by 2050.	Include suggested initiatives (e.g. superstack replacement) and reduce overall energy use 35% by 2040.

	BASELINE/BAU	80% REDUCTION	CLIMATE EMERGENCY
LOCAL CLEAN ENERGY GENERATION			
Ground mount solar	Current instances held constant.	+10 MW per year.	+20 MW per year.
Solar PV - net metering	Current instances of solar PV use held constant.	90% of new buildings and 50% of existing buildings have solar PV installed, supplying 50% of their electric load.	90% of new buildings and 80% of existing buildings have solar PV installed, supplying 50% of their electric load.
District energy	Current systems held constant.	Expand DE systems in the downtown core where building density thresholds are met to a 23MW capacity.	
Energy storage	None	Scale up to 50 MW by 2050 in decentralized storage.	
LOW-CARBON ENERGY PROCUREMENT			
RNG Procurement	None.	None.	Replace 75% of the remaining natural gas with RNG.
Electricity Procurement	None.	None.	Replace 100% of the remaining grid electricity with green electricity.
CARBON SEQUESTRATION			
Increase forest cover	Consistent with current reforestation efforts.	Consistent with current reforestation efforts.	Increase reforestation and afforestation efforts to quadruple carbon sequestration rates by 2050.

Actions Discussion

Complete, Compact Communities

As cities expand outward, they convert agricultural and vacant land to suburban uses. Costs increase for the municipality to provide and maintain infrastructure such as roads, pipes, and emergency services. Residents are more likely to be dependant on cars, driving longer distances, adding stress and time to commutes. Once neighbourhoods are built, it is difficult to alter the development pattern, thus locking in transportation patterns, building design, infrastructure, and energy supply for decades to come.

Land-use policy is also some of the most cost-efficient energy and emissions actions a municipality can take. Unlike retrofitting buildings or creating new energy systems, directing new development to create complete, compact neighbourhoods is very low cost.

Well-considered land-use policy also achieves many objectives simultaneously. Infill and compact, complete developments provide greater support for transit services. They also allow more trips to be made through active transportation, as places of work, play, schools, and services are close by. Smaller homes and homes that share walls are much more energy efficient, which reduces energy bills.

All these elements have impacts on energy use and emissions production. It makes sense to upgrade existing communities where possible and ensure new communities are complete. Land-use is a critical area of focus for energy efficiency and emissions reduction. It is a low-cost effort to ensure decades of low-carbon infrastructure is in place.

Through CEEP implementation, it is expected that residential development would focus on multi-family and mixed-use buildings. Apartment and condominium buildings are typically more energy efficient than single family homes. This is in part due to smaller dwelling sizes. Under CEEP implementation, it is expected that new homes would be 25% smaller than existing homes, on average. The focus on multi-family and mixed-use housing would also result in fewer new single-family homes. By 2050, the share of new single-family homes being built would decrease to 10% of total housing starts.

Efficient Buildings

New Buildings

Compared to many emissions-saving actions, energy efficient new buildings are easy to achieve. Energy use intensity targets (i.e. kw/m^2/year) can be established and met through efficient heating, ventilation and air conditioning systems, other mechanical systems, and building envelopes (walls, ceilings, and windows). Passive House buildings consume up to 90 percent less heating and cooling energy than conventional buildings. It is applicable to almost any building type. Buildings built to the standard provide fine-tuned control over indoor air quality and temperature with simple and durable systems. The operating costs of Passive House buildings is very low.

Existing Buildings

The existing building stocks present a greater challenge than new buildings – their energy inefficiencies have already been locked in. They also represent a great energy efficiency and emissions reduction opportunity. Although most buildings will require similar types of retrofits, some tailoring of the approach will be required. Building energy assessments are a good way to determine the most effective retrofit approach. Many homes in Sudbury could benefit from upgrading their envelopes and updating their heating systems.

Water, Wastewater, and Solid Waste

Potable Water

Greater Sudbury's potable water distribution system pumps water throughout the nearly 4,000 square kilometre community. Two major efforts can reduce the energy (electricity) used in the system: reducing end water use volumes and increasing the efficiency of the mechanical systems used in treatment and distribution. Education and incentive programs are required for the former while pumping station upgrades are required for the latter. The water distribution system is already undergoing diagnosis for pump upgrades that will greatly reduce energy use, following on a pilot project that achieves 50-60% greater energy efficiency. Automated water metering systems are planned as well, which will encourage water savings. Wastewater anaerobic treatment plants have been explored and are an option for facility upgrades that would produce renewable natural gas.

Solid Waste and Wastewater

Greater Sudbury's solid waste and wastewater activities have some of the richest metrics and plans in the city, allowing precise tracking of actions targeting emissions reductions in these sectors. A gas capture system is already in place at the Sudbury landfill. As the landfill volume grows, so too can the system's renewable natural gas generation capacity. Decreased weekly garbage volume limits, improved organics collection, increased diversion, and changes to disposal fee structures are some of the approaches that have been considered by the City that could decrease waste-generated emissions. Reducing wastewater through education programs and water saving fixture incentive programs will reduce emissions from treatment plants, as will improving end treatment to higher standards.

Low-carbon Transportation

Transit

Transit service enhancements are already being made in Greater Sudbury with the updated Transit Action Plan and the new GOVA family of transit services. As new building and land-use actions are coordinated, enhanced transit services will become increasingly viable. Increasing transit frequency, right-sizing the fleet for different routes and schedules, and offering integrated transit service with GOVA Plus, GOVA Zone, park-and-rides, and cycling infrastructure are some of the actions that will increase ridership.

As transportation is responsible for the most emissions of all sectors in Greater Sudbury, replacing trips made by car with transit trips is an important emissions reductions action.

Vehicles

The two major approaches to reducing vehicle emissions are to reduce trips and to make vehicles more fuel efficient. Creating complete, compact communities and enhancing transit services helps to reduce vehicle trips. The fuel efficiency of the internal combustion engine vehicle has improved only marginally over the last century. The emerging shift to electric vehicles is a leap in energy efficiency. Electrifying City fleets, commercial vehicles, business fleets, and personal vehicles will result in great emissions reductions.

With EV prices dropping and more models becoming available every year, fleet and personal vehicle electrification is becoming easier. The growing EV market will shift some new car purchases to electric versions, but several coordinated actions are required to accelerate the EV transition in Greater Sudbury, including education and awareness programs, coordinating a bulk buy program, and partnering with local car dealerships to increase model variety and support promotion.

Supplying EV charging infrastructure is a key consideration in the shift to EVs. EV ranges are getting longer, but ‘range anxiety’ still exists for prospective owners. Approaches to public, business, and private EV charging infrastructure are presented in the Greater Sudbury EV Study (Appendices).

Active Transportation

Few trips are currently made by walking, cycling, or other mode of active transportation in Greater Sudbury. The amalgamation of former towns is spread out, making many trips too far for comfortable active transportation. As proven in various cities around the world, balancing the provision of infrastructure, application of appropriate land-use policy, and use of market forces is the most effective way to achieve transportation mode shift away from personal vehicles to transit, walking, and biking. Focusing on one of these elements without attention to the others results in poor services, low uptake, and negative stigmatization of the so-called alternative modes of transportation. By aptly considering all three in any transit or active transportation efforts made, the City may achieve success in progressing towards its mobility goals. Transit and active transportation are also key options for reducing household transportation expenditures.

Industrial Efficiency

Greater Sudbury's industrial sector is already indicating shifts toward electric vehicles, more efficient processes and motors, and lower carbon activities. The CEEP encourages timelines for process and motor efficiency improvements and emissions reduction targets for their operations. Greater Sudbury mining companies are increasingly tracking energy and emissions metrics, which will help set and achieve CEEP-related targets in the industrial sector.

Local Clean Energy Generation

District Energy

Expansion of Greater Sudbury's central district energy systems will make heating energy delivery more efficient. Infill development will provide greater building density, making the systems more effective. Although these systems currently operate on natural gas, the facilities could be retrofit to use one or a combination of renewable energy sources like geothermal exchange heat pumps, air source heat pumps, solar PV or thermal, or renewable natural gas.

Solar PV

Solar PV systems are a local energy generation approach that reduces the need for grid electricity, which is likely to be supplied at least in part by natural gas generation for the foreseeable future. Greater Sudbury could replicate the success of the Capreol 10 MW solar PV system in various locations throughout the community. Solar PV incentive programs for existing buildings and requirements for new buildings could quickly expand the local electricity generation capacity of the community.

Energy Storage

Renewable energy can be stored for use when needed, in battery electric storage or pumped hydro storage, for example. Stored renewable energy can be deployed when needed, bridging the temporal gap between when energy is produced and when it is needed, for example at night and during peak demand periods. Releasing stored energy decreases reliance on fossil fuel-based peaking plants that operate during peak demand hours (e.g. mornings and evenings). The current cost of battery electric storage is high, but prices are decreasing quickly as battery technologies become increasingly inexpensive to produce.

Fuel Switching

Air and ground source heat pumps are typically 300% more efficient than electric resistance heating and current models operate in remarkably low-temperature conditions. These systems extract thermal energy from the air and ground (much like a refrigerator extracts heat from the air inside it) for use in buildings. Different heat pump configurations are available to retrofit various building heating systems.

Low-carbon Energy Procurement

It is challenging to reduce all energy demands and supply 100% of the remainder with renewable energy. Procurement of renewable electricity and renewable natural gas from outside the city is a simple and convenient approach to reducing emissions from the grid and in applications that use natural gas. It is a scalable option. An energy procurement study is needed to determine the best options for Greater Sudbury.

Carbon Sequestration

For over 40 years, tree planting has been the central element in the regreening of the industrially impacted Sudbury barrens. The program has been an important part of the social, economic and environmental renewal of Greater Sudbury, with 9.8 million trees planted on 24,811 hectares (average density of 395 tree seedlings per hectare) to date.[8]

There are large tree density variations from one plot to the next, but replanting increases sequestration on the remediated sites by an average of 1.1 tonnes of CO_2 per hectare per year.[9] This implies a current rate of sequestration of roughly 25,000 tonnes of CO_2 per year. Annual tree planting programs continue,[10] and the rate of sequestration should continue to increase.

It is important to note that efforts must be maintained to refresh the existing tree stock to keep its carbon sequestration rate consistent. The numbers noted above are based on average tree age and sequestration rates. Newly planted areas may not achieve these rates until their trees reach the average age. In planning to achieve target sequestration rates, it is best to overestimate the area and tree stocks required for these reasons.

8 Krista McCracken, "The Journey from Moonscape to Sustainably Green", Active History, June 2013. Accessed at: http://activehistory.ca/2013/06/11360 and personal communication, L-CARE (Landscape Carbon Accumulation through Reduction in Emissions) project researcher, Laurentian University.

9 Michael Preston, "Carbon sequestration following re-greening of a barren landscape: a chronosequence study", presentation to Mining and Environment International Conference VII, Laurentian University, Sudbury, June 26, 2019.

10 VETAC, "Regreening Greater Sudbury, Five Year Plan, 2016-2020", March 2016. Accessed at https://www.greatersudbury.ca/live/environment-and-sustainability1/regreening-program

Part 3: CEEP Energy and Emissions Outlook

Scenarios Energy Use Comparison

Total Energy Demand

Greater Sudbury's total energy use is 12.3 petajoules in the 80% Reduction scenario and 10.6 petajoules in the Climate Emergency scenario in 2050 (Figure 17). These amounts are 54% and 61% below 2016 energy use values, respectively. They are 50% and 57% less energy use than in the BAU scenario.

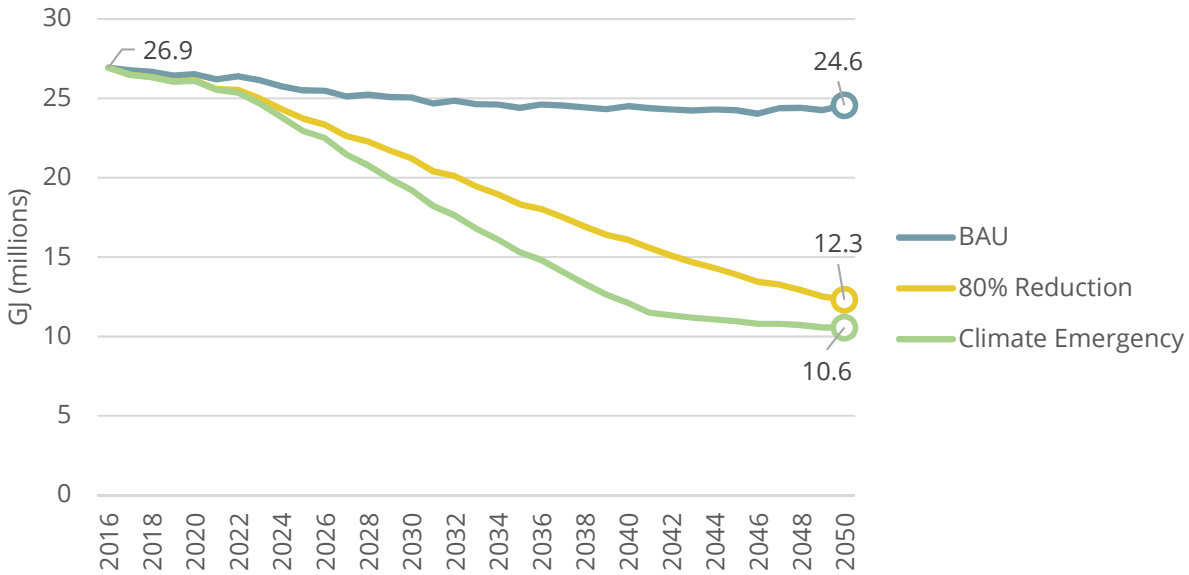


Figure 17. Scenarios total energy use comparison, 2016-2050.

Where Energy Comes From

The CEEP's energy efficient buildings and low-carbon transportation actions reduce natural gas and gasoline use dramatically. In both scenarios fossil fuel used is greatly diminished, with it being all but phased out in the Climate Emergency scenario with greater instances of heat pump and solar PV installations. The effects of greater building electricity efficiency measures coming into effect in the 2040s is evident in the Climate Emergency scenario.

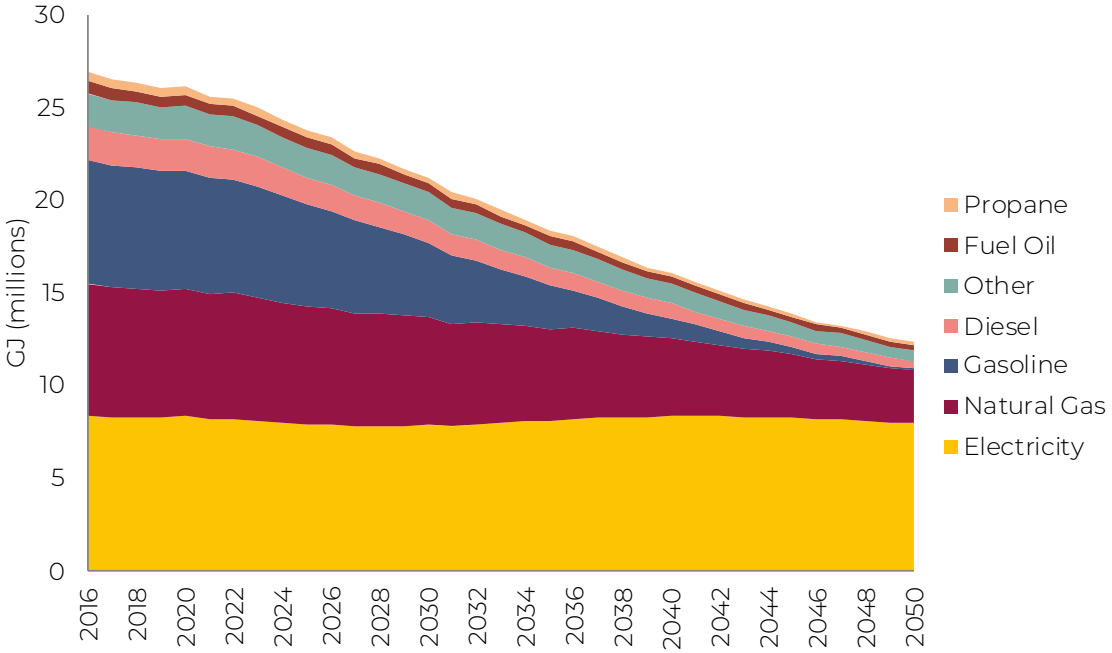


Figure 18. 80% Reduction scenario community energy use by energy source, 2016-2050.

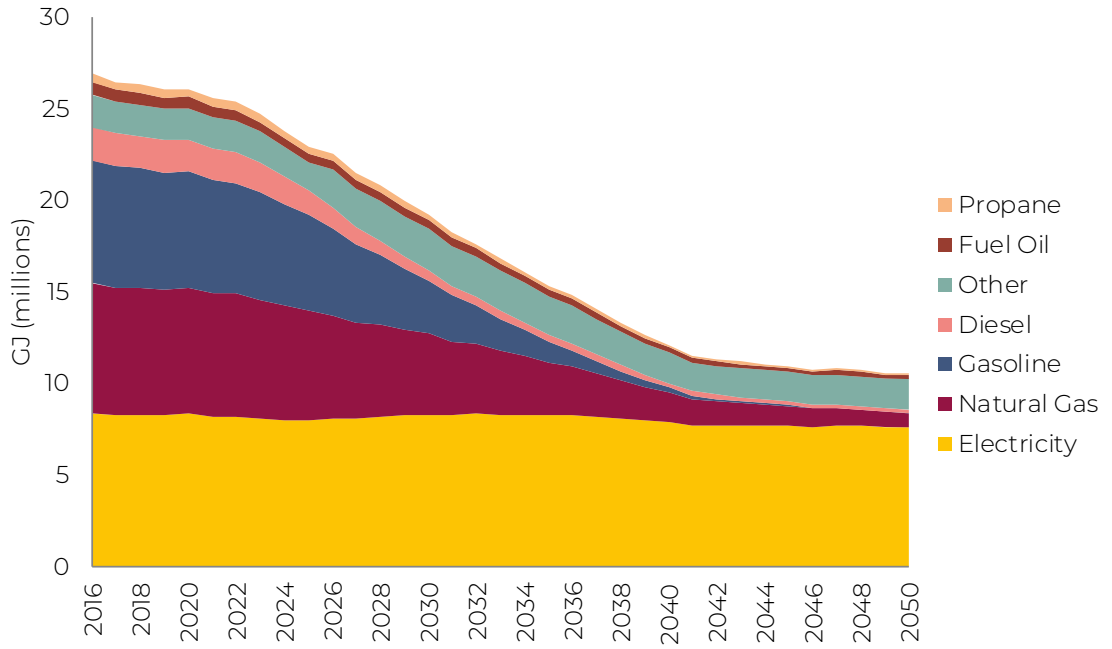


Figure 19. Climate Emergency scenario energy use by energy source, 2016-2050.

Where Energy is Used

The Climate Emergency scenario achieves energy reductions sooner than the 80% Reduction scenario (Figures 20 and 21). The biggest differences in energy use between the two scenarios is in the residential sector, where heat pump installations and building retrofits are more aggressive.

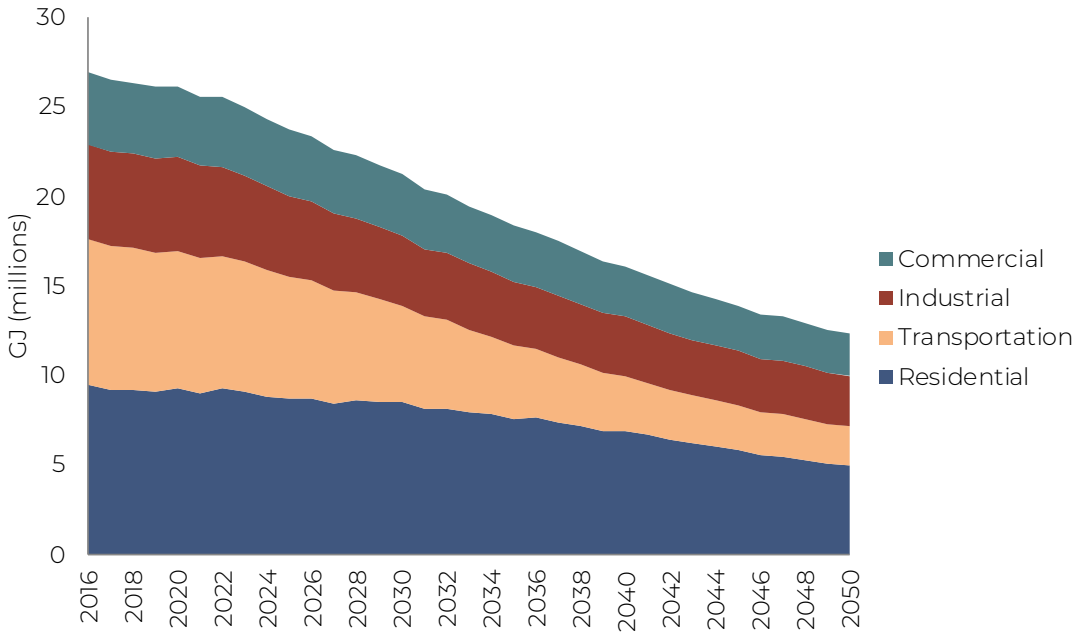


Figure 20. 80% Reduction scenario community energy use by sector, 2016-2050.

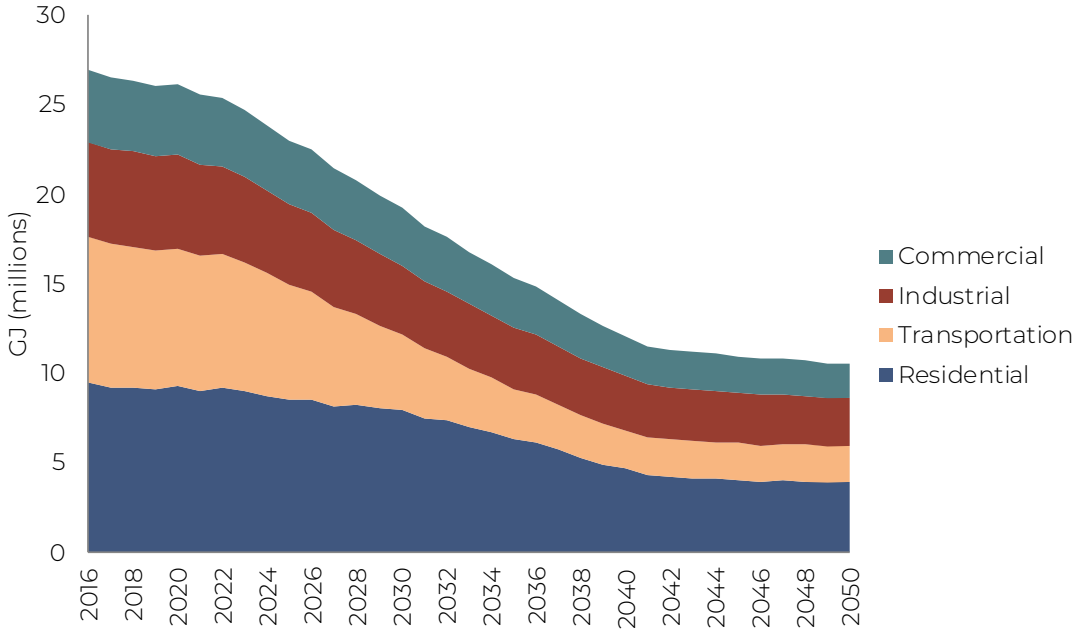


Figure 21. Climate Emergency scenario community energy use by sector, 2016-2050.

How Energy is Used

The effects of more aggressive heat pump installations and building retrofits in the Climate Emergency scenario can be seen in the space heating areas of Figures 22 and 23. Transportation energy also decreases further and faster in this scenario, as EV uptake is increased. Although less discernible, the Climate Emergency scenario also achieves greater energy efficiency in all other end uses than in the 80% Reduction scenario.

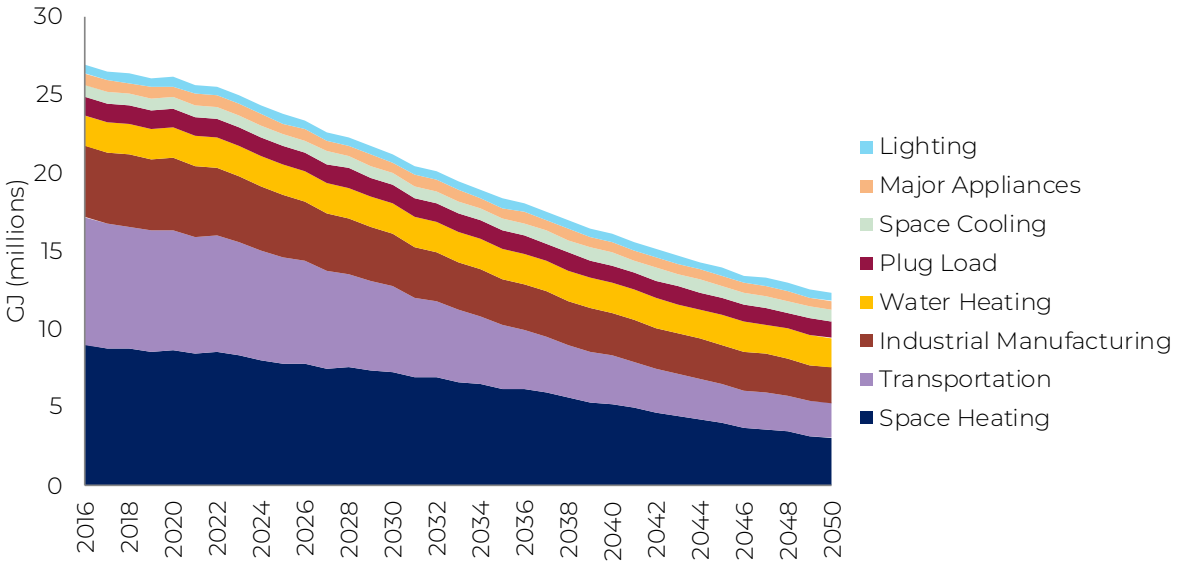


Figure 22. 80% Reduction scenario community energy use by end use, 2016-2050.

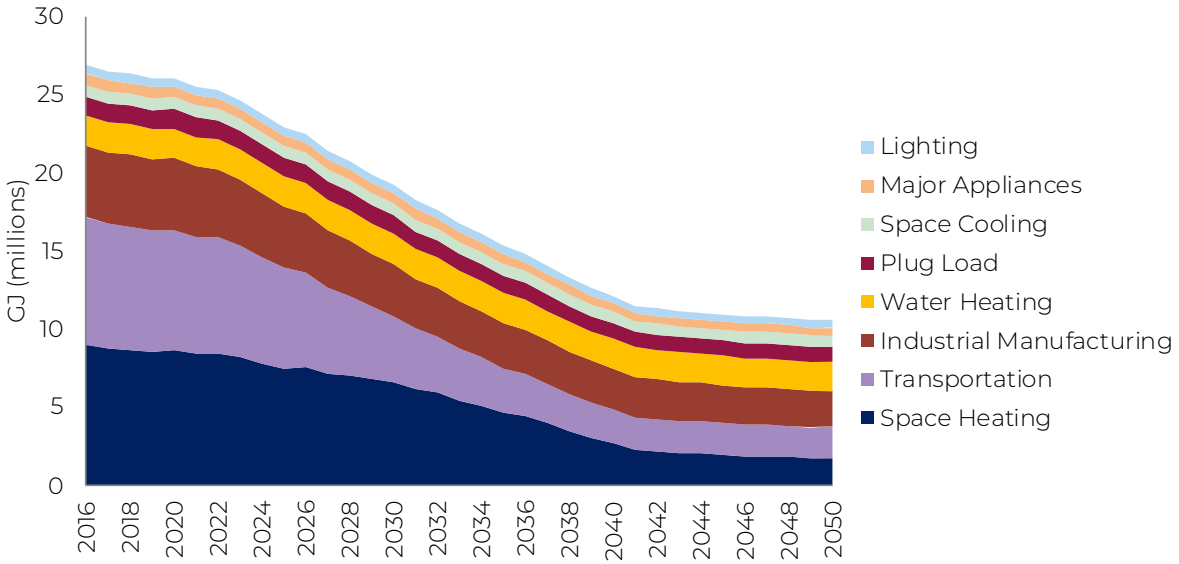


Figure 23. Climate Emergency scenario community energy use by end use, 2016-2050.

Low-carbon Energy Flows

Figure 24 shows Greater Sudbury's energy flows under the Climate Emergency scenario. Compared to the BAU Sankey diagram, solar PV, thermal networks (district energy), and electricity supply are greatly increased. Gasoline and natural gas energy sources are greatly diminished. Total energy used is much less than in the BAU, and conversion losses dwindle as inefficient fossil fuels are replaced with more efficient renewable and electric energy sources. The ratio of useful energy to conversion losses in much improved over the BAU scenario, at 1:0.44 (i.e. for every 1 gigajoule of energy used, 0.44 is lost).

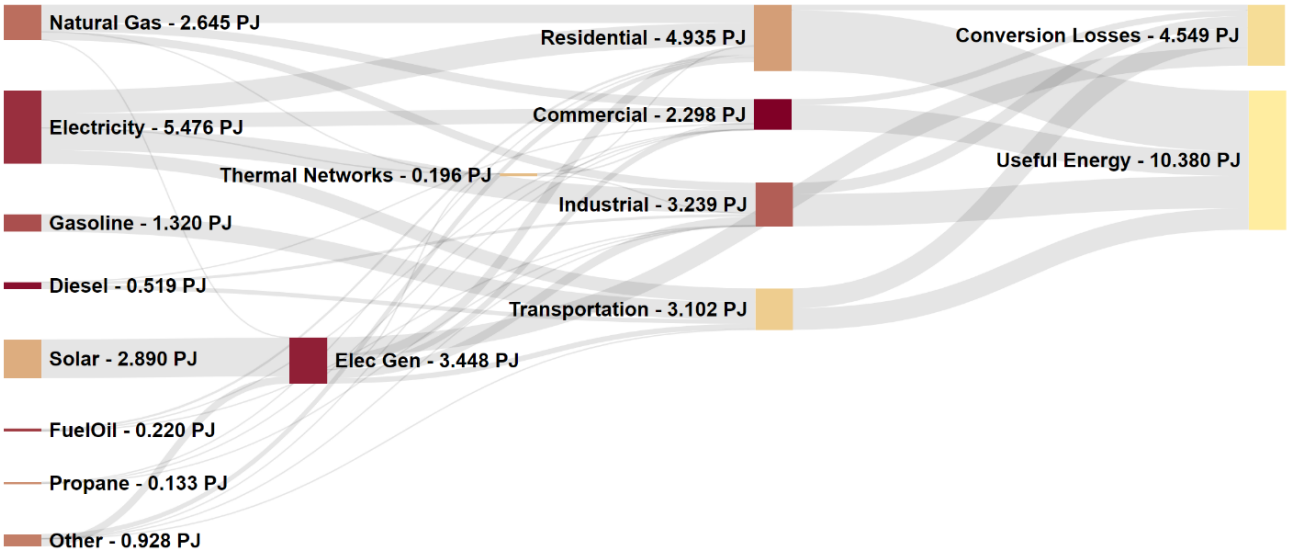


Figure 24. Sankey diagram of the Climate Emergency scenario.

Scenarios Emissions Comparison

Total Emissions

As energy demand is decreased under CEEP implementation, so too are GHG emissions. The 80% Reduction scenario achieves 80% emissions reductions from 2016 levels and 75% emissions reductions from BAU levels in 2050. The Climate Emergency scenario achieves 93% emissions reductions from 2016 levels and 92% emissions reductions from BAU levels in 2050. 300,000 tCO_2e of annual emissions remain in 2050 under the 80% Reduction scenario while 100,000 tCO_2e of annual emissions remain in the 2050 under the Climate Emergency scenario.

As modelled, the Climate Emergency scenario does not quite achieve the net emissions by 2050 target. It is still possible to bridge the final 100,000 tCO_2e of annual emissions in 2050 through increased renewable energy production and/or procurement and/or carbon sequestration actions (e.g. afforestation). These actions are discussed later in the report.

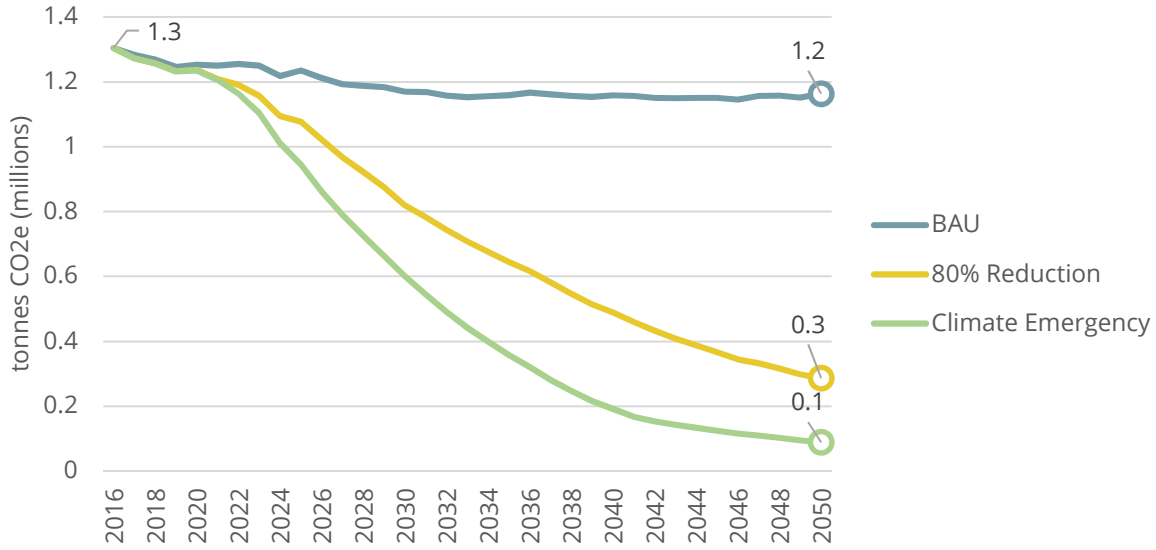


Figure 25. Scenarios total community emissions, 2016-2050.

Emissions from Energy Sources

Comparison of emissions by energy source in the two scenarios reveals the extra ambition in the Climate Emergency scenario to phase out gasoline and diesel use early on and to a greater extent through EV introduction. The effects of more aggressive buildings actions are also apparent in the greatly reduced natural gas and electricity emissions.

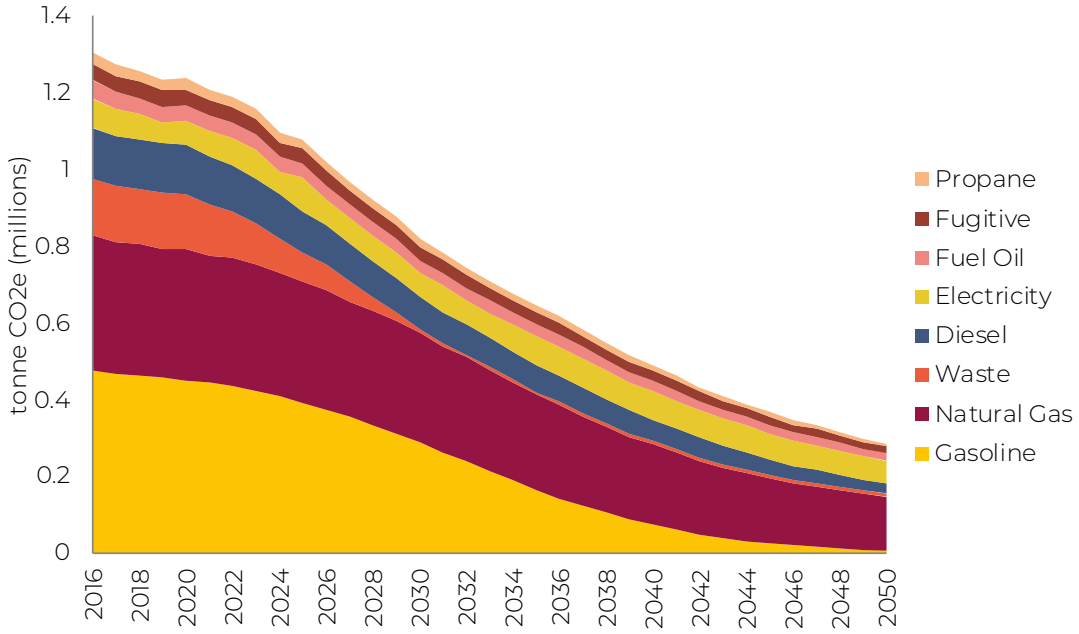


Figure 26. 80% Reduction scenario emissions by energy source, 2016-2050.

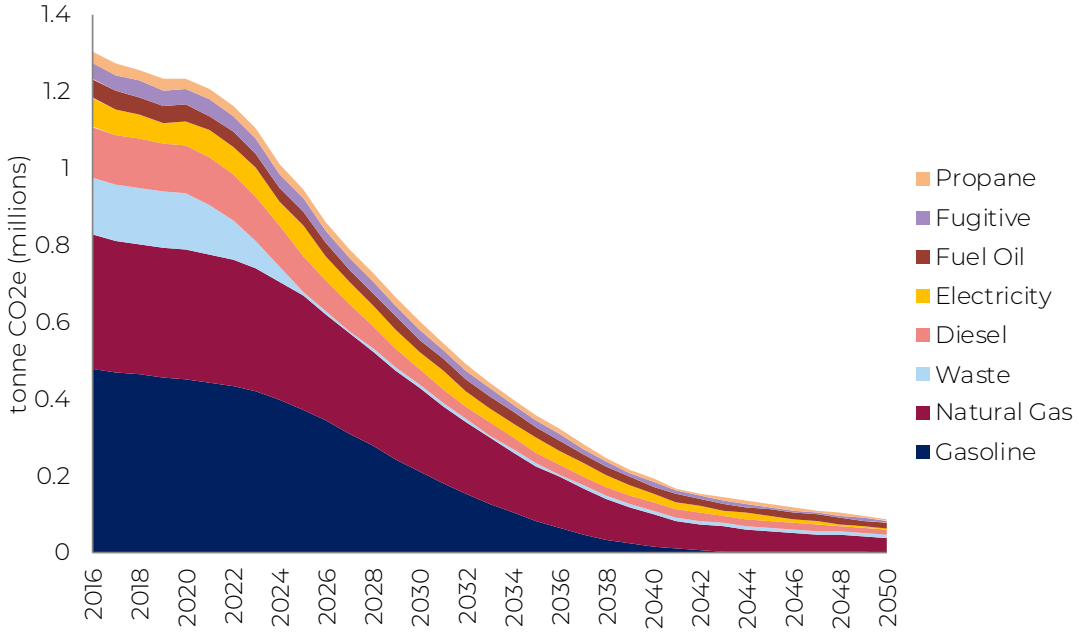


Figure 27. Climate Emergency scenario emissions by energy source, 2016-2050.

Where Emissions are Produced

Comparison of the emissions by sector between the two scenarios shows the extent to which actions in all sectors contribute to substantially more reductions in the Climate Emergency scenario. Transportation emissions are all but phased out by 2050, while buildings and waste emissions are reduced to very little. The residential sector remains the largest emitter in 2050 as there is still some natural gas heating assumed, as well as some emissions from grid electricity use.

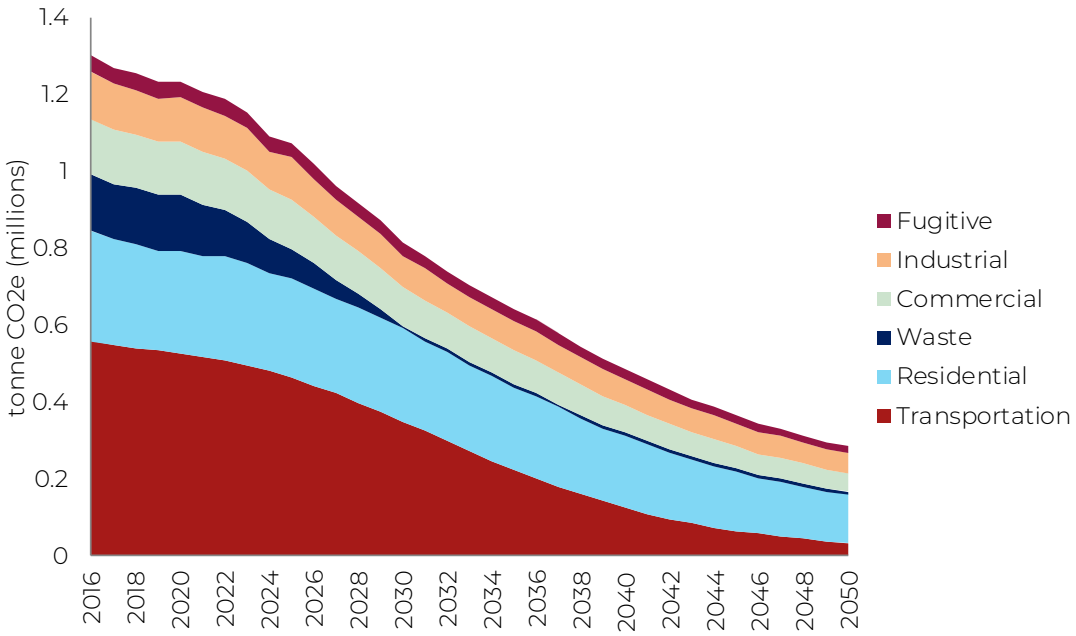


Figure 28. 80% Reduction scenario emissions by sector, 2016-2050.

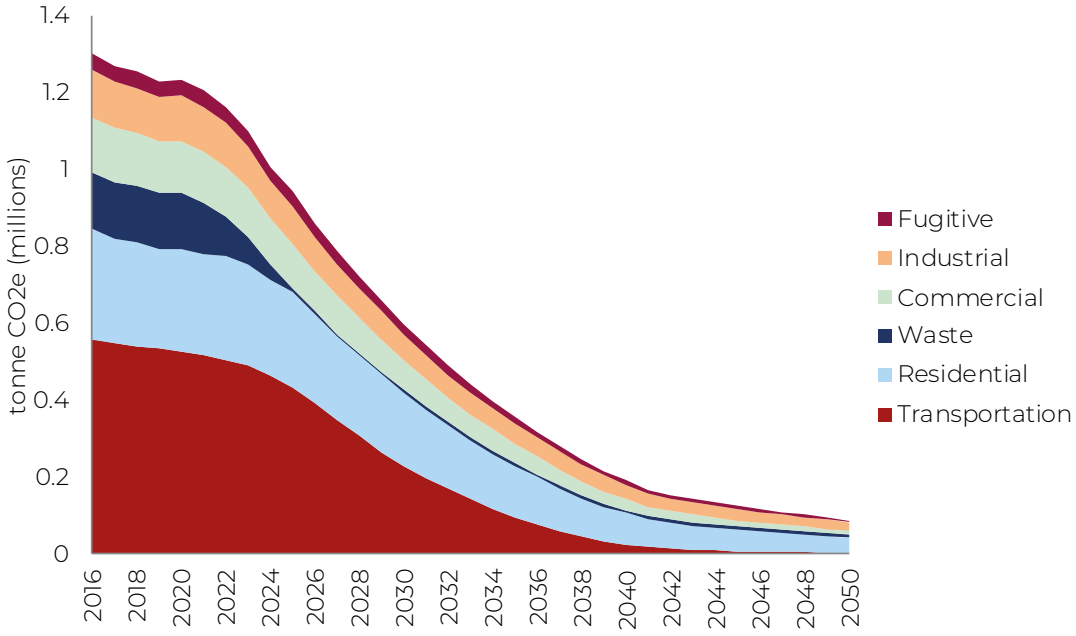


Figure 29. Climate Emergency scenario emissions by sector, 2016-2050.

Scenarios Energy and Emissions Outlook

Actions in both scenarios will substantially reduce energy use and emissions production in Greater Sudbury. Land-use theme actions are consistent in the two scenarios. The extra ambition in the other action themes in the Climate Emergency scenario is substantial, achieving another 200,000 tonnes of emissions reduction in 2050 compared to the 80% Reduction scenario. Figure 30 Summarizes the collective GHG emissions reductions of all the actions in the Climate Emergency scenario.

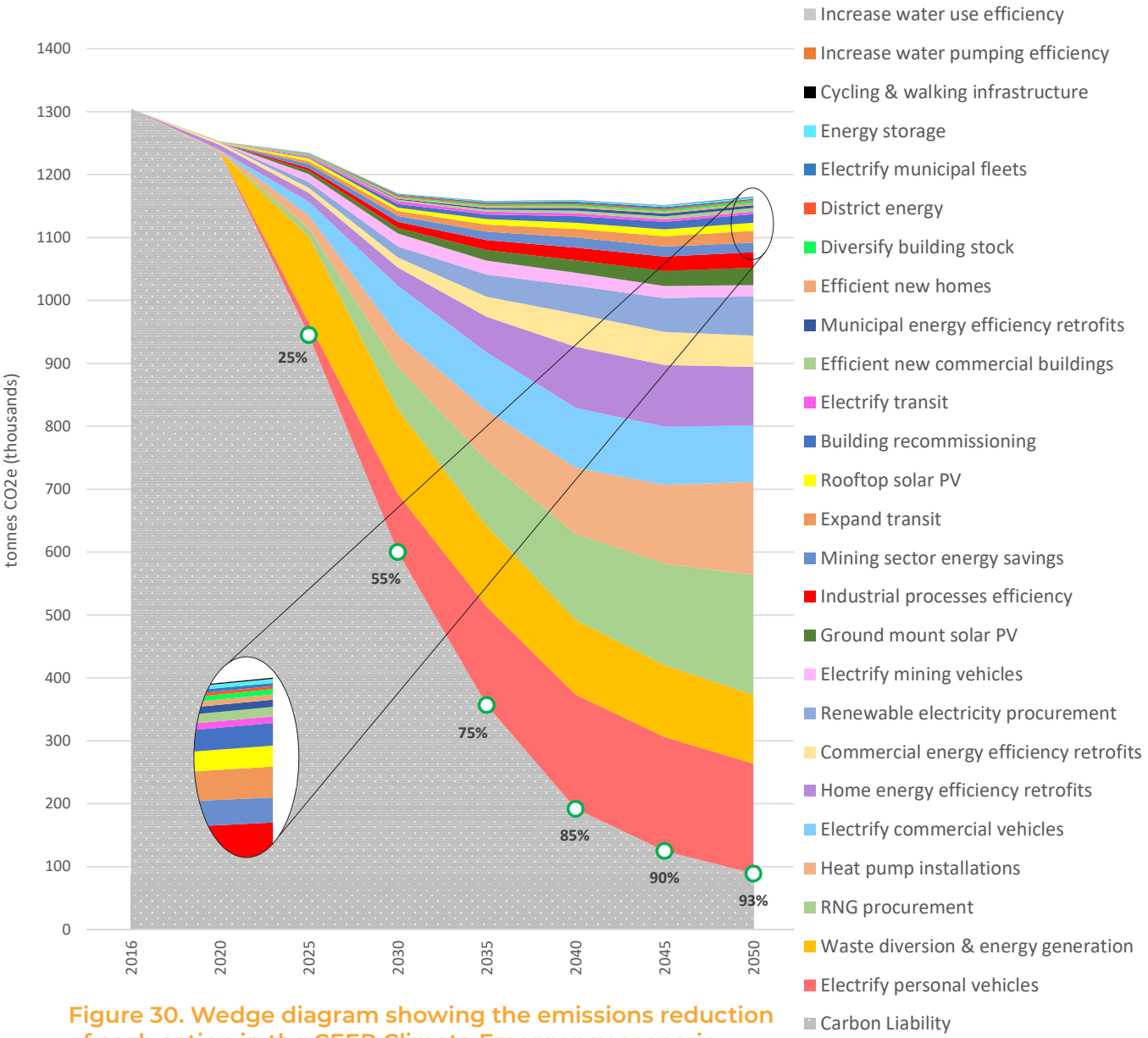


Figure 30. Wedge diagram showing the emissions reduction of each action in the CEEP Climate Emergency scenario, including emissions reduction percentage targets (of 2016 emissions levels). Note that although water use efficiency and water pumping efficiency actions save energy, their emissions saving is negligible and does not display on this graph.

Part 4: An Investment in Greater Sudbury

High-level financial analysis was undertaken to identify the required expenditures, savings, net present value, marginal abatement costs, and employment impacts of all Climate Emergency scenario actions in the CEEP. In both the BAU scenario and Climate Emergency scenario, buildings, transportation, and energy expenditures are made and savings occur. Financial information here is presented as the incremental additional expenditures required and costs and savings resultant from implementing the Climate Emergency scenario actions over those that are expected to be incurred in the BAU scenario.

Costs and Savings Summary

Costs and savings modelling considers upfront capital expenditures, operating and maintenance costs (including fuel and electricity), and carbon pricing. Table 3 summarizes expenditure types that were evaluated for the CEEP.

Table 3. Categories of expenditures evaluated.

CATEGORY	DESCRIPTION
Residential buildings	Cost of dwelling construction and retrofitting; operating and maintenance costs (non-fuel).
Residential equipment	Cost of appliances and lighting, heating and cooling equipment.
Residential fuel	Energy costs for dwellings and residential transportation.
Residential emissions	Costs resulting from a carbon price on GHG emissions from dwellings and transportation.
Commercial buildings	Cost of building construction and retrofitting; operating and maintenance costs (non-fuel).
Commercial equipment	Cost of lighting, heating and cooling equipment.
Commercial vehicles	Cost of vehicle purchase; operating and maintenance costs (non-fuel).
Non-residential fuel	Energy costs for commercial buildings, industry and transport.
Non-residential emissions	Costs resulting from a carbon price on GHG emissions from commercial buildings, production and transportation.
Energy production emissions	Costs resulting from a carbon price on GHG emissions for fuel used in the generation of electricity and heating.

CATEGORY	DESCRIPTION
Energy production fuel	Cost of purchasing fuel for generating local electricity, heating or cooling.
Energy production equipment	Cost of the equipment for generating local electricity, heating or cooling.
Municipal capital	Cost of the transit system additions (no other forms of municipal capital assessed).
Municipal fuel	Cost of fuel associated with the transit system.
Municipal emissions	Costs resulting from a carbon price on GHG emissions from the transit system.
Energy production revenue	Revenue derived from the sale of locally generated electricity or heat.
Personal use vehicles	Cost of vehicle purchase; operating and maintenance costs (non-fuel).
Transit fleet	Costs of transit vehicle purchase.
Active transportation infrastructure	Costs of bike lane and sidewalk construction.

Figure 31 summarizes modelled annual CEEP costs and savings over those in the BAU scenario. Costs vary year-over-year as investments in transit vehicles, active transportation infrastructure, City fleet, solar PV installations, building retrofits, and other elements are made. Costs wane after 2040 as retrofit and energy system installation efforts conclude.

Building mechanical systems and electric vehicles operations and maintenance (O&M) savings grow over the next thirty years as systems become more efficient and electricity powered, requiring less servicing and replacement. Energy cost savings grow substantially as energy savings are realized from more efficient buildings and vehicles, as well as increased transit use and active transportation (more affordable trips than those made by car).

Carbon pricing in the CEEP increases the value of fuel and electricity savings, modestly in the first half of the time period but more significantly in later years as the price increases. Federal carbon pricing is currently valued at $20 per tonne of emissions and is scheduled to increase to $50/tonne by 2022. Commitments beyond 2022 have not yet been made, but it is estimated that carbon pricing will be over $100/tonne by 2050.

The rooftop and ground mount solar PV systems and the district energy systems generate substantial revenues for their operators. As more systems are implemented over the time period, the total annual revenues of these systems increase.

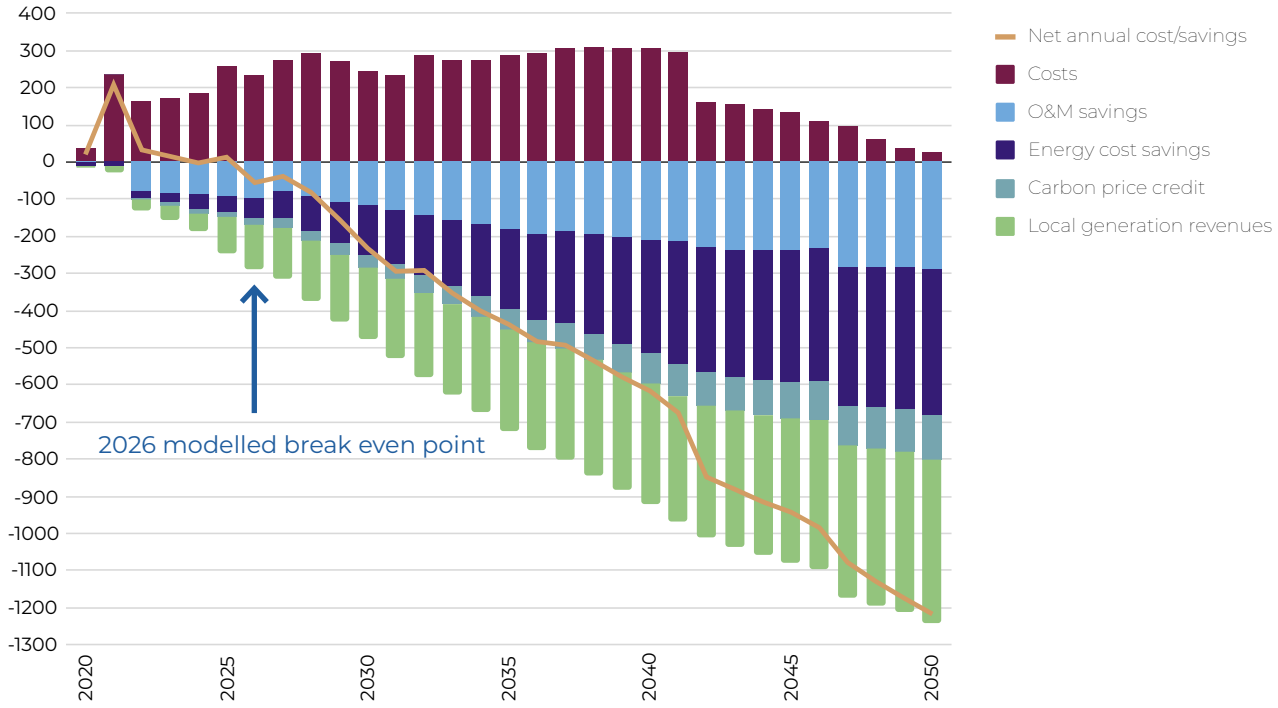


Figure 31. Summary of annual CEEP costs (above x-axis) and savings (below x-axis) relative to the BAU scenario.

Table 4 and Figure 32 summarize the cumulative costs and savings of CEEP implementation for the Climate Emergency scenario, with those of the 80% Reduction scenario for comparison. By 2050 cumulative CEEP implementation costs total $6.5B with a present value of $4.3B (at a discount rate of 3%). Total net savings reach $14.6B.

Table 4. Summary CEEP financial metrics (2016 $).

	CUMULATIVE COSTS AND SAVINGS TO 2050 (UNDISCOUNTED)		NET PRESENT VALUE (DISCOUNT RATE OF 3%)	
	80% REDUCTION SCENARIO	CLIMATE EMERGENCY SCENARIO	80% REDUCTION SCENARIO	CLIMATE EMERGENCY SCENARIO
Costs	$ 4.84B	$ 6.46B	$ 3.05B	$ 4.29B
O&M savings	(4.79B)	(5.15B)	(2.69B)	(2.91B)
Energy cost savings	(5.70B)	(6.44B)	(3.01B)	(3.47B)
Carbon price credit	(1.29B)	(1.78B)	(0.68B)	(0.96B)
Local generation revenues	(3.01B)	(7.72B)	(1.68B)	(4.28B)
Net annual cost / (saving)	$ (9.95B)	$ (14.63B)	$ (5.01B)	$ (7.33B)

The net present value of CEEP costs are $1.24B more in the Climate Emergency Scenario. The net annual savings are $2.32B greater.

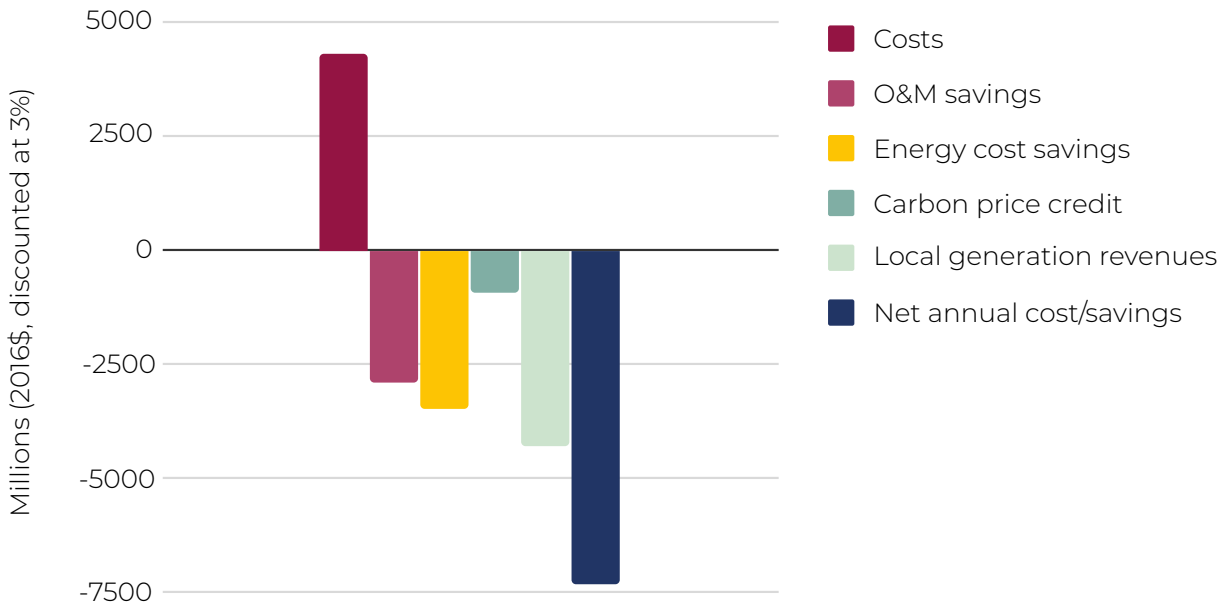


Figure 32. CEEP present value of costs (negative) and savings (positive) of the Climate Emergency scenario over the BAU scenario.

Capital Costs Summary

CEEP Climate Emergency scenario capital annual costs are summarized in Figure 33.

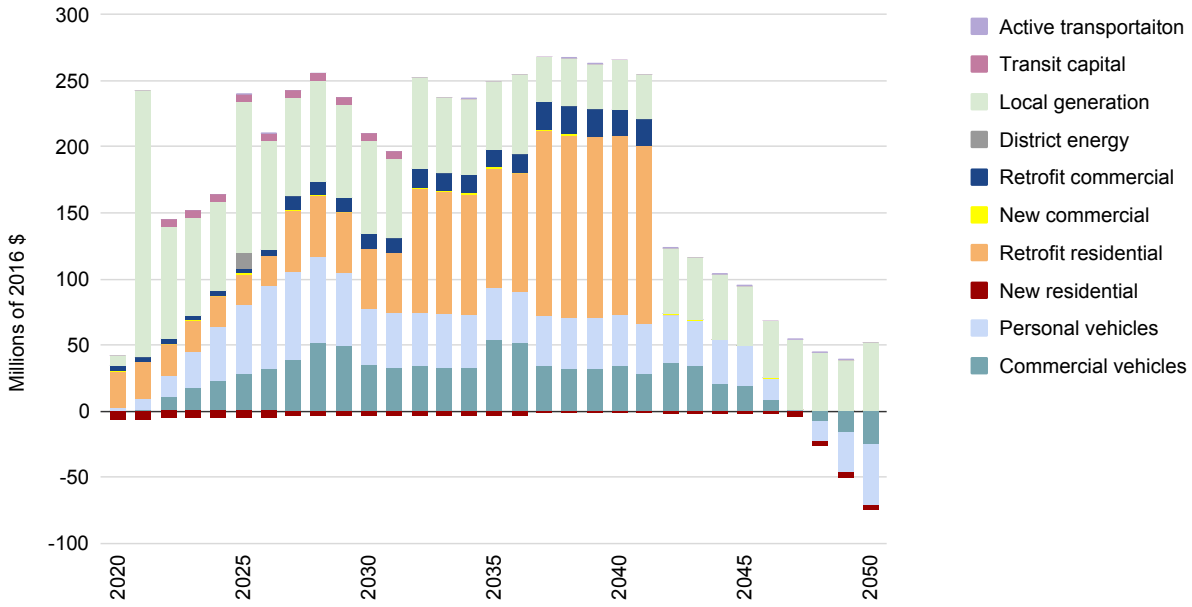


Figure 33. Annual incremental CEEP Climate Emergency scenario capital costs over BAU capital costs.

After peaking in the late 2020s, personal vehicle costs steadily decrease as EV ownership grows, until a crossover point in 2048 when net savings begin. The analysis assumes that the cost of electric vehicles will be lower than internal combustion engines by the middle of 2040, a conservative projection.

Residential and commercial retrofit costs increase over the time period, as more and more buildings are retrofit for energy efficiency. Building retrofits are completed in 2041.

Local solar PV generation investments are strong over the first 10 years of implementation, then steady for the last 20 years as ground mount and rooftop solar PV systems are consistently installed. District energy system expansion occurs in 2025.

Transit electrification costs occur between 2022 and 2032 and active transportation costs (sidewalks, bike lanes, etc.) occur over the whole 30-year period.

Energy Costs

Figure 34 depicts the expected total energy (fuel and electricity) costs paid by the community (residents, businesses, institutions, etc.) for CEEP Climate Emergency scenario implementation versus the BAU scenario.

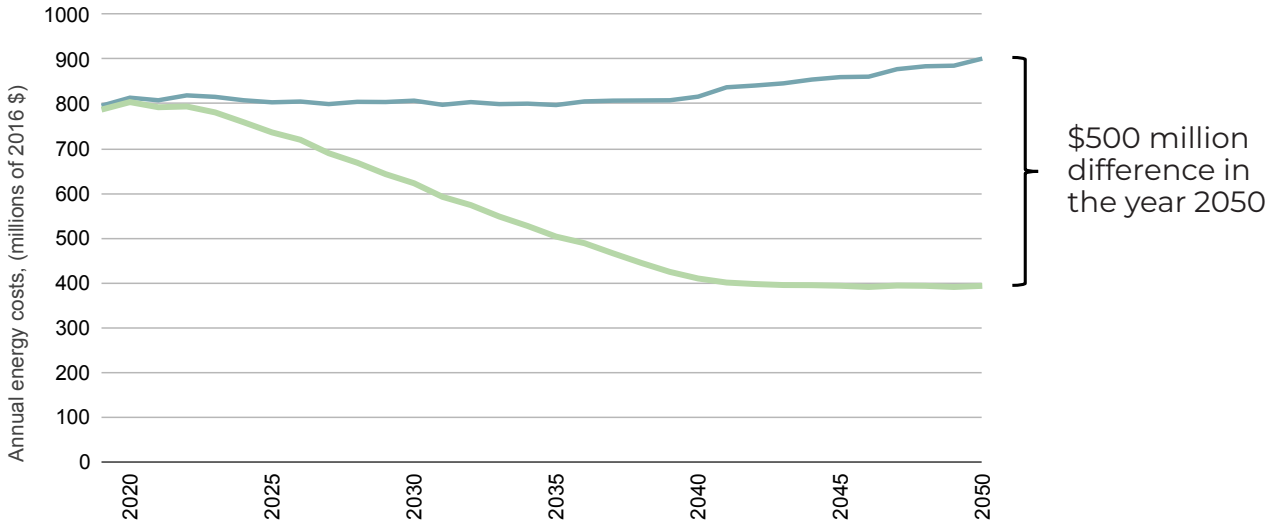


Figure 34. Estimated total annual energy costs for the BAU scenario (blue) and CEEP Climate Emergency scenario (green). CEEP energy costs decrease as solar PV and district energy expansion come online in the 2020s, levelling off in the 2040s when most energy efficiency efforts have been achieved.

In 2016, total energy costs paid by the community totalled $776M. Annual energy costs are projected to increase to over $900M/year by 2050 in the BAU scenario. Under CEEP implementation, energy costs are reduced to $393M. This is 49% less than 2016 costs and 56% less than the expected costs in 2050 under the BAU scenario. In the year 2050 this equates to more than a $500M difference in community-wide energy costs under CEEP implementation.

In the BAU scenario, costs are expected to increase for all types of energy (Figure 35).

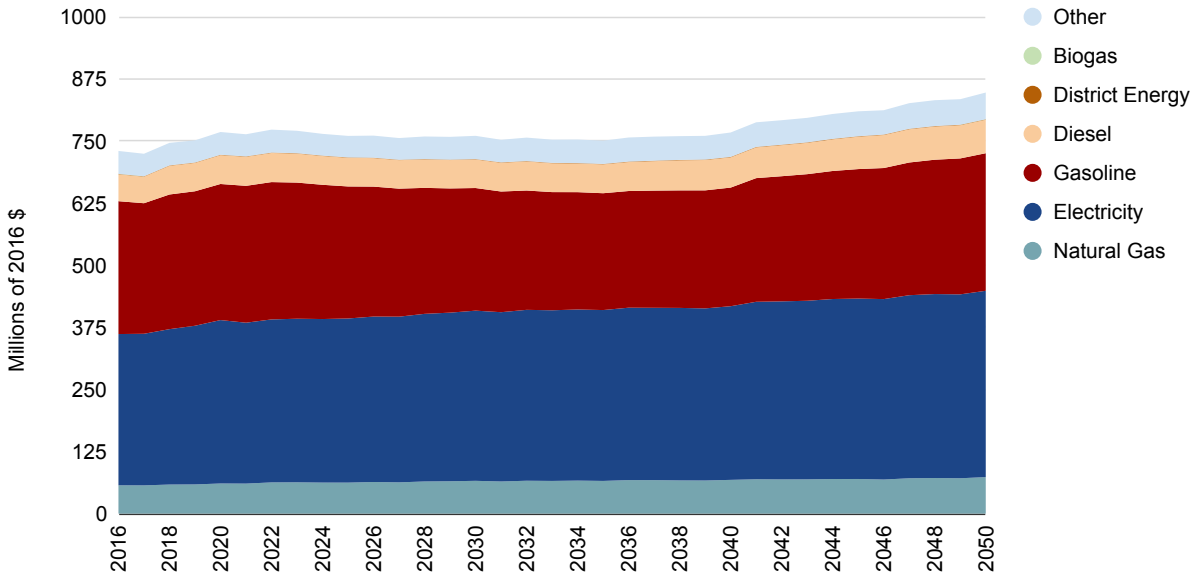


Figure 35. Total BAU annual energy costs by energy source.

Under CEEP implementation, total energy costs are lower than under the BAU scenario and electricity comes to dominate total energy spending as vehicles and building HVAC loads are electrified (Figure 36). Gasoline and diesel spending are all but phased out by the early 2040s. Biogas (renewable natural gas) costs begin in the mid 2020s, increasing to 2050 as RNG procurement increases.

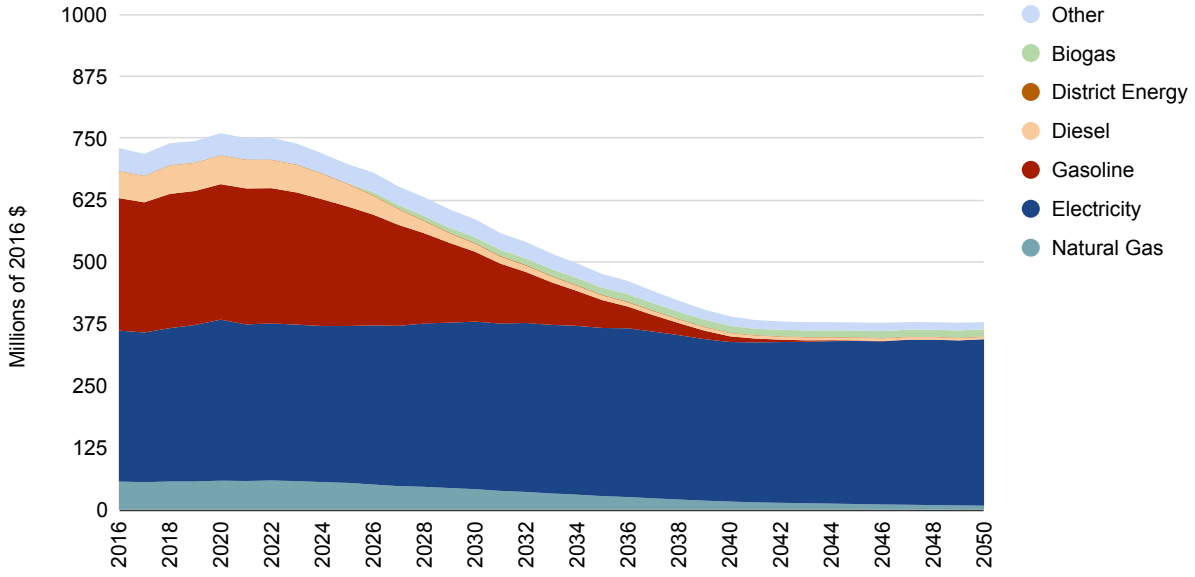


Figure 36. Total CEEP annual energy costs by energy source.

Marginal Abatement Costs

The marginal abatement cost (MAC) graph (Figure 37) provides at-a-glance emissions reductions versus costs/savings for each CEEP action. It is a measure of the cumulative cost or savings of reducing emissions for a particular action over the 2020-2050 time period. The MAC divides the total costs or savings of an action, as represented by the net present value (NPV), by the total emissions reductions associated with that action over its lifetime. The result is a cost or savings per tonne of emissions reduced for each action. An action costs money overall if its cost per tonne of emissions saved is positive. An action saves money if its cost per tonne of emissions saved is negative.

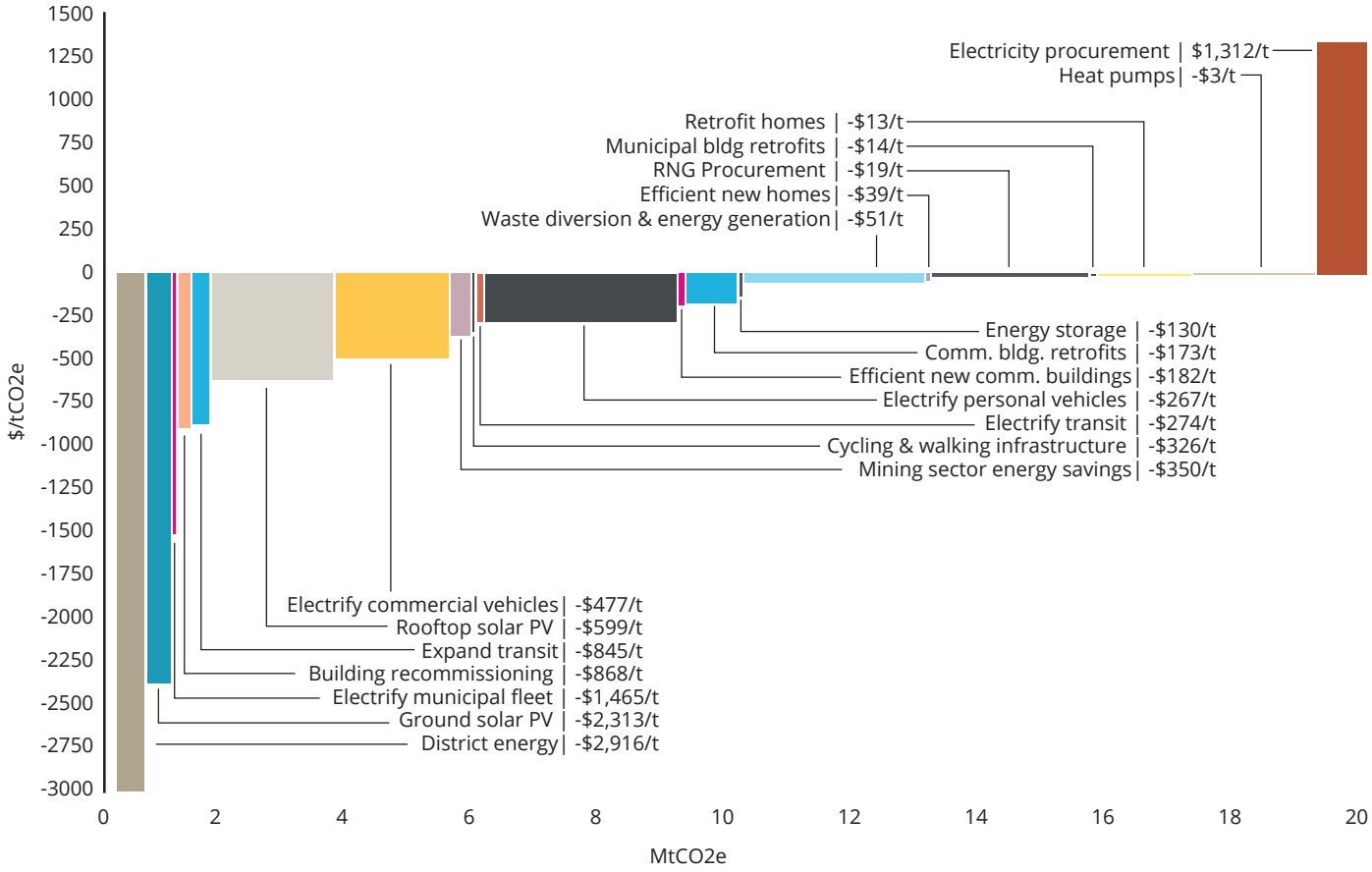


Figure 37. CEEP marginal abatement cost (MAC) curve, showing the cost/savings per tonne of emissions reduced by action. Horizontal axis: megatonnes CO_2e reduced by the action (wider bars = greater reductions). Vertical axis: net financial cost/savings of the action (taller bars = greater cost/savings). Positive numbers are costs, negative numbers are savings.

The MAC graph shows that Greater Sudbury's CEEP actions all generate savings on the emissions they reduce except for renewable electricity procurement. Some actions have a large negative marginal abatement cost, but their emissions reductions are small relative to other actions, as summarized in Table 5. Other actions have less savings but achieve great emissions reductions, as summarized in Table 6. It is important to remember that the MAC graph presents cost/savings and emissions savings relative to each action. All actions are worth considering as they all reduce emissions.

Table 5. Marginal abatement costs (MACs) of sample actions with small emissions reductions relative to other actions.

ACTION	MAC	EXPLANATION
Electrify municipal fleet	-$1,465	The total emissions saved by electrifying the municipal fleet is small as the municipal fleet itself is small and does not produce many emissions. The cost of reducing fleet emissions by replacing vehicles with electric versions is low, whereas the fuel cost and operations and maintenance savings are high, yielding a large negative MAC. There is a large savings for every tonne of emissions reduced from municipal fleet operations.
Cycling and walking infrastructure	-$326	The travel mode shift from personal vehicle trips to cycling and walking trips does not result in large emissions reductions compared to some other actions. However, providing walking and cycling infrastructure saves $326 per tonne of transportation-related emissions reduced through avoided fuel and vehicle costs.
Electrifying transit	-$274	Electrifying the bus fleet saves relatively few emissions as the fleet is small and doesn't contribute much to the community's overall emissions. $274 is saved per tonne of emissions reduced as electric buses use less energy (i.e. reduced fuel costs) and require less operation and maintenance costs than fossil fuel powered buses.
Efficient new commercial buildings	-$182	As new commercial building floorspace is small over the next 30 years, efficient new commercial buildings have a small emissions reduction impact compared to other actions. The $182 saved per tonne of emissions reduced in commercial buildings is a result of energy cost savings.
Efficient new homes	-$39	The small anticipated population growth over the next 30 years is accompanied by limited housing growth. Thus, efficient new homes have a small emissions reduction impact compared to other actions. $39 is saved for every tonne of emissions reduced by energy efficient new homes due to lower energy costs.

Some of these actions represent low cost quick wins. Electrifying the municipal fleet and transit can be done quickly at relatively low cost, with few barriers in doing so. Ensuring new buildings are energy efficient requires the implementation of low-cost policy tools.

Table 6. MACs of sample actions with large emissions reductions relative to other actions.

ACTION	MAC	EXPLANATION
Electrify commercial vehicles	-$477	Commercial vehicles account for large emissions production in Greater Sudbury. Electrifying them results in greatly reduced fuel and operation and maintenance costs, resulting in large emissions reductions and a large negative MAC. $477 is saved in fuel and operations and maintenance costs for every tonne of commercial vehicle emissions reduced.
Electrify personal vehicles	-$267	Personal vehicles are responsible for a large portion of emissions production. Personal vehicle electrification saves the most emissions of any action while saving on fuel and operation and maintenance costs, saving $267 for every tonne of emissions reduced.
Waste diversion & energy generation	-$51	Sending less waste to landfills and expanding the capture of methane from landfills for use as renewable natural gas (RNG) reduces emissions substantially. The RNG displaces natural gas use, saving $51 per tonne of emissions reduced.
RNG procurement	-$19	Replacing natural gas use with RNG has a large emissions reduction. Although there is a premium assumed on the cost of RNG versus natural gas, the MAC is negative due to considerations like production costs and social cost of carbon.
Retrofit homes	-$13	Retrofitting the existing housing stock for improved energy efficiency achieves large emissions reductions. Reduced energy costs contribute to achieving a negative MAC despite retrofit costs.

The sample actions in Table 6 are all relatively high cost and have high emissions reduction potential. They are typically implemented over the long term (except for RNG procurement) and they all result in savings per tonne of emissions reduced. By providing the cost/savings per tonne of emissions reduced for each CEEP action, the MAC analysis provides another tool in CEEP action decision-making.

CEEP Employment

CEEP capital expenditures result in increased employment. Employment factors for each sector were used to translate each million dollars of activity resultant from CEEP actions into full-time equivalent jobs (Figure 38). The CEEP is estimated to generate 40,000 person years of employment between 2020 and 2050 – an average of 1300 annually – compared to the BAU scenario. Many jobs are in the energy sector, with solar PV, DE systems, and heat pumps to install. Many others are related to building retrofits, lasting two decades until the vast majority of the building stock is retrofit by 2042. Some automotive repair jobs are lost (2048-2050) as the requirement for maintenance of vehicles is expected to decline. Residential building jobs are slightly fewer under CEEP implementation than in the BAU as fewer single-family homes will be built and dwellings will be smaller on average. These construction jobs are picked up by the renewable energy sector, as new and existing buildings have solar PV systems installed.

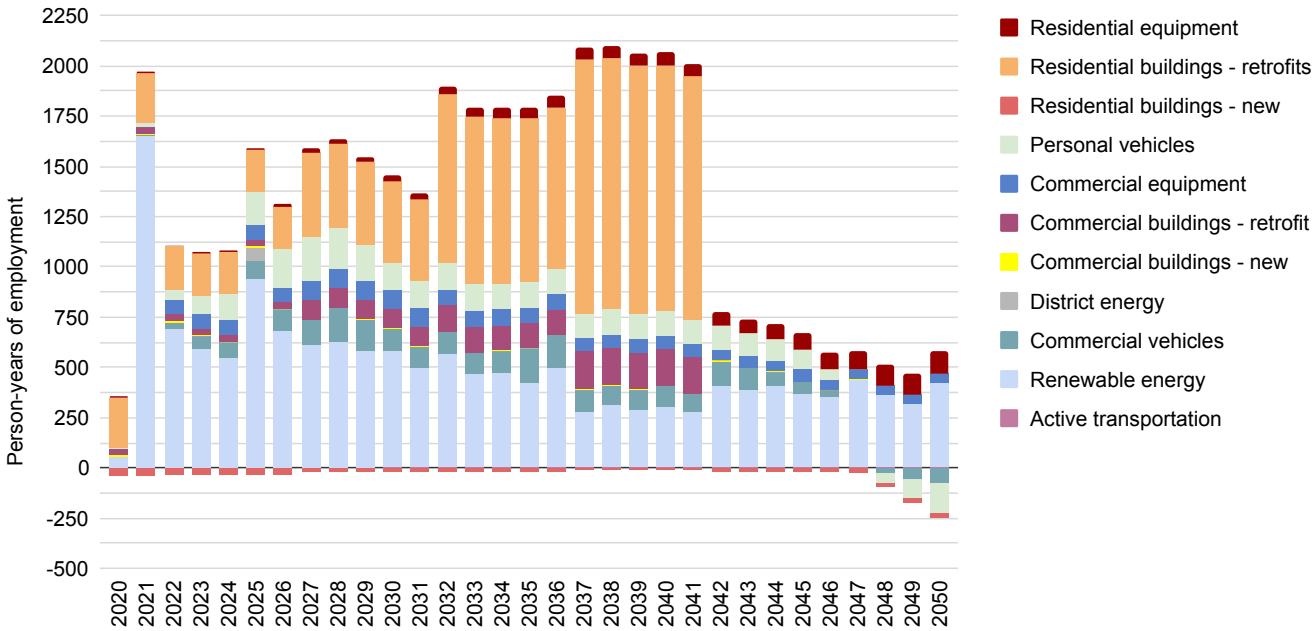


Figure 38. Employment generated by CEEP implementation.

Financial Analysis Summary

The high-level financial analysis reveals that CEEP implementation requires major upfront investments by the City, public and non-profit institutions, residents, and the private sector. However, energy savings, operations and maintenance savings, and avoided carbon taxes far outweigh the costs, and will therefore create significant economic value for the community over the long-term. Costs incurred on high emitting fuels and activities decline as the CEEP actions are implemented. Energy costs decrease overall and go increasingly toward clean, renewable energy sources. Almost all CEEP actions save money while reducing emissions and create substantial new employment opportunities.

Part 5: Recommendations and Next Steps

The energy and emissions analysis presented in the CEEP demonstrates what is needed to achieve a net-zero emissions target by 2050. The recommendations presented here reflect this. Through strong policy and action, Greater Sudbury can reduce its energy use and emissions production substantially over the next 30 years, responding to the direction set by the climate emergency declaration. The analysis shows that there are major areas of focus to achieve the bulk of the energy and emissions reductions, but also that many efforts must be made across all sectors to achieve a net-zero emissions target by 2050.

The CEEP's major action recommendations are grouped into their strategy sectors below. Goals, primary actions, and brief discussion on action implementation are indicated for each strategy sector. The implementation timing is also noted for each action:

- Near-term: implementation complete in fewer than 5 years;
- Medium-term: implementation complete in 5 to 10 years; and
- Long-term: implementation complete in 10-15 years or ongoing.

More action considerations are detailed in the CEEP Implementation Framework (Appendices). For each action sector the Framework considers:

- Base assumptions
- Implementation schedule
- Target audience(s)
- Existing policy/strategy/workplan considerations
- Potential partners
- Estimated human resources (not necessarily limited to City staff) and other resources required (besides funding)
- Estimated implementation budget (not limited to City funding)
- Potential implementation challenges
- Next steps
- Key performance indicators (KPIs) and reporting frequency

Recognizing that a City and its divisions are an intricate arrangement of policy and strategy application, the Implementation Framework provides some initial direction for CEEP implementation, which can be supplemented with additional and more precise information from each division. Its elements can be integrated into other plans and strategic documents as needed. They can also be updated, indicating the next steps in each policy's and action's trajectory as CEEP implementation proceeds.

Compact, Complete Communities Actions

Goal 1: Achieve energy efficiency and emissions reductions by creating compact, complete communities through infill developments, decreasing dwelling size through an increase in multi-family buildings, and increasing building type mix.

Primary Action: Coordinate land-use development through the Executive Leadership Team, Growth and Infrastructure Department, and Transit Services Division to direct land-use development in achieving compact, complete communities.

The direction given in the current Official Plan (OP) is strong in its support of infill development and compact land-use planning. Following this direction and strengthening it with energy, emissions, and climate goals will achieve energy and emissions reductions at very low cost. City land-use, development, and transportation plans and strategies that work with or in parallel to the OP should be updated as well to reflect the importance of the climate emergency declaration, ensuring that all City planning efforts are coordinated to foster low-carbon land-uses resulting in compact, complete communities. These efforts should include:

- A focus on infill development in core areas and scaling back urban settlement area development;
- Increasing minimum housing densities;
- Transportation oriented development approaches to coordinate transit and active transportation options with development densities;
- A focus on mixed-use and multi-family buildings to increase building energy efficiency and provide population density to support neighbourhood services and amenities;
- Green space and urban forestry requirements for community spaces that have carbon sequestration capacity.

The Official Plan includes energy and emissions considerations in its Transportation, Utilities, and Energy Efficiency sections, but energy, emissions and climate considerations are not central to its content. Amendments to the OP and related land-use plans could be quick wins in the near-term.

Efficient Buildings Actions

Goal 2: Periodically increase the energy efficiency of new buildings until all new buildings in 2030 onward are Passive House energy efficiency compliant.

Primary Action: Develop a Greater Sudbury Green Standard and rezoning energy efficiency requirements.

The Green Standard would be a tiered set of performance measures implemented through the development approval process. This standard can be based on the Toronto Green Standard or the BC Step Code. The Standard would outline incremental energy efficiency performance between the current provincial Building Code and Passive House energy performance standards.

Rezoning requirements can be invoked under the Provincial Planning Act through bylaw. Rezoning applications would trigger energy efficiency requirements determined by the City for proposed buildings. The efficiency requirements could be aligned with the Green Standard.

Although municipalities do not have specific powers under the Provincial Building Code to require higher energy efficiency in new buildings not requesting land-use rezoning, the Green Standard can be implemented as a voluntary option that would encourage developers and builders to build to improved energy standards. This could involve development processing incentives that encourage demonstration of improved energy performance of proposed developments.
The Standard could be coupled with a local improvement charge (LIC) program designed with local utilities to provide additional upfront capital for improved building energy performance construction and energy generation systems. Under the LIC, energy related building costs could be paid back over a 10–20-year period at a rate aligned with avoided energy costs.

Using templates from other jurisdictions, the Greater Sudbury Green Standard and rezoning bylaws updates should be a near-term action to implement.

Goal 3: The existing building stock is retrofit for 50% increased energy efficiency by 2040 and large buildings are routinely recommissioned.

Primary Action: Develop a deep energy efficiency retrofits program.

A strong program focused on energy efficiency retrofits could involve partnerships with Provincial and Federal governments, utilities, industry, and higher education, with the City as the lead program manager and deliverer.

The program would be accessible to anyone wanting to upgrade the energy efficiency of their building, and would also actively target groups of buildings, such as neighbourhoods and specific sectors (e.g. restaurants, grocery stores, offices, etc.). Renewable energy system installations (e.g. solar, district energy, heat pumps, etc.) would be included in the program. Retrofit funding could be offered through local improvement charges (LICs) and property-assessed clean energy (PACE) programs. The retrofit program would include incentives to building owners and minimum requirements for building energy efficiency performance. A promotional and educational campaign would accompany the program. The City already has a good track record of housing retrofits through the Social Housing Energy Retrofits and Social Housing Apartment Improvement programs that have been performed over the years. These programs should be continued and supplemented.

The retrofit program is a medium-term action that starts in the near-term.

Goal 4: Achieve net-zero emissions in City buildings by 2040.

Primary Action: Develop a prioritized list of City buildings to retrofit and perform energy audits, payback analyzes, and retrofits starting with the highest priority buildings.

Through retrofitting its own building stock for enhanced energy efficiency, the City will show leadership to homeowners and ICI building owners and operators. The lessons learned through City building retrofit processes will be transferable to retrofit efforts in other sectors.

Municipal building retrofits can start in the near-term and will be a medium-term endeavour.

Water, Wastewater, and Solid Waste Actions

Goal 5: Decrease energy use in the potable water treatment and distribution system by up to 60% by 2050.

Primary Actions:

- Continue with water treatment and distribution system upgrades through pump replacements with more energy efficient models.
- Decrease potable water use by 45% community-wide by 2050 through incentive and education programs.

The Water/Wastewater Services Division has pilot pump replacement projects underway and are monitoring the performance of new, more energy efficient pumps. A pump replacement plan is under development and Advanced Metering Infrastructure is being installed.

Water conservation education and awareness programming is already present in Greater Sudbury through municipal programs. Expanding these programs and offering a water efficient fixtures replacement incentive program would encourage homeowners and businesses to conserve water. These actions are being implemented over the long-term.

Goal 6: Achieve 90% solid waste diversion by 2050. An organics and biosolids anaerobic digestion facility is operational by 2030.

Primary Actions:

- Continue to implement and update the services and direction of the Waste Diversion Plan to incrementally improve solid waste diversion each year until the 90% target is reached or exceeded.
- Work with community partners to deliver consumption, conservation, and waste reduction education and awareness programs.
- Perform an updated anaerobic digestion facility study including options for producing electricity and RNG from its outputs.

Solid waste collection and treatment is a multi-faceted sector with overlapping governmental jurisdictions and service considerations. Direction from the Province governs some of what can be achieved with solid waste diversion. The City can choose to exceed direction from the Province for certain elements of its solid waste programming to increase solid waste diversion. Education and awareness programs employing demonstration projects and social media have proven effective in other jurisdictions; similar programs could be employed in Greater Sudbury. These actions can be implemented in the near-term and will endure over the long-term.

Although anaerobic digesters may not currently be feasible for Greater Sudbury, the technology is developing rapidly and costs will continue to decrease. Anaerobic digesters could be installed at wastewater treatment plants where organic waste delivery could be mixed with biosolids for treatment. The gas captured from the facility could be used to create electricity (similar to the existing landfill electricity generation facility) or as RNG in natural gas lines. This is a near to medium-term action.

Low-carbon Transportation Actions

Goal 7: Enhance transit service to increase transit mode share to 25% by 2050.

Primary Actions:

- Update the Transit Action Plan and Transportation Master Plan periodically with increasingly ambitious transit mode share targets.
- Enhance transit service through expanded routes and frequency, as possible.
- Right-size the transit fleet with smaller vehicles serving short and/or low passenger count routes.
- Develop an employer and institution transit incentive program that can be offered to employees and students to encourage transit use.

The recent Transit Master Plan update makes service and route improvements and some institutional bus pass programs are in effect during the school year. Enhancing these elements and supplementing them with other efforts will be critical to increasing ridership in years to come. Transit and transportation have many facets to consider. Coordinated efforts across City sectors are required to connect transportation, land-use, housing, and other city planning efforts to improve ridership.

Transit services are continuously being refined. These actions can be implemented in the near-term and refined over the long-term.

Goal 8: Achieve 35% active mobility transportation mode share by 2050.

Primary Actions:

- Continue to implement the Cycling and Pedestrian Master Plan (part of the Transportation Master Plan), developing the recommended cycling and walking infrastructure and networks.
- Dedicate and deploy annual capital budget to new active transportation infrastructure that makes significant progress toward implementing the full Cycling and Pedestrian Master Plan.
- Coordinate with community partners to deliver education and awareness programs about the economic and health benefits of active transportation.

Implementation of the City's Cycling and Pedestrian Master Plan is a critical component of increasing city-wide active transportation. Annual investments in, and realization of, new infrastructure are good metrics of plan implementation progress. Delivering education and awareness programs with community partners is an important component of creating the behaviour shift to choose making trips by active transportation, especially in winter months.
Active transportation improvements should be made each year. These actions are near-term with continued implementation over the long-term.

Goal 9: Electrify 100% of transit and City fleet by 2035.

Primary Action: Replace transit and city fleet vehicles with electric versions.
The rapid increase in electric vehicle model availability and continuing decrease in pricing greatly facilitates City fleet and transit vehicle replacement. Fleet replacement can occur through the dedication of annual capital budget. The City can also require its contractors to use electric vehicles through the contracting process and agreements. This action can be a near-term quick win for the City.

Goal 10: 100% of new vehicle sales are electric by 2030.

Primary Actions:

- Implement the recommendations of the Electric Vehicle Study, including:
- Updating building development applications, building permits, rezoning and retrofitting policies;
- Including EV infrastructure data in building records;
- Updating relevant city plans;
- Updating the licensing, regulating and governing of vehicles for hire;
- Coordinating and promoting EV subsidies, purchase incentives, and bulk purchases;
- Coordinating and delivering various sector-specific education and awareness campaigns; and
- Installing charging infrastructure.

The electric vehicle market is evolving quickly. However, EV sales remain only a small fraction of overall car sales. Accelerating EV uptake through the recommendations of the Electric Vehicle Study will help address the high energy use and emissions output of Greater Sudbury's transportation sector over a shortened timespan. Most actions in the Electric Vehicle Study can be started in the near-term and continued over the long-term.

Industrial Efficiency Actions

Goal 11: Increase industrial energy efficiency by 50% by 2040.

Primary Action: Create an industry energy efficiency working group composed of industry stakeholders that meets quarterly to discuss energy efficiency progress. Vehicle electrification and process equipment upgrades are saving money in industrial applications. Many industrial outfits in Greater Sudbury are already refining their activities with lower emissions vehicles and equipment. The working group would serve to disseminate knowledge of the latest technologies and industrial energy efficiency improvement approaches and discuss plans, action implementation, lessons learned, and timelines. This group can be formed in the near-term.

Local Clean Energy Generation Actions

Goal 12: Establish a renewable energy cooperative (REC) to advance solar energy systems and other renewable energy efforts of the CEEP.

Developing Greater Sudbury's new energy infrastructure and programs is a substantial amount of work. A renewable energy cooperative (or similar organization) will be essential to providing the capacity to do so. Its members can include staff, the City, utilities, businesses, institutions, and citizens. The REC's initial staff can consist of local experts and/or be formed from a community group already knowledgeable in the renewable energy field.

This is an organization effort that can be implemented in the near-term.

Goal 13: Install 10 MW of ground mount solar PV each year, starting in 2022.

Primary Actions:

- Assess land availability for solar farms and prioritize properties on which to install solar energy systems with input from stakeholders and the public. Use the Capreol solar array as a template for installation.
- Secure contracts with solar PV providers to achieve bulk purchase discounts on solar PV arrays.

The Capreol solar array is a precedent worth repeating in Greater Sudbury. With lessons learned from this project, future projects should be more efficient to realize. The renewable energy cooperative is a new entity whose mandate can include:

- Provision of renewable energy projects;

- Coordination of community investment opportunities in renewable energy projects;
- Developing local renewable energy expertise;
- Stimulating the local economy;
- Providing energy security and resilience; and
- Delivering education and awareness programs.

To be on target for the first 10 MW solar energy installation in 2022, these actions start in the near-term and be sustained over the long-term.

Goal 14: Install net metered solar photovoltaic (PV) systems on 90% of new buildings and 80% of existing buildings, supplying 50% of their electric load.

Primary Actions:

- Include this action as part of the approach of Goal 2;
- Deliver developer and builder information and training through the REC;
- Coordinate homeowner outreach and incentive programs through the REC;
- Coordinate ICI outreach and incentive programs through the REC;
- Arrange bulk solar PV system purchasing; and
- Coordinate with electrical utilities on new metering programming.

New building solar PV systems can be mandatory under the new Green Standard and rezoning practices. The REC can help train developers and builders in the installation of solar PV systems while coordinating outreach and incentive programs to expedite the installation of systems on existing buildings. Installations on existing buildings will constitute a substantial effort but can be coordinated with the deep energy efficiency retrofits goal (Goal 3). New building solar PV installations can start in the near-term. Retrofitting buildings with solar PV systems can start in the near-term and will occur over the long-term.

Goal 15: Expand the downtown district energy system to 23 MW capacity.

Primary Action: Conduct a system expansion feasibility study that identifies priority buildings to connect to the system, determines system requirements, and demonstrates the business case.

The current downtown district energy system can be expanded to provide energy efficient heat to additional buildings. Discussions with current owners/operators and a feasibility study will determine the viability, timeline, and cost/payback of expansion. The expansion feasibility study can be performed in the near-term. The expansion itself will likely occur in the medium-term.

Goal 16: Install 50 MW of renewable energy storage.

Primary Actions

- Engage local utilities in exercises to determine the best approach to energy storage provision and ownership;
- If deemed necessary, perform a feasibility study on energy storage options; and
- Incrementally install renewable energy storage in concert with new renewable energy systems.

Mornings and evenings are when electricity grid demand peaks. Energy storage (likely in the form of batteries) could store energy from Greater Sudbury's new renewable energy installations for release during these peak times. This decreases demand from other grid generation sources, using renewable energy instead. Discussions and studies can begin in the near-term. The first storage projects can accompany renewable energy installations and will endure over the long-term.

Low-carbon Energy Procurement Actions

Goal 17: Procure 100% of community-wide grid electricity and 75% of natural gas demand from renewable sources by 2050.

Primary Actions:

- Engage subject matter experts to complete a preliminary study evaluating procurement options, including:
- Public-private partnerships (City, major property owners, large institutions) that sign long-term power purchase agreements with renewable energy developers; and
- Establishing a local (municipal) electricity retailer, allowing the City to purchase renewable electricity for all local customers that sign on.
- Following initial study, establish a stakeholder working group to identify/ evaluate procurement options, opportunities, and obstacles.

Community Choice Aggregation is a community energy purchasing framework used in several jurisdictions in the United States. It allows municipalities to aggregate the buying power of customers to procure large amounts of renewable energy through contracts with suppliers. The municipality can choose the energy generation source and may be able to offer rates lower than those available to individual customers. In some jurisdictions in the United States, this arrangement employs an opt-out model wherein all customers are part of the aggregated energy purchasing system by default but can opt out if desired.

75% RNG procurement is an ambitious goal and will rely on availability, which will likely increase over the next 30 years. This action is scalable, as discussed in Part 6. Studies can occur in the near-term while setting up the procurement system would likely take place in the medium-term.

Carbon Sequestration Actions

Goal 18: Increase the reforestation effort of the Regreening Program.

Primary Action: Increase the resources available to the Regreening Program for its reforestation efforts through operating budget assignment and coordination with businesses, institutions, and community groups.

Greater Sudbury's Regreening Program is a renowned success. Increasing its capacity will help sequester more carbon and engage the community in environmental protection and restoration efforts. This action is scalable, as discussed in Part 6.

This action can be scaled up in the near-term through the Regreening program.

Part 6: Discussion

The CEEP's 18 goals and their associated actions form a low-carbon pathway to achieving net-zero community-wide emissions by 2050. Major energy efficiency, energy generation, and vehicle electrification actions will achieve the majority of emissions reductions. A variety of smaller actions will be critical for achieving the net-zero emissions target.

The actions reduce 93% of 2016 emissions levels by 2050 – 100,000 tCO_2e of annual emissions is projected to remain in that year. This is equivalent to the annual emissions of about 3,100 cars or the energy use of about 2,400 Canadian homes.[11] Figure 14 in Part 3 of this report identifies the residential and industrial sectors as responsible for 70% of the remaining emissions. The natural gas, fuel oil, propane, and diesel remaining in use in these sectors in 2050 are responsible for 82% of the remaining emissions. Waste is responsible for 10%. Fugitive emissions are responsible for the remaining 8%.

Addressing the remaining 100,000 tCO_2e of annual emissions in 2050 would involve a combination of the following approaches:

- Increasing RNG use from the current goal of 75% natural gas replacement to 100% replacement, including in district energy systems;
- Operating all industrial activities on biofuels or renewable electricity;
- Expanding gas capture to all landfill operations; and
- Carbon sequestration.

The 24,811 hectares of replanted area through the Regreening program provides 25,000 tCO_2e of sequestration per year. Quadrupling this amount would achieve an additional 75,000 tCO_2e of annual emissions reductions (100,000 tCO_2e total). This would require reforesting an additional ~75,000 hectares, an area equivalent to almost one quarter the land area of Greater Sudbury. Thus, it is unlikely the entirety of a tree planting effort like this could occur within the City boundary, especially with some land-use competition from new renewable energy projects. If this action were pursued, land outside the City could be considered for afforestation, in agreement with neighbouring jurisdictions, and perhaps on Crown lands. While new forests are planted, existing forests would also have to be maintained, replacing dying trees to maintain the forests' carbon sequestration capacity.

11 As calculated by NRCAN's Greenhouse Gas Equivalency Calculator: http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/ghg-calculator.cfm

Conclusions

Greater Sudbury's climate emergency declaration sets a strong direction for the City and community to mitigate GHG emissions. Its actions are supported by energy and emissions modelling indicating that their implementation will successfully reduce emissions by 93% of 2016 levels by 2050. By scaling up renewable energy procurement, energy generation actions, and/or afforestation efforts to achieve increased carbon sequestration, the climate emergency declaration goal of net-zero emissions by 2050 can be met.

Financial analysis of CEEP strategies presents a compelling case for action, with $7.33B in net present value cost savings over the next 30 years. CEEP implementation will require sustained leadership and investment, with $4.29B (net present value) required over the next 30 years from the City, businesses, institutions, and homeowners. The investment will foster a new local economy of renewable energy and construction goods and jobs, with 40,000 person years of employment added to the community.

The CEEP's implementation will rely on City political and staff leadership. It will also rely on industry stakeholders participating in working groups, educational institutions contributing research and development efforts, community groups contributing expertise and passion, and partnerships with First Nations. The new Renewable Energy Cooperative is an exciting mechanism for professional training, public education, and implementation of renewable energy projects. As the City's climate change adaptation efforts progress, mitigation and adaptation efforts can be integrated to holistically address climate impacts across the region.

The CEEP is a pathway to a low-carbon future for Greater Sudbury following the paradigm of Reduce-Improve-Switch. The 2050 net-zero emissions target is ambitious but achievable under this paradigm. The leadership of City council in declaring a climate emergency in response to the climate change concerns expressed by citizens is consistent with the shift among municipalities worldwide to take bold action to reduce emissions while creating resilient, high quality of life, and prosperous communities. The Community Energy and Emissions Plan aligns Greater Sudbury's efforts with those of hundreds of other municipalities across the globe taking action for a better future.

Appendices

1. Implementation Framework
2. Electric Vehicle Study
3. Public Engagement Summary

Appendix 1
Greater Sudbury
CEEP Implementation Framework

Summary and Overview

The Implementation Framework is the starting point for CEEP actions. It is designed to generate momentum on each action, providing reference checklists for starting implementation processes. As circumstances evolve (e.g. community champions are identified, funding becomes available, technologies change) the Implementation Framework can be updated to reflect new direction and opportunity. The Framework is presented in summary table form. It follows the template below.

Consideration	Notes
Assumptions	The circumstances and assumptions forming the basis of the action.
Schedule	The timing of action implementation.
Audience(s)	The direct and indirect audiences the action affects or engages.
Reporting Medium	The means by which progress and evaluation of the action are reported.
In which existing policies/ strategies/workplans can this action be embedded?	The City policies and administrative practices and processes to which the action is related and/or governed.
Partners	The entities with which to partner in this process and the approvals required prior to implementing and reporting.
Resources required (besides funding)	The technical and human resources (not necessarily City staff) required to support the action.
Budget	The estimated funding required to undertake the action, which can be provided by a variety of sources (i.e. all costs are not borne by the City). ***This is a high-level estimate that may change with further study and action refinement.***
Challenges	The key challenges that need to be overcome for the action to be successful.
Next steps	The practical steps needed to implement the action.
Key Performance Indicators (KPIs) Reporting frequency:	The metrics to be tracked and reported in order to determine the success of the action. The reporting frequency is annual unless otherwise stated.

Compact, Complete Communities Actions

Goal 1: Achieve energy efficiency and emissions reductions by creating compact, complete communities through infill developments, decreasing dwelling size through an increase in multi-family buildings, and increasing building type mix.

Timing: Near-term.

Consideration	Notes
Assumptions	- The City can use land-use by-laws and development permitting (Community Planning Permits) to create complete, compact communities that are energy efficient, require shorter trips that can be made by active transportation and transit, and create positive health and community outcomes
Schedule	- Ongoing
Audience(s)	- Residents - Businesses - Development community
In which existing policies/ strategies/workplans can this action be embedded?	- Official Plan - Transportation Action Plan - Transit Action Plan - Zoning by-laws - Development permitting processes
Partners	- Development community - Real estate community - Resident and business organizations
Resources required (besides funding)	- Staff time to coordinate with partners - Staff time to perform public engagement during planning and development processes - Staff time to update policies and regulatory frameworks
Budget	- $150,000/year. Budget needed for new planning tools and processes design, and to update existing planning tools and processes.
Challenges	- Implementing design guidelines to ensure multi-family and mixed-use buildings are designed to human scale and have community benefits. - Updating by-laws to enforce development area restrictions. - Changing public preferences for single family housing. - Current expansive, low density layout of the city. - Large supply of developable land. - Lack of minimum housing and population densities.
Next steps	- Review Official Plan and land-use by-laws to determine if updates are needed to focus development in infill and transit-served areas. - Scale back urban settlement area development. - Increase minimum housing densities. - Establish priority development areas and development-restricted areas. Update zoning to allow for appropriate residential densities. - Continue to align transportation policy, the Official Plan, and land-use by-laws.

	- Establish partnerships with development and real estate community to discuss direction of future growth. - Apply energy efficiency and climate change criteria to new development considerations.
KPIs Reporting frequency: annual	- Housing starts - Dwellings per hectare - Floor space ratio - New building type ratios - Percent of agricultural land preserved - Amount of growth occurring in settlement areas - Amount of growth occurring in built boundary

Efficient Buildings Actions

Goal 2: Periodically increase the energy efficiency of new buildings until all new buildings in 2030 onward are Passive House energy efficiency compliant.

Timing: Near-term.

Consideration	Notes
Assumptions	- The City can update its development processes to achieve high energy efficiency in new buildings.
Schedule	- All new buildings are Passive House compliant starting in 2030.
Audience(s)	- Entire community - Homeowners - Commercial property owners and developers - Real estate community
In which existing policies/ strategies/workplans can this action be embedded?	- Development application processes - Zoning by-laws
Partners	- Development community - Trades - Construction training program providers - Cities that have similar goals and have taken preliminary steps - Passive House Institute Canada
Resources required (besides funding)	- Staff time to update by-laws and development processes - Staff time to coordinate with partners - Communications staff time to promote program
Estimated Budget	- $150,000/year. Budget will be needed for additional building inspection requirements.
Challenges	- Facilitating uptake of a step code with the development community. - Enforcement policies. - Lack of ability to supplement the provincial Building Code. - Resistance from new building owners based on lack of knowledge of building construction approaches, energy efficiency, and upfront capital costs versus paybacks. - The short timeline during which to implement the changes.
Next steps	- Consult with cities that have implemented building energy efficiency step codes and green standards to see if their template can be applied in Sudbury. The step code or standard would increase new building energy efficiency every two-three years over the next decade until Passive House level energy efficiencies are attained. - Update development planning policies with a new Greater Sudbury Green Standard (step code and Passive House energy efficiency requirements). - Develop an engagement program for discussion with and education of the local construction and development community. Work with the community to facilitate a smooth transition to new building standards and practices.

	- Update engineering staff and building inspector skillsets with step code and Passive House knowledge through programs offered by the building organizations and networks, and Passive House Canada. - Join intermunicipal lobbying efforts to improve energy efficiency requirements in the provincial Building Code.
KPIs Reporting frequency: annual	- Building starts - Building energy performance - Instances of building standard certification (e.g. Passive House)

Goal 3: The existing building stock is retrofit for 50% increased energy efficiency by 2040 and large buildings are routinely recommissioned.

Timing: Near-term.

Consideration	Notes
Assumptions	- 50% thermal savings and 50% electrical savings can be achieved in 100% of existing buildings - All buildings over 200,000 ft^2 and 40% of buildings over 25,000 ft^2 are recommissioned every 10 years for 10% energy savings - Heat pumps are typically >300% more efficient than electric baseboard heating and their installation is straigtforward. - 100% of homes and 75% of commercial buildings can be retrofit with heat pumps to increase heating energy efficiency in buildings - 70% and 30% of homes have air source and geothermal heat pumps installed, respectively. 75% of space heating and 100% of space cooling is electric in commercial buildings.
Schedule	- Retrofitting program starts as soon as possible, and all building stock is retrofit by 2040 - All heat pump installations are complete by 2050
Audience(s)	- Homeowners - Commercial property owners - Landlords
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plans - Land use by-law - Design guidelines
Partners	- Homeowners - Developers & industry associations - Small contractors and tradespeople - Real Estate Board - Provincial and federal government departments - Local colleges - Green building organizations like Passive House Institute Canada - Hydro One First Nations Conservation Program and Home Assistance Program - GreenSaver - City of Sudbury's Social Housing Energy Retrofits and Social Housing Apartment Improvement programs
Resources required (besides funding)	- Staff time for policy research and development, public/stakeholder consultations - Staff to prepare and oversee municipal programs and permitting - External subject matter experts
Budget	- Estimated >$1B costs
Challenges	- Developing financing programs, incentives, and other mechanisms to support retrofits - Overcoming upfront costs and encouraging a life cycle cost approach to building renewal - Overcoming inertia from building owners

	- Achieving heat pump life cycle cost parity with natural gas heating - Addressing potential heat pump noise concerns - Addressing supplementary heat requirement during extreme cold (i.e. heat pumps cease heat extraction from air below ~-20°C)
Next steps	- Develop partnerships with relevant provincial and federal government agencies, utilities, and local college departments - Research property-assessed clean energy (PACE) programs in other municipalities for best practices transfer - Develop education program to promote home retrofits - Develop sector-specific programs that support retrofits - Explore options for connecting property owners with private energy efficiency investment capital - Partner with relevant home improvement organizations and retailers to help develop green retrofit programs - Identify priority neighbourhoods and buildings for retrofitting and reach out to owners to help remove retrofit obstacles - Create recommissioning information materials for distribution to building owners and operators - Host information and engagement meetings with building owners - Establish partnerships with commissioning agents and authorities - Work with local HVAC contractors to document available heat pump technologies, market opportunities/challenges, best practices - Complete pilot/demonstration projects, e.g. on a municipally owned building - Research options for a heat pump incentive program - Consider implementing a bulk heat pump purchasing program in which residents and businesses can participate
KPIs & reporting frequency	- Greenhouse gas emissions (tonnes/year) - Total residential buildings energy consumption (MWh/year) - Green retrofit program participation rate

Goal 4: Achieve net-zero emissions in City buildings.

Timing: Medium-term.

Consideration	Notes
Assumptions	- The City has a financial impetus and a leadership imperative to upgrade the energy efficiency of its building - 100% of City buildings can be retrofit to net zero emissions
Schedule	- Retrofits begin as soon as possible and are complete by 2040
Audience(s)	- Council - Administration - Facility tenants
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan - Facilities Master Plan and management policies
Partners	- Council - Standards development & building permitting departments - Contractors - Green building organizations like Passive House Institute
Resources required (besides funding)	- Staff time for project management of energy audits, upgrades/retrofits, and energy performance monitoring
Budget	- $400M, depending on how net-zero is achieved.
Challenges	- Ensuring long-term commitment to retrofit investments - Managing potential disruptions to municipal operations
Next steps	- Identify priority buildings for retrofits, and schedule work - Complete energy audits - Monitor external funding opportunities
KPIs & reporting frequency	- Greenhouse gas emissions (tonnes/year) - Natural gas consumption (GJ/year) - Electricity consumption (MWh/year) - Annual energy costs ($/year)

Water, Wastewater, and Solid Waste Actions

Goal 5: Decrease energy use in the potable water treatment and distribution system by 60% by 2050.

Timing: Long-term.

Water pumping system upgrades.

Consideration	Notes
Assumptions	- The energy efficiency of the expansive potable water and wastewater networks can be improved through investment in modern pumping technologies. - Total system energy used in pumping can be decreased by 2%/year.
Schedule	- Starting as soon as possible, target of up to 60% increased efficiency is reached by 2050.
Audience(s)	- Public
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan - Water and Wastewater Master Plan
Partners	- N/A
Resources required (besides funding)	- Staff time to research pumping technologies - Staff time to oversee system upgrades
Budget	- $2M
Challenges	- Maintaining system performance during upgrades
Next steps	- Survey the water/wastewater network for priority system upgrade projects - Tender replacement pumps - Implement replacement scheduling - Develop a public information program if service outages are expected - Update Facilities and Wastewater Master Plans as required
KPIs & reporting frequency	- Pumps replaced - Water savings (l/year) - System efficiency improvements (kWh/year) - Emissions (tonnes/year)

Water network leak detection upgrades and incentive and education programs.

Consideration	Notes
Assumptions	- Energy use in potable water treatment and distribution can be decreased through water efficiency and leak detection/repair. - Water volume use can be decreased by 1.5%/year.
Schedule	- Starting as soon as possible. 45% community-wide water use reduction by 2050.
Audience(s)	- Public
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan - Water and Wastewater Master Plan

Partners	- Local sustainability and environment-focused not for profit groups - Educational institutions - Businesses (e.g. restaurants, other high-volume water users) - Residents (using new Advanced Metering Infrastructure)
Resources required (besides funding)	- Staff time to coordinate with partners - Staff time to produce incentive programs and educational and promotional programs - Staff time to detect and repair system leaks - Staff time to prepare and install Advanced Metering Infrastructure - Staff time to implement district metering
Budget	- $36M (assume average of $500 per household)
Challenges	- Changing public water use behaviour - Delivering education programs effectively
Next steps	- Continue the potable water network leak detection upgrades - Update Water and Wastewater Master Plan as required - Coordinate with partners on behaviour change education program deliver - Develop incentive program for efficient water using appliance upgrades and fixtures
KPIs & reporting frequency	- Incentive program participation - Water savings (l/year) - Energy savings (kWh/year) - Emissions (tonnes/year)

Goal 6: Achieve 90% solid waste diversion by 2050. An anaerobic digestion facility is operational by 2030.

Timing: Medium-term.

Consideration	Notes
Assumptions	- Increased waste diversion avoids emissions associated with anaerobic decomposition in landfills. - 90% of residential and ICI waste can be diverted. - An anaerobic digestion facility can be installed for organic waste and wastewater treatment with biogas capture for use as RNG.
Schedule	- Waste diversion targets is achieved by 2050. - Anaerobic digestion facility is installed by 2025.
Audience(s)	- Public - Employers - Institutions
In which existing policies/ strategies/workplans can this action be embedded?	- Facilities Master Plan - Waste Diversion Plan - Solid Waste Management Plan
Partners	- Waste haulers - Local waste-focused not for profit groups - Businesses - Building owners - Industry/Commercial/Institution sector - Subject matter experts
Resources required (besides funding)	- Staff time to research anaerobic digester options and oversee project implementation - Staff time to coordinate public waste diversion campaign - Staff time to coordinate City waste diversion approaches
Budget	- $150,000/year for staff. $1.5M for an anaerobic digester.
Challenges	- Changing public behaviour on consumption and waste disposal - Investment required for small increment in system performance improvement - Waste policy is a Provincial Government jurisdiction, making local waste programming and responsibility determination complicated
Next steps	- Engage subject matter experts to conduct a study to determine the best options for the anaerobic digestion facility, updating the knowledge gained from the previous study using best current practices and technologies. Determine implementation budget and schedule. - Consult with other cities to determine best practices. - Update Master Plans as required. - Coordinate with partners on waste disposal programming and education program delivery. - Set annual waste reduction and diversion targets. - Report publicly on waste diversion target progress.
KPIs & reporting frequency	- Waste diversion (tonnage/year) - Emissions (tonnes/year)

Low-carbon Transportation Actions

Goal 7: Enhance transit service to increase transit mode share to 25% by 2050.

Timing: Being implemented in the near-term and refined over the long-term.

Consideration	Notes
Assumptions	- With comfortable, frequent, and convenient transit service, fewer trips will be made by personal vehicle, thus reducing transportation emissions. - Transit service is increased to 10-minute frequency on high-demand routes, 20-minute frequency on medium demand routes, 7 days/week service. - Transit mode share increases to 25%.
Schedule	- Expanded transit actions are completed by 2050
Audience(s)	- Public - Employers - Institutions
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan - Transportation Action Plan - Transit Master Plan
Partners	- Employers (incentive programs) - Institutions (incentive programs) - Local transportation-focused not for profit groups
Resources required (besides funding)	- Staff time to research and coordinate transit service upgrades - Staff time to coordinate communications with residents and develop partnerships with employers and institutions - New fleet vehicles to right-size the fleet - Periodic additional human resources to update plans
Budget	- $3M for buses and maintenance.
Challenges	- Promoting a mode shift to transit among general public - Dispelling negative perceptions of public transit - Integration of transit with cycling, TransCab, park and ride, and Handi-Transit services in order to support mode-shift - Ensuring high ridership in winter months
Next steps	- Continue to implement and update the Transit Master Plan - Update the Transportation Action Plan as needed - Plan for increased service in fleet growth plans - Research and implement integrated mobility solutions between GOVA, GOVA Plus, GOVA Zone, and active transportation - Coordinate with other planning efforts, such as Official Plan updates - Perform surveys of transit infrastructure needs and prioritize new and upgraded infrastructure projects - Enhance promotion and awareness of transit services and benefits of using transit through education and awareness campaigns - Develop an employer and institution transit incentive program
KPIs & reporting frequency	- Ridership - Vehicle kilometres travelled (VKT, km/year) - Transit mode share

Goal 8: Achieve 35% active mobility transportation mode share by 2050.

Timing: Near-term with continued implementation over the long-term.

Consideration	Notes
Assumptions	- Improved cycling and walking infrastructure encourages active mobility transportation modes for trips less than 5km. - 35% of trips can be made by active mobility.
Schedule	- Ongoing infrastructure improvements to achieve the target mode shift by 2050.
Audience(s)	- Public - Employers - Institutions
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan - Transportation Master Plan and Cycling and Pedestrian Master Plan - Complete Streets Policy - Transportation Demand Management Plan - Transit Action Plan - Development plans - Official Plan
Partners	- Employers (incentive programs) - Institutions (incentive programs) - Local transportation-focused not for profit groups - Health organizations (promotion)
Resources required (besides funding)	- Staff time to coordinate and manage infrastructure upgrades and to update related policies - Staff time to engage public
Budget	- $5000 - $100,000/km depending on bike lane and sidewalk infrastructure approach.
Challenges	- Selecting and designing bike lane infrastructure - Determining the best mix of various cycling and walking programs and promotions to achieve the target mode shares - Minimizing any perceived or real impacts on local businesses - Maintaining active transportation mode share in the winter
Next steps	- Continue to implement the Cycling and Pedestrian Master Plan (part of the Transportation Master Plan) - Assess streetscapes for potential cycling and walking infrastructure upgrades (sidewalks, separated and/or identifiable bike lanes, bike parking, complete streets, active transportation priority intersections, etc) - Work to minimize interference between cycling and vehicle/pedestrian rights-of-way - Identify preferred route alternatives and program designs - Prepare public consultation program - Determine integration with transit services - Research funding opportunities for active transportation infrastructure upgrades

	- Coordinate with partners in delivering education and promotion programming
KPIs & reporting frequency	- Walk and bike mode shares - Traffic counter data (vehicle counts, and vehicle kilometers traveled) in key areas - User experience (surveys, interviews)

Goal 9: Electrify 100% of transit and city fleet by 2035.

Timing: Near-term.

Consideration	Notes
Assumptions	- Electric transit and City fleet vehicles are more efficient, have lower emissions, require less maintenance, and are cheaper to operate than internal combustion engine vehicles. - 100% of transit and City fleets can be electrified. - Fleet charging infrastructure can be spatially accommodated. - Vehicles' additional energy needs for field operations can be met by high capacity battery vehicles and/or solar PV charging panels.
Schedule	- All vehicles (City and contractor) are electric by 2035
Audience(s)	- City fleet operators and users
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan - Transportation Action Plan - Transit Master Plan - Solid Waste Management Plan
Partners	- Vehicle suppliers
Resources required (besides funding)	- Staff time to determine costs and vehicle replacement schedule - Staff time to coordinate with departments and fleet users on fleet needs and replacement scheduling
Budget	- $35M
Challenges	- Weighing higher capital costs versus lower operational costs - Managing cold weather operations - Accommodating charging requirements - Ensuring adequate vehicle range - Ensuring no reduction in quality of service - Dispelling negative perceptions about EVs
Next steps	- Support Greater Sudbury Transit in researching suitable EV bus models - Establish fleet replacement schedule - Determine needs to accommodate charging infrastructure - Provide support for maintenance/operations staff retraining
KPIs & reporting frequency	- Greenhouse gas emissions (tonnes/year) - Average fleet kilometrage (km/l equivalent) - Annual operating costs ($/km)

Goal 10: 100% of new vehicle sales are electric by 2030.

Timing: Started in the near-term and continued over the long-term

Consideration	Notes
Assumptions	- Electric vehicles are low-emission and inexpensive to operate and maintain. - Charging infrastructure is installed and maintained by public, private, and institutional entities.
Schedule	- 100% of all new vehicle sales are electric by 2030.
Audience(s)	- Public - Employers - Institutions - Auto dealerships and rental agencies
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan - Transportation Action Plan - Transit Master Plan - Official Plan
Partners	- Provincial and Federal Governments - Businesses - Institutions - Auto dealerships and rental agencies - Local transportation-focused not for profit groups
Resources required (besides funding)	- Staff time to research and implement incentive and charging infrastructure installation programs - Staff time to coordinate with partners on incentives, increasing local availability of EV models, and education and promotion programs
Budget	- $150,000/year for staff.
Challenges	- Municipality has little influence over private and commercial vehicle purchases - Municipality has little influence over EV technology development and market maturation - Charging infrastructure installation, especially in less dense residential areas and multifamily/mixed-use buildings
Next steps	- Prioritize and implement the recommendations of the Electric Vehicle Study (2019)
KPIs & reporting frequency	- EV market penetration - Available charging infrastructure - EV vehicle user experiences/recommendations

Industrial Efficiency Actions

Goal 11: Increase industrial energy efficiency by 35% by 2040.

Timing: Near-term.

Consideration	Notes
Assumptions	- Mining and other industrial businesses are self-incentivized to generate cost savings through energy efficiency measures. - Electrification of vehicles will result in emissions reductions and cost savings. - Energy use is reduced 35%.
Schedule	- Efficiency measures are already in progress and/or implemented as soon as possible and are complete by 2040.
Audience(s)	- Industrial businesses.
In which existing policies/ strategies/workplans can this action be embedded?	- Community Economic Development Strategic Plan
Partners	- Mining companies - Mining company equipment suppliers - Utilities - Business associations
Resources required (besides funding)	- Staff time to coordinate with partners
Budget	- To be determined by industrial businesses
Challenges	- Overcoming potential inertia of the sector - Availability of replacement technologies - Balancing lifecycle costs of new equipment versus sunk investments in existing equipment
Next steps	- Continue to coordinate with industrial businesses to determine their timelines for energy efficiency measures. - Relay public input on renewable energy and climate emergency concerns to the industrial sector, citing the impetus for action. - Create an industry energy efficiency working group composed of industry stakeholders that meets quarterly to discuss energy efficiency progress.
KPIs & reporting frequency	- Industrial fleet stocks - Energy use (GJ/year) - Emissions (tCO2e/year)

Local Clean Energy Generation Actions

Goal 12: Establish a renewable energy cooperative (REC) to advance solar energy systems and other renewable energy efforts of the CEEP.

Timing: Near-term.

Consideration	Notes
Assumptions	- An increase in energy system deployment and electrification will require expertise, education and awareness campaign coordination, and championship. - Existing local community groups, utilities, and businesses are interested in leading and supporting energy system deployment and electrification efforts.
Schedule	- Operational in 2020
Audience(s)	- Public - Utilities - Businesses
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan
Partners	- Utilities - Local renewable energy generation businesses and suppliers - Energy-focused local not for profit groups - Provincial, regional, national and international energy organizations - Local First Nations
Resources required (besides funding)	- Staff time to sit on the board of the organization - Staff time to participate in the organization's activities - Partner organization time to establish and operate the organization
Budget	- Estimated $250,000/year for staff and overhead costs
Challenges	- Coordination of existing organizations and efforts in the energy and electrification areas - Establishing start up funding - Prioritization of a variety of energy system and electrification projects, campaigns, and outreach
Next steps	- Convene the stakeholders in the related energy, electrification, and education fields to determine whether a new organization is needed or if an existing organization can take on increased mandate and responsibilities. - If a new organization is needed, determine the co-op (or other) structure, membership, vision and goals - Incorporate the new organization - Secure start up funding, establish the board of directors, and hire staff - Prioritize the organization's activities - Create workplans for the first energy and electrification projects
KPIs & reporting frequency	- Annual membership - Annual projects initiated and completed

Goal 13: Install 10 MW of ground mount solar PV each year, starting in 2022.

Timing: Start in the near-term and be sustained over the long-term

Consideration	Notes
Assumptions	- The electricity grid will be partially dependent on fossil fuel generation for the next thirty years. - The 10 MW Capreol solar PV plant is a successful model to replicate. - Solar PV panels are increasing in efficiency and decreasing in price per kW installed capacity. - There is enough unused open space (e.g. fields, lakes for solar PV rafts, roadside, etc.) in Greater Sudbury to accommodate 560 MW of installed solar PV capacity.
Schedule	- The first new plant is operational in 2022. - An average of 20 MW of solar PV is installed each year until 2050.
Audience(s)	- Public
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan
Partners	- Farmland owners - Utilities - Local renewable energy generation businesses and suppliers - Energy-focused local not for profit groups - Local First Nations
Resources required (besides funding)	- Staff time to site locations, issue tenders, liaise with utilities, host public engagement, and coordinate with partners - Consultants to perform feasibility studies where needed
Budget	- Estimated $700M based on average assumption of $1M per megawatt capacity, plus installation costs
Challenges	- Land availability - Short timeframe for delivery of large solar PV projects - Securing long-term capital investment for repeated annual investments - Public perceptions of using land for solar PV electricity generation
Next steps	- Establish a renewable energy cooperative (REC) to coordinate energy projects. - Revisit the Capreol project lessons learned to help chart a development plan for the solar farms. - Assess land availability and identify all potential solar sites. Prioritize their development with input from stakeholders and the public. - Get solar capacity and installation quotes from providers. - Secure contracts with solar PV providers to achieve bulk purchase discounts on solar PV arrays. - Develop detailed short and long-term budgets for the installations, accounting for increased solar PV efficiency and decreased costs projections.
KPIs & reporting frequency	- Grid emissions avoided (tCO2e/year) - Installed solar PV capacity (MW/year) - Annual maintenance cost ($/year)

Goal 14: Install net metered solar PV systems on 90% of new buildings and 80% of existing buildings, supplying 50% of their electric load.

Timing: New building solar PV installations can start in the near-term. Retrofitting buildings with solar PV systems can start in the near-term and will occur over the long-term.

Consideration	Notes
Assumptions	- Renewable energy generation and use helps avoid use of grid electricity which is produced in part by fossil fuels - 90% of new buildings and 80% of existing buildings have solar PV installed, supplying 50% of their electric load
Schedule	- Systems are installed starting as soon as possible and all systems are operational by 2050
Audience(s)	- Homeowners and residential property owners - Commercial property owners & public institutions
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan
Partners	- Utilities - Building owners - Local renewable energy system providers and installers - Local not-for-profit organizations - Institutions
Resources required (besides funding)	- A staff member dedicated to sustained management of incentives, policies, reporting, communications, etc.
Budget	- $350-750M. Budget needed for permitting, roof load assessments, engineering assessments, energy system purchase and installation, etc.
Challenges	- Education and communication about benefits of solar PV (e.g. simplicity of participating in incentive programs, installation, low maintenance, prolonged roof life, etc.) - Overcoming property owner perceptions (e.g. value, cost, aesthetics, effectiveness, effect on property value)
Next steps	- Include this action as part of the approach of Goal 2 - Deliver developer and builder information and training sessions through the REC - Coordinate homeowner outreach and incentive programs through the REC; - Coordinate ICI outreach and incentive programs through the REC - Arrange bulk solar PV system purchasing - Coordinate with electrical utilities on new metering programming - Develop partnerships with local renewable energy system providers and installers and coordinate pricing - Establish installed capacity milestone targets (kW/year)
KPIs & reporting frequency	- Greenhouse gas emissions (tonnes/year) - Total solar installed (kW) - Total annual output (MWh) - Program participation over time (kW/year) - Average install cost ($/W)

Goal 15: Expand the downtown district energy system to 23 MW capacity.

Timing: The expansion feasibility study can be performed in the near-term. The expansion itself will likely occur in the medium-term.

Consideration	Notes
Assumptions	- District energy systems supplying multiple buildings with heat are more energy efficient than individual buildings heating systems. - Existing district energy systems are expandable to more buildings and can be upgraded to higher generation capacity. - Additional combined heat and power generation can be accommodated by the electrical grid. - Existing downtown and hospital district energy systems are successful projects for replication.
Schedule	- System expansion starts as soon as possible & is complete by 2025.
Audience(s)	- Building owners and operators in the downtown area.
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan - Official Plan - Community Economic Development Strategic Plan - Downtown Community Improvement Plan
Partners	- Toromont Power Systems/Sudbury District Energy Corporation - Utilities - Sudbury Regional Hospital - Energy-focused local not for profit groups
Resources required (besides funding)	- Staff time for project management - Leadership and support from administration, Council - External subject matter experts
Budget	- $5-10M.
Challenges	- Technical feasibility must be established early on - Large projects require long-term staff capacity/capability - Development permits and environmental review may be required - Delivering energy at a cost comparable to, or lower than standard retail costs for electricity and gas. - Requires a strong economic case/return on investment - Stakeholder consultation, communications, and knowledge sharing required
Next steps	- Discuss expansion opportunities with current system operators - Identify priority buildings to connect to an expanded system - Conduct feasibility studies - Consult with electrical utilities on adding capacity to the grid - Secure funding - Determine whether to expand public-private partnership or if other entities should fund, own, and operate the system
KPIs & reporting frequency	- Greenhouse gas emissions (tonnes/year) - Natural gas consumption (GJ/ year) - Electricity consumption (MWh/ year) - Annual operating cost ($/year) - Annual maintenance cost ($/year)

Goal 16: Install 50 MW of renewable energy storage.

Timing: Discussions and studies can begin in the near-term. The first storage projects can accompany renewable energy installations and will endure over the long-term.

Consideration	Notes
Assumptions	- Renewable energy can be stored for use during peak electricity grid demand periods, reducing the amount of grid electricity (i.e. partially fossil fuel generated) required. - 50 MW total storage can be installed.
Schedule	- Storage is added with new solar PV and district energy generation systems starting in 2022, completed by 2050.
Audience(s)	- Generation and transmission utilities
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan
Partners	- Utilities - Renewable energy system owners and operators - Energy-focused local not for profit groups - Local First Nations
Resources required (besides funding)	- Staff time for engagement with partners - Staff time for systems siting and installation - External subject matter experts
Budget	- Estimated at ~$85M at current battery electric storage prices
Challenges	- Determining the optimal energy storage solutions to interface between the installed renewable energy capacity, end electricity uses, and the electricity grid - Financing installations - Availability of optimal storage technologies - Determining which systems the storage will be part of and who the owners/operators are
Next steps	- Consult with other cities on their energy storage approaches (e.g. Toronto, Sault St. Marie) - Engage a consultant to perform a feasibility study and determine the best energy storage options - Coordinate with partners on developing an energy storage installation schedule - Install energy storage in concert with new renewable energy systems
KPIs & reporting frequency	- Greenhouse gas emissions (tonnes/year) - Energy storage capacity installed (MW and MWh)

Low-carbon Energy Procurement Actions

Goal 17: Procure 100% of community-wide grid electricity and 75% of natural gas demand from renewable sources by 2050.

Timing: Studies can occur in the near-term while setting up the procurement system would likely take place in the medium-term.

Consideration	Notes
Assumptions	- Procurement of renewable electricity and RNG decreases emissions associated with grid electricity and natural gas use. - 75% of remaining natural gas use after energy efficiency and local biogas capture actions have been completed will be supplied by renewable natural gas procurement. - 100% of remaining electricity use after energy efficiency and local generation actions have been completed will be supplied by renewable electricity procurement.
Schedule	- Targets are met by 2050.
Audience(s)	- Energy consumers
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan
Partners	- Utilities - Transmission and distribution companies - Renewable energy suppliers - Subject matter experts
Resources required (besides funding)	- Staff time to coordinate with renewable energy suppliers
Budget	- +$0.01 to $0.03 per kWh
Challenges	- Sourcing credible renewable energy credits - Availability of sufficient RNG volumes - Legal/regulatory hurdles - Building local stakeholder support for program - Achieving cost parity with status quo

Next steps	- Engage subject matter experts to complete a preliminary study evaluating procurement options, including:
	  - Public-private partnerships (City, major property owners, large institutions) that sign long-term power purchase agreements with renewable energy developers
	  - Establishing a local (municipal) electricity retailer, allowing the City to purchase renewable electricity for all local customers that sign on
	- Following initial study, establish a stakeholder working group to identify/evaluate options, opportunities, and obstacles
	- Begin discussions with natural gas retailers and distributors about potential options for procuring RNG at scale

KPIs & reporting frequency	- Greenhouse gas emissions (tonnes/a) - Scale of community participation (MWh, as a percentage of total community electricity demand)

Carbon Sequestration Actions

Goal 18: Increase the reforestation effort of the Regreening Program.

Timing: This action is already being implemented through the Regreening program. It can be scaled up in the near-term.

Consideration	Notes
Assumptions	- Greater Sudbury's current afforestation efforts can be enhanced. - Local forestry knowledge can provide accurate estimates for local tree species carbon sequestration rates.
Schedule	- The current rate of carbon sequestration achieved by the Regreening program is substantially increased by 2050.
Audience(s)	- Public - Greater Sudbury Regreening Program
In which existing policies/ strategies/workplans can this action be embedded?	- Strategic Plan - Environmental Services Initiatives Workplan
Partners	- Landowners and farmers - National ecosystem and habitat not-for-profits (e.g. Scouts Canada, Ducks Unlimited, World Wildlife Federation, Sierra Club) - Community groups - Local First Nations
Resources required (besides funding)	- Staff time to consult on how to enhance afforestation programs - Staff time to coordinate with national and local not-for-profit groups - Staff time to plant trees
Budget	- TDB based on amount of saplings/year planted
Challenges	- Identifying and securing land and land agreements for planting - Cost of tree supply and planting workforce - Coordinating funding and volunteer efforts of not-for-profits - Monitoring tree growth - Managing competing land-use interests
Next steps	- Continue to consult with Laurentian College experts in determining land, tree species and number, and planting timeline requirements for the afforestation effort - Consult with Greater Sudbury Regreening Program staff to determine effort required to modify tree planting efforts in accordance with Laurentian College recommendations - If necessary, seek partnership and funding from national and local not-for-profit groups - Coordinate annual community tree planting events
KPIs & reporting frequency	- Annual number of trees planted - Greenhouse gas emissions sequestered (tonnes/a)

Appendix 2
Greater Sudbury
Electric Vehicle Study

Prepared by SSG

January 2018

Electric Vehicle Terms

Battery Electric/Plug-in Electric (BEV/PEV) Vehicles: Vehicles that rely solely on batteries and electricity and require electrical charging to refuel.

Plug-in Hybrid Electric Vehicles (PHEV): Vehicles that require plug charging and rely on internal combustion engines should their battery be insufficient.

Fuel Cell Electric Vehicles: Vehicles that convert on-board hydrogen to electricity for use in electric engines similar to that of BEVs. There are no tailpipe emissions and the byproduct is water.

Internal Combustion Engine (ICE) Vehicles: Vehicles whose engines are powered by gasoline, natural gas, or diesel.

Zero-Emissions Vehicle (ZEV): A synonym for battery or plug-in electric vehicle.

Contents

Executive Summary

Municipalities across Canada are increasingly looking to transform transportation in their jurisdiction to support their local economy, encourage diverse travel modes, and reduce emissions resulting from the sector. Electric vehicles (EVs) present an opportunity to reduce emissions, pollutants, and noise from urban environments and have therefore spurred new policies and incentives to encourage their uptake. In the context of policy making and incentives it is widely accepted that a multi-stakeholder approach is necessary for rapid uptake of EVs, including all levels of government and the private sector. Ontario has a proven track record in rapidly increasing EV uptake through provincial programs such as the "Electric and Hydrogen Vehicle and Charging Incentive Programs" where Ontario EV sales led the country, exceeding 4,500 vehicles annually. Municipalities across Ontario and Canada are applying different levels of effort to ensure EVs are well integrated into their community and can help meet climate goals.

Transportation is responsible for almost 40% of Greater Sudbury's greenhouse gas emissions and 30% of the city's energy use.[1] The dispersed nature of the city's homes and places of work, learning and recreation encourage driving to most destinations. One important strategy to reduce emissions in the transportation sector is to transition from internal combustion engine (ICE) vehicles to electric vehicles (EVs).

This report explores the potential energy and emissions reduction results of two scenarios in which the electric vehicle uptake rate is accelerated compared to the currently estimated market rate from now until 2050. Scenario modelling of electrification of transit, City fleets, personal vehicles, and industrial vehicles found the following:

Moderate Effort Scenario (by 2050)

- Transitions more than 16,000 ICE vehicles to EVs over the business as usual case;
- Reduces emissions by 1923.8 ktCO2e; and
- Reduces energy use by 29.6 million GJ.

Aggressive Scenario (by 2050)

- Transitions more than 82,000 ICE vehicles to EVs over the business as usual case;
- Reduces emissions by 2983.3 ktCO2e; and
- Reduces energy use by 42.4 million GJ.

Various EV uptake encouragement strategies available to a municipality that could be employed in either of the scenarios are detailed in the report. The areas of strategy concentration and their action recommendations are:

Municipal Policy Recommendations

- Update Building Development Applications, Building Permits, Rezoning and Retrofitting Policies
- Include EV Infrastructure Data in Building Records
- Update Relevant City Plans
- Update the Licensing, Regulating and Governing of Vehicles for Hire

Subsidies and Incentives

[1] From the energy and emissions inventory developed as part of the Greater Sudbury Community Energy and Emissions Plan (2019).

- Provide Business Licensing Subsidies
- Provide Property Tax Incentives
- Provide EV Purchase Subsidies
- Coordinate EV Bulk Buying
- Provide ICE Vehicle Retirement Incentives

Education and Marketing

- Develop an Overarching EV Campaign Branding Strategy
- Deliver a Public EV Awareness Campaign
- Deliver a Car Dealership Campaign
- Deliver a Workplace EV Promotion Campaign
- Deliver an Industry and Institutions Campaign
- Establish Partnerships

Charging Infrastructure Provision

- Deliver charging infrastructure in two phases: the first to create visibility and generate demand, and the second to create a connected city.
- Prioritize DC Fast Charging station installation over Level 2 and Level 1 chargers.
- Perform ongoing financial analysis to ensure capital costs, return on investments, and charging fees are up to date and appropriate as charging infrastructure costs change
- Engage with Hydro Sudbury for optimal charging station locations, and potentially cluster charging stations near Science North to capitalize on the Smart Micro Grid.
- Continuously monitor EV uptake and charging station use to enable proactive municipal programming that increases EV uptake

Governance and Leadership

- Update City Fleet Purchasing and Replacement Policies
- Showcase City Fleet EVs and Charging Stations
- Update City Purchasing Policies
- Hire an EV Strategy Manager in the Planning Services Division

1. Introduction

EVs and Sudbury's Low Carbon Future

Greater Sudbury's regional geography and urban development patterns result in reliance on private automobiles as the primary transportation mode (first as drivers and second as passengers). The transportation sector used 7.7 million GJ in 2016, representing 29.6% of total energy use. This yielded 539,385 tonnes carbon dioxide equivalent (tC02e), making the transportation sector responsible for a large portion of Greater Sudbury's total greenhouse gas (GHG) emissions (39.9%). Rural areas and places of employment are difficult to access without a personal vehicle due to long distances and lack of frequent transit. Public transit and walking have similar modal shares, with slightly less than 5% of trips each.

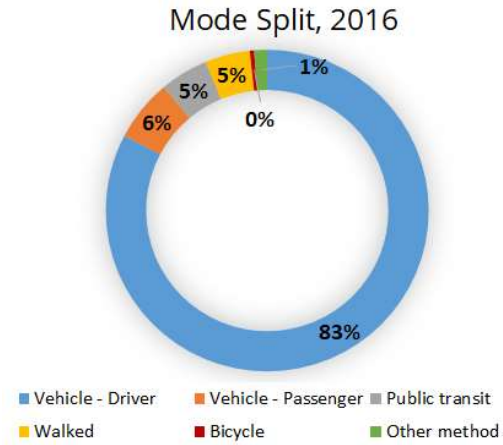


Figure 1: Transportation mode split, 2016.[2]

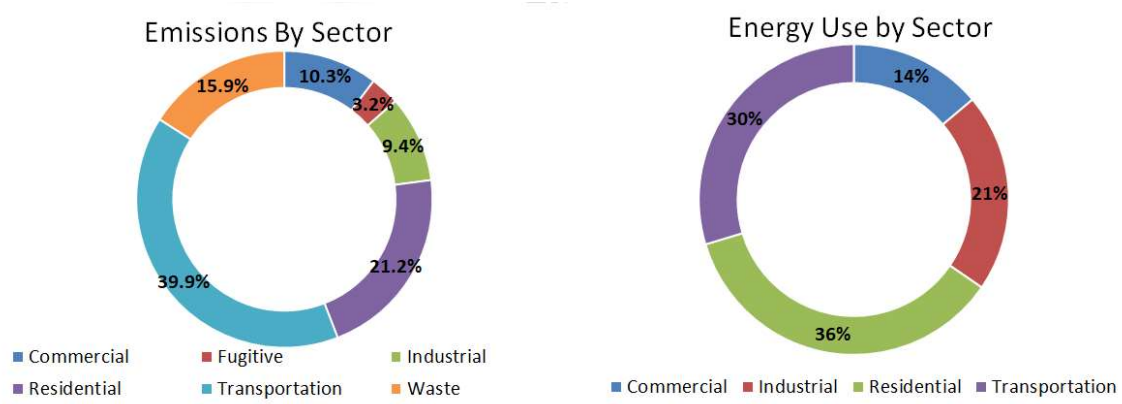


Figure 2. Emissions and energy in Greater Sudbury, 2016.

Light trucks consume most of the energy in 2016 (51%), followed by cars (42%) and heavy trucks (9%). Under a Business-as-usual approach energy consumption in cars declines by 51% in 2050 from 2016, as a result of fuel efficiency standards, saving nearly 2 million GJ. Heavy trucks show a slight decrease in energy consumption from 2016 to 2050 as a result of increased fuel efficiency.

Vehicle kilometres travelled (VKT) are estimated to increase in coming years, as a slight population increase results in greater vehicle ownership. Light truck ownership is projected to increase while car ownership decreases. This results in a decrease in average fuel efficiency across privately owned vehicles. Total VKT is projected to increase by 210,000,000 in the year 2051 compared to 2016.

[2] Census 2016, Greater Sudbury. Census Profile, Mobility and Transportation

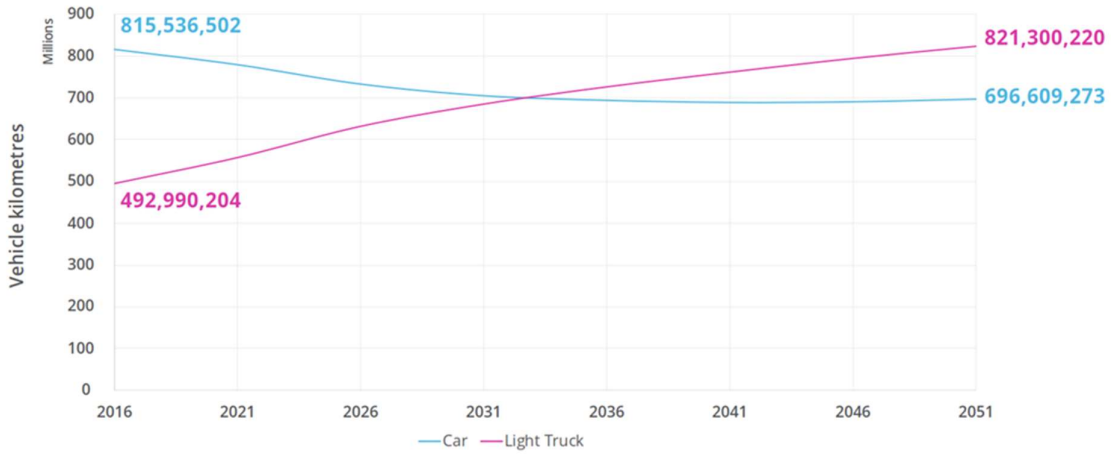


Figure 3: Personal vehicle ownership and vehicle kilometres travelled, 2016-2051.

Transportation will remain the largest emitting sector in Sudbury moving toward 2050, despite an anticipated reduction between 2016 and approximately 2032 owing to improved vehicle fuel efficiency standards, lower carbon fuels, and a small uptake of electric vehicles.

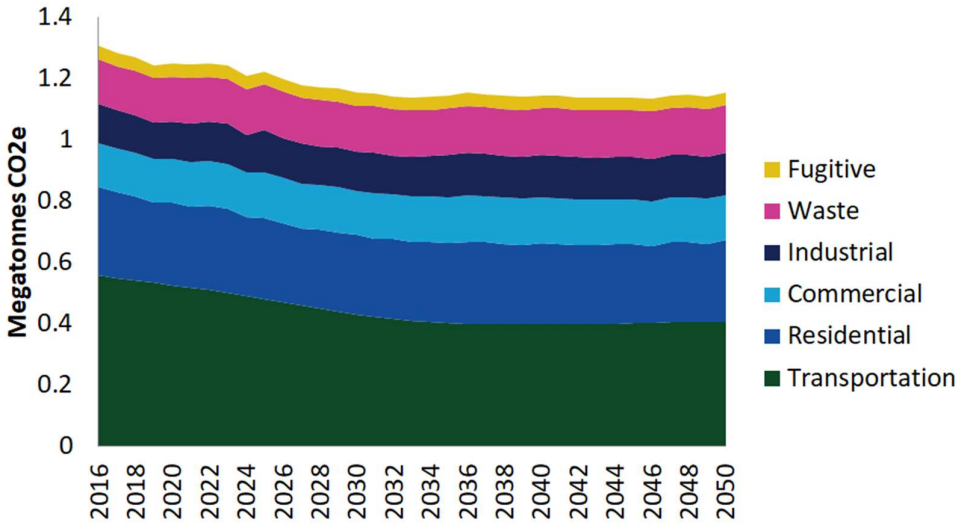


FIgure 4. Business as usual emissions projection, 2016-2050.

2. Background

Ontario Electric Vehicle Sales

The 2017 Long-term Energy Plan (LTEP) prioritized switching to electric vehicles and began a rebate program—awarding approximately $10,000 per vehicle—to equalize the cost of EVs with non-electric vehicles.[3] This program is on hold by the current government, but has a proven track record of success with electric vehicle ownership increasing incrementally year-over-year in Ontario, reaching 120% growth from 2016 to 2017.[4] The LTEP targeted 5% of new vehicle sales by 2020.[5] Despite this target and strong sales growth, EVs represented less than 1% of total vehicles sold in 2017.[6] It is unlikely that LTEP targets will be met in the current context, where EV rebates are no longer available. However, transitioning from combustion engine vehicles to EVs significantly reduces GHG emissions and remains a worthwhile strategy to pursue.

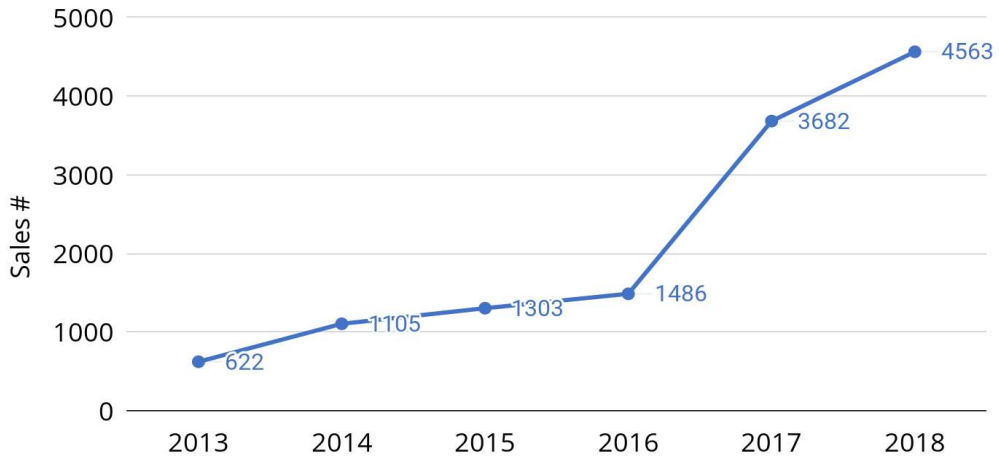


Figure 5. BEV sales in Ontario, 2013-2018.[7]

Electrical Capacity for Increased Electrical Vehicle Demand

Many municipalities and utility companies in Ontario have been considering electric load capacity should a dramatic increase in EVs occur. The IESO estimates that they are able to meet demand for the growing uptake for EVs in the near future, but this will need to be supplemented by increased low carbon energy or natural gas in the medium-term.[8] Demand for electricity creates a challenge but also an opportunity where municipalities can lead in creating local renewable energy under their own utilities to supplement grid electricity for EV use. More information on this topic is provided in the "Barriers" section.

[3] Ontario News Bulletin (2009) https://news.ontario.ca/mto/en/2009/07/a-plan-for-ontario-1-in-20-by-2020.html

[4] Sales Data provided by Fleetcarma. https://www.fleetcarma.com/electric-vehicles-sales-update-q1-2018-canada/ There is some agreement that sales were boosted before the termination of the EV granting program.

[5] Ontario News Bulletin (2009)

[6] New Motor Vehicle Sales: Ontario 2013-2018 https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=2010000101

[7] Sales Data provided by Fleetcarma. https://www.fleetcarma.com/electric-vehicles-sales-update-q1-2018-canada/

[8] "Preliminary Outlook and Discussion: Ontario Supply/Demand Balance to 2035." 2016. IESO, March 23. http://www.ieso.ca/-/media/Files/IESO/Document-Library/sac/2016/SAC-20160323-Ontario-Planning-Outlook.pdf?la=en.

Grid Emissions

The high GHG intensity of using fossil fuels to power vehicles means that EVs present a strong opportunity to reduce emissions in Ontario communities. The province's electricity grid offers a much lower GHG intensity factor (Figure 6).

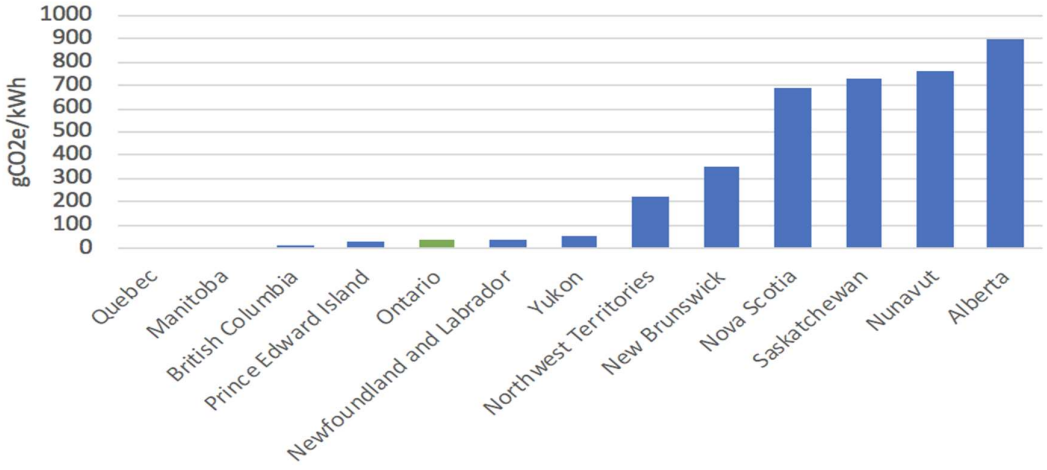


Figure 6. Electricity grid emissions by province.[9]

Ontario's electricity grid will continue to have a low emissions intensity, as Ontario's LTEP plans to meet new electrical capacity requirements with renewable capacity.[10] Currently, 58% of electricity is provided by nuclear energy, but the LTEP anticipates growth in wind energy. The relatively clean electricity means that electrification is a key strategy for GHG reductions for transportation sectors.

[9] Environment Canada (2018). National and Provincial/Territorial Greenhouse Gas Emission Tables. Retrieved from: http://data.ec.gc.ca/data/substances/monitor/national-and-provincial-territorial-greenhouse-gas-emission-tables
[10] Ontario Long-Term Energy Plan (2017) p. 43.

Electric Vehicles in Greater Sudbury

Registered Electric Vehicles

Data compiled by the Ontario Ministry of Transportation in 2018 gives an estimate of 125 registered EVs in Sudbury. This group includes both Plug-in Hybrid Electric (PHEV) and Battery-Electric (BEV).

Charging Stations

There are currently 11 charging stations in Greater Sudbury. These have been implemented largely under private initiative and the majority are located at car dealerships. Table 1 summarizes the location and charging type of Greater Sudbury's current charging stations.

Charger Type Definitions

Level 1	First generation technology. Uses 120V plug capacity and is capable of providing 65km driving distance in an 8 hour period and has been generally used for homes.
Level 2	Faster charging and increasingly common for homes and public charging stations. Uses a 240V plug capacity (washer and dryer outlets) and can charge up to 290km driving distance in 8 hours.
DC Fast Charger	Fastest charging method and public chargers increasingly use this infrastructure. Capable of charging up to 128-145km driving distance in 30 minutes.
Tesla Supercharger	Up to 275km driving distance in 30 minutes, but are only compatible with Tesla vehicles.

Table 1. Public charging stations in Greater Sudbury.[11]

Location	Charger Type
Ford Lincoln - Belanger Dealership, 204 Michael Street, Chelmsford	Level 2 Charger
Tim Horton's, 514 Notre Dame St E, Azilda	DC Fast Charger
Ionic Engineering, 95 Mumford Rd, Lively ON	Level 2 Charger
2404 Long Lake Road, Sudbury	Tesla Supercharger
Southside Chevrolet, 2601 Regent Street, Sudbury	Level 2 Charger
Science North, 100 Ramsey Lake Road, Sudbury	Level 2 Charger
Quality Inn Conference Centre, 290 Elgin Street South, Sudbury	Level 2 Charger
Sudbury Hyundai, 1120 Kingsway, Sudbury	Level 2 Charger
Audi Dealership, 1593 Lasalle Boulevard, Sudbury	Level 2 Charger
Nickel Centre International Truck Centre, 1035 Falconbridge Rd, Sudbury	Level 2 Charger
Mid North Mitsubishi Chargepoint, 2100 Kingsway, Sudbury	Level 2 Charger

[11] Chargehub: Sudbury. https://chargehub.com/en/charging-stations-map.html?lat=46.56832006126451&lon=-81.18976539154 05&locId=65301

Industry Trends

Cost of Batteries and Energy Density

As EV technology progresses, the cost to manufacture lithium-ion batteries decreases, resulting in lower vehicle purchase prices. From 2009 to 2015, battery manufacture costs decreased 73%. The cost is anticipated to continue decreasing by 53% toward 2023.[12] Bloomberg Energy reports that the cost to produce a battery pack in 2010 was $1000/kWh, dropping to $209/kWh in 2017.[13] The United States Department of Energy conservatively estimates that the cost will be $125/kWh by 2022.[14] Decreasing production costs has been accompanied by higher battery energy density enabling longer driving ranges, up to 200km.[15] Figure 7 illustrates the decreased cost of battery packs compared to the increase of energy density over time.

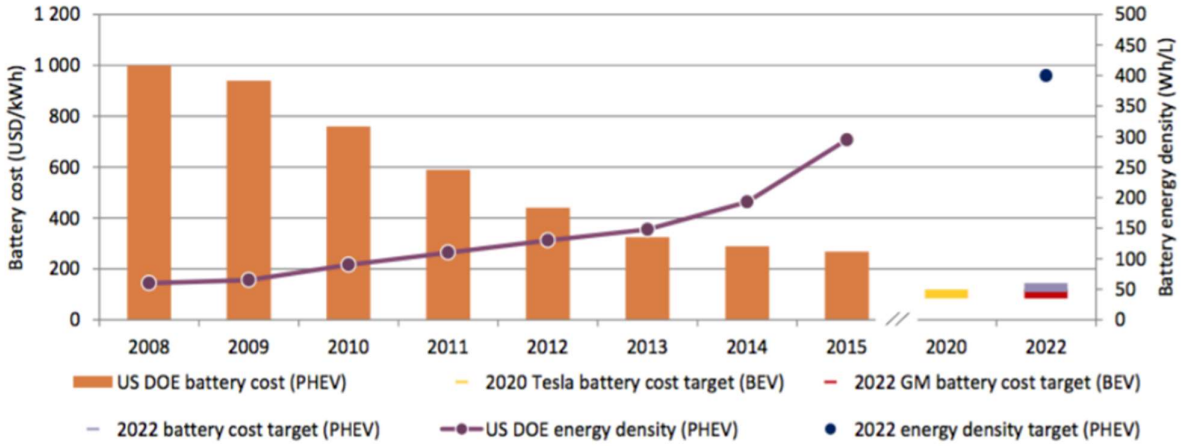


Figure 7. Battery production cost per kWh and energy density over time.[16]

There is some concern over the sustainability of lithium and cobalt supplies – key components of lithium ion batteries. The EV market and other lithium-ion battery markets are elevating the demand for these materials at increasing rates.[17] In the near-term, limits to supply of these metals could create material bottlenecks, increasing the cost of, and/or limit the supply of, EV batteries before battery technologies evolve to use other materials.[18]

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[12] An Analysis of Electric Vehicle Trends in Developed Nations: A Sustainable Solution for India. Farhan Faisal University of Illinois at Chicago, Chicago, IL.

[13] "Electric Vehicle Outlook." 2018. United States: Bloomberg New Energy Finance. https://about.bnef.com/electric-vehicle-outlook/.

[14] An Analysis of Electric Vehicle Trends in Developed Nations: A Sustainable Solution for India. Farhan Faisal University of Illinois at Chicago, Chicago, IL.

[15] Ibid

[16] Ibid.

[17] Lithium and Cobalt: A Tale of Two Commodities. McKinsey & Company, 2018. https://www.mckinsey.com/industries/metals-and-mining/our-insights/lithium-and-cobalt-a-tale-of-two-commodities

[18] Olivetti, Elsa & Ceder, Gerbrand & Gaustad, Gabrielle & Fu, Xinkai. (2017). Lithium-Ion Battery Supply Chain Considerations: Analysis of Potential Bottlenecks in Critical Metals. Joule. 1. 229-243. 10.1016/j.joule.2017.08.019. https://doi.org/10.1016/j.joule.2017.08.019

Charging Behaviour

Cities and provinces are increasing the number of public charging stations available. This has several benefits including creating awareness of the technology, adding assurance that drivers can charge while taking a variety of trips, and allowing residents who do not have off-street parking to charge their vehicles.

80-90% of charging currently happens at home, likely during evening hours.[19] Level 2 Chargers provide a full charge over an 8-hour period and are amenable to in-home installation, as the charger fits contemporary laundry machine or deep freeze plugs. Outdoor charger installation may require an electrician, but it is a minor procedure. Home charging does not currently present any issues with grid electricity supply, but increased EV uptake may require policy intervention and/or infrastructure upgrades.

EV users increasingly prefer to charge their vehicles at work. A study on consumer preference reported that purchasers would be 20% more likely to choose an EV if there were chargers at their workplace.[20] Greater charging infrastructure at work has several benefits, including reduced need for public chargers, and the potential to use solar PV generated electricity for charging.

EV Model Diversity

Lack of variety in the early stages of EV production presented a sales barrier. Also, to some the EV aesthetic was unattractive and deterred their purchase.[21] An increasing number of vehicle manufacturers now produce different EV models, as shown in Figure 8.

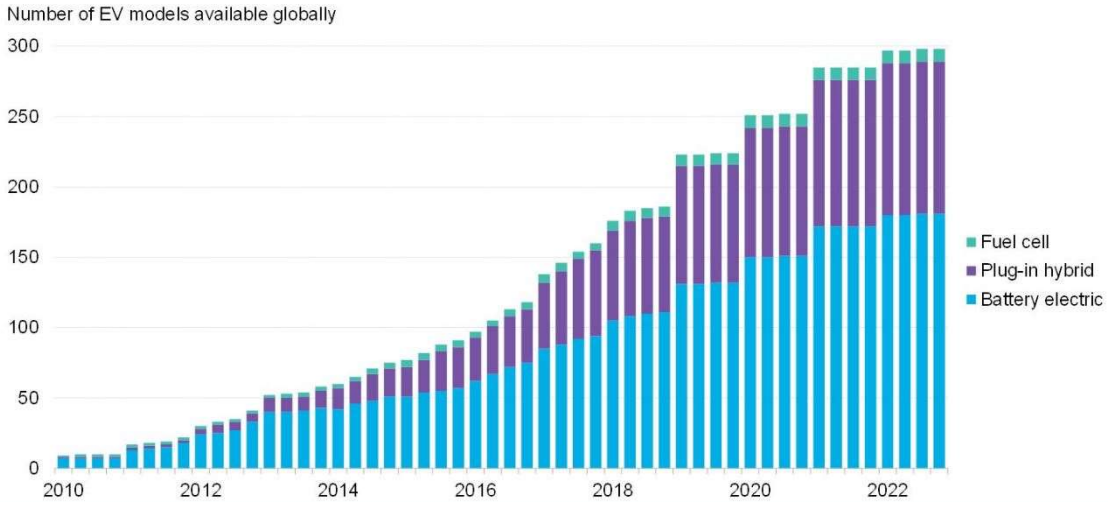

Figure 8. EV model diversity over time.[22]

[19] Plugn'Drive Canada: https://www.plugndrive.ca/wp-content/uploads/2017/07/160159_ElectricVehicleReport_R001.pdf
[20] Hall, Dale, and Nic Lutsey. 2017. "Emerging Best Practices for Electric Vehicle Charging Infrastructure." White Paper. USA: International Council on Clean Transportation. https://www.theicct.org/sites/default/files/publications/EV-charging-best-practices_ICCT-white-paper_04102017_vF.pdf
[21] Plugn'drive Canada: Market Report.
[22] Bloomberg New Energy Finance, Marklines. 2018. Retrieved from: https://twitter.com/colinmckerrache

Heavy Duty Vehicles and Transit Fleets

Electrifying commercial, industrial, and transit vehicles presents a larger challenge than personal vehicles due to the greater size and weight of vehicles, the distance of daily travel for shipping, and the absence of widely-distributed vehicle charging stations. Commercial vehicles that operate solely within urban areas or industrial face lower barriers due to shorter trips and greater charging stations availability. There is promise of new technologies as major companies such as Daimler and Tesla have announced the launch of electric semis able to operate for similar distances as most long distance freight trucks operating today.[23] Many different transit authorities across Canada have tested electric buses and have begun to make commitments to electrify their fleets.

[23] Lambert, Fred. "Daimler Unveils Electric E-Cascadia Semi Truck to Compete with Tesla Semi, Launches Electric Truck Group." Electrick, June 9, 2018. https://electrek.co/2018/06/07/daimler-electric-semi-truck-ecascadia-tesla-semi/

Discussion: Electric Vehicle Uptake Without Intervention

The trends presented above indicate continued increases in EV ownership in Ontario and Sudbury. With falling material prices, EVs are expected to be price competitive with internal combustion engine vehicles by 2024 or sooner, depending on battery price.[24] The Bloomberg report refers to two potential barriers to greater uptake: the availability of cobalt to produce batteries, and the availability of charging facilities for users.[25]

There are 3 types of EV consumers: pioneers, potential early mainstream PEV buyers, and potential later mainstream PEV buyers. Characteristics of the group are summarized in Table 2.

Table 2. Consumer groups and electric vehicles.[26]

Consumer Group	Characteristics
EV Pioneers	This group represents the very first group of buyers, who are generally enthusiasts of the technology, but represent a small market share. Pioneers are likely to have higher income and education levels. This group generally has pro-technology and pro-environmental values.
Potential early mainstream EV buyers	This group represents a larger proportion of consumers. Early mainstream EV buyers will wait until the technology is widely proven and accepted.
Potential later mainstream EV buyers	This group also represents a large market segment. They may become buyers at a future date, but changes in policy, costs, technology, or cultural norms are required.

Consumer surveys and interviews suggest that all three groups would prefer or need some form of incentive in order to purchase an EV (inclusive of the pioneers group).[27] There is some likelihood that the industry trends covered in the previous section will meet the needs of the pioneer group and a proportion of the potential early mainstream EV buyers group.

Significant incentives are needed to meet the greater needs of the early mainstream EV buyers, and even more for the potential later mainstream EV buyers. This may include increased visibility and availability of charging stations, increased knowledge of the technology, and price incentives for vehicles and home chargers. For the later mainstream group who has no current interest in purchasing an EV, policies that would push them towards EVs may include carbon pricing, vehicle taxes, or road pricing that targets internal combustion engine (ICE) vehicles. When surveyed, the potential early and later mainstream EV buyers often referred to price incentives as the major

[24] Electric Vehicle Outlook, 2018. Bloomberg.
[25] Ibid.
[26] Axsen, John, Suzanne Goldberg, and Joseph Bailey. 2015. "Electrifying Vehicles: Insights from the Canadian Plug-in Electric Vehicle Study." Simon Fraser University: Sustainable Transportation Research Team. http://rem-main.rem.sfu.ca/papers/jaxsen/Electrifying_Vehicle_(Early_Release)-The_2015_Canadian_Plug-in_Electric_Vehicle_Study.pdf.
[27] Ibid.

incentive that would convince them to purchase an EV, but greater stability in the technology will also be required to ensure EVs meet their needs.[28]

Intervention from different groups is also needed to promote knowledge about EVs and about incentives when they become available. Plug'n Drive Ontario released a consumer survey that found that potential car consumers were unaware of any vehicle incentives, reduced costs over time from driving an EV, and unaware of GHG emissions resulting from ICE vehicles.[29] Specific to driving and charging, other surveys found that a large proportion of vehicle consumers were unaware of nearby charging stations, the distance that an electric vehicle could travel on a charge, or how to charge an EV.[30] Relaying information about the cost savings of owning and operating EVs versus ICE vehicles to the public is a simple step EV proponents can take (Figure 9).

Industry trends suggest that EVs will become cheaper and reduce the price gap with ICE vehicles, but more incentives, awareness campaigns, and policies will be required to increase EV uptake. These actions are especially necessary to meet 2050 emissions targets.

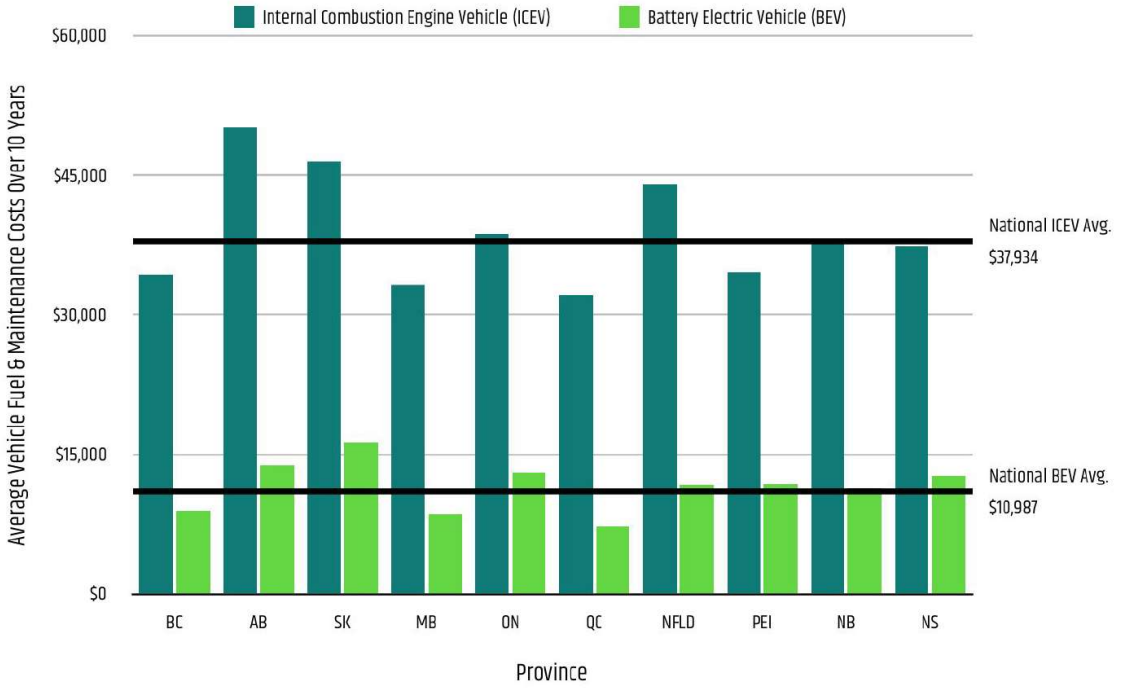

Figure 9: Average 10-year fuel and maintenance costs of ICE vehicles and BEV per household.[31]

[28] Ibid.
[29] Driving EV Uptake in the Greater Toronto and Hamilton Area. Plug'nDrive. May 2017. http://www.plugndrive.ca/wp-content/uploads/2017/07/EV-Survey-Report.pdf
[30] Electrifying Vehicles: Insights from the Canadian Plug-in Electric Vehicle Study.
[31] 2O Institute, 2018. *Comparing Fuel and Maintenance Costs of Electric and Gas Powered Vehicles in Canada*. https://www.2degreesinstitute.org/reports/comparing_fuel_and_maintenance_costs_of_electric_and_gas_powered_vehicles_in_canada.pdf

3. Policies and Programs to Promote EV Uptake

There are two main approaches to encourage potential buyers to choose EVs: through "push factors", which may add fees or "penalize" someone from choosing to drive a gas or diesel powered vehicle, and "pull factors" which encourage or make it more convenient and accessible to use electric vehicles. Push factors such as road pricing, carbon pricing, and vehicle taxes require participation and approval from senior levels of government and other stakeholders, but several other policy measures are available to municipalities. A summary of push and pull factors is provided in Figure 10.

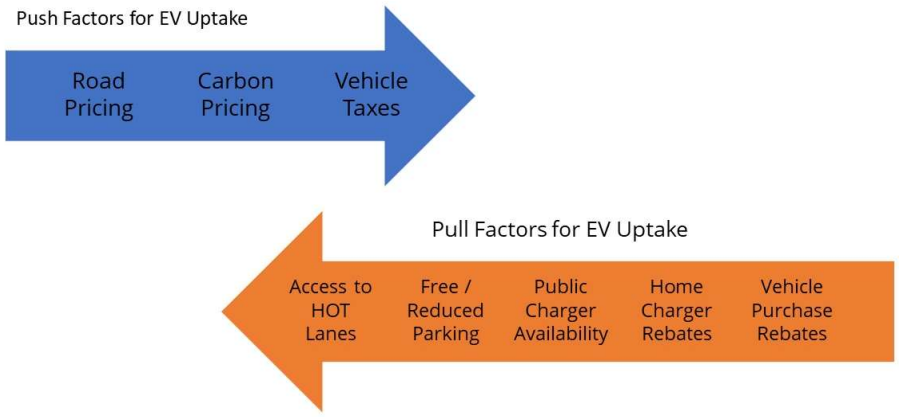

Figure 10. Push and pull factors for EV uptake.

Provincial and Federal Policies and Funding Programs

Funding, awareness, and incentive programs stemming from the Federal and Provincial government will continue to be the strongest levers in an EV strategy. These programs may periodically be put on hold or be given increased funding depending on priorities. Both the Federal and Provincial Governments are capable of providing large financial incentives to consumers and reducing the current price gap between EVs and ICE vehicles.

Federal Policies and Funding

The Energy Innovation Program (EIP) 2016[32]

Commencing in 2016, Natural Resources Canada (NRCan) received $49 million over 3 years to support clean energy initiatives. This program is supported by the Federal Government with the intention of transitioning to a low-carbon economy. Priority areas of the program are:

- Renewable, smart grid and storage systems;
- Reduced diesel use by industrial operations in northern and remote communities;
- Methane and VOC emission reduction;
- Reduced GHG emissions in the building sector;
- Carbon capture, use and storage; and
- Improved industrial efficiency.

[32] Energy Innovation Program (EIP), information retrieved from: https://www.nrcan.gc.ca/energy/funding/icg/18876

This program has funded multiple zero emission vehicle programs across the country including projects such as: EV charging stations across the Trans-Canada Highway, developing electrical safety standards for EVs in Canada, the Electric Mobility Adoption and Prediction Tool, and battery density studies for EVs.

Federation of Canadian Municipalities (FCM) Green Municipal Fund[33]

The FCM provides funding and knowledge services to support sustainable and low-carbon actions in cities. The Green Municipal fund provides funding for plans, feasibility studies, pilot projects, and capital projects. One strategy area is under "Transportation and fuel efficiency" where municipalities have applied to fund initiatives to green their fleets, developing city-wide EV strategies, and start-up the process to install EV charging stations across a city. For example, FCM helped the City of Vancouver launch their EV strategy commencing in 2005. It includes a network of public charging sites across the city, updating building code requirements to be EV-ready, updating the municipal fleet, and having a fast charging demonstration project.[34]

Pan-Canadian Framework[35]

In December 2016, the Government of Canada adopted the Pan Canadian Framework on Clean Growth and Climate Change with the goal to reduce GHG emissions and build resilience to adapt to a changing climate. The framework had a 2016 budget proposal to invest in strategies to reduce GHG emissions from transportation and fuel emissions among a diversity of other sectors. This investment includes $3.25 million in funding for electric and alternative fuel vehicle information technology development; an additional $62.5 million to fund charging infrastructure and research for the next generation of recharging technologies.

Provincial Policies and Funding

The Province of Ontario has a proven track record through previous incentive programs to aggressively increase EV uptake within the province. Recent initiatives such as the Electric Vehicle and Charging Incentive Program, The Cap and Trade program for emissions, and the Green Climate Fund were all proven to move the province away from ICE vehicles and their related emissions. Should policies around these areas return in the future, there is an increased likelihood of meeting aggressive goals for EV uptake.

[33] Green Municipal Fund, retrieved from: https://fcm.ca/home/programs/green-municipal-fund/what-we-fund/eligibility/transportation-funding.htm
[34] Vancouver EV strategy 2011-2016, Green Municipal Fund. Retrieved from: https://fcm.ca/home/awards/sustainable-communities-awards/past-winners/2014-winners/2014-transportation.htm
[35] Government of Canada. Pan-Canadian Framework on Clean Growth and Climate Change: http://publications.gc.ca/collections/collection_2017/eccc/En4-294-2016-eng.pdf

Municipal Policies for Electric Vehicles

Municipal policies and incentives are strongest when paired with those of senior levels of government. If senior support is lacking, municipal efforts can still spearhead policy to promote awareness and provide strategic infrastructure for EVs and to encourage uptake.

Table 3. Sample municipal policy initiatives for EV adoption.

Policy	Description
Gas station retrofits and new development	As gas stations renew or are developed,[36] a bylaw that mandates EV charging infrastructure be placed on-site can increase EV charging spots within the city.
Update Zoning and Building bylaws for residential and commercial buildings	For new multi-family, commercial, or mixed-use developments within Greater Sudbury, EV chargers installation can be mandated. Alternatively, new developments can also be "EV ready" by providing plug capacity for level 2 chargers (240 V).
EV charging stations on municipal land	Greater Sudbury can make use of municipal lands to begin providing greater public EV charge points for drivers in the community. Recreation, cultural centres, government buildings, or utility buildings can help a municipality to begin developing a network of charge points.
Municipal bulk EV purchases	A municipality can partner with large employers (hospitals, universities, school boards, taxi companies, and industrial employers) to purchase EVs in bulk. This approach has been pioneered by the US Coalition of Mayors who issued a Request for Proposals to purchase more than 100,000 EVs.[37]
City fleet renewals	The city vehicle fleet can renew every 30 years or less, and policy to renew the fleet to be electric will allow the municipality to lead the community to a low-carbon future. Renewal can also be accelerated with a cost analysis of EV versus ICE purchase and operating costs that shows the ideal transition time for vehicle replacement with EVs. This policy can work in tandem with the bulk purchases policy above.
Taxi bylaw	A proposed bylaw change requiring that all new taxis transition to low-carbon sources at time of renewal, a 10-year period under Greater Sudbury's current bylaw.
Transit fleet renewal	The Greater Sudbury Transit provider has 58 buses running primarily on diesel fuel or as hybrid-diesel. Transit electrification can have large emission reductions while encouraging EV uptake in the community.
Residential subsidies for home chargers	A subsidy or rebate program for residences to purchase home chargers can help new vehicle buyers choose EVs and provide security in always having an available charge point.
Workplace subsidies	Subsidies for workplaces to install chargers for EV drivers to charge while at work can provide confidence that commuters can get home and to work.
Prioritized parking	Greater Sudbury can allow priority parking for EVs.

[36] e.g.: Petro Canada stations charging initiative: https://www.petro-canada.ca/en/personal/fuel/alternative-fuels/ev-fast-charge-network

[37] Lambert, Fred. 2017. "U.S. Cities' Massive Electric Vehicle Order Increases to 114,000 Vehicles, ~40 Companies Competing." *Electrek*, March 15, 2017. https://electrek.co/2017/03/15/electric-vehicle-order-114000-vehicles-40-companies-competing/

Supporting Industrial Fleet EV Transition

Electrification can be a benefit to industry in two major ways: reducing expenses related to fuel, and reducing air pollutants from diesel vehicles associated with industrial activity. Heavy duty vehicles rely more on diesel fuel for energy, which has lower costs but produces more particulate matter, and can be dangerous to human health in confined areas such as Greater Sudbury's mines.

Municipal authorities' influence in transitioning industrial and commercial fleets towards electrification is limited. Commercial and industrial businesses in Sudbury have an interest in reducing their costs through reduced fuel use and vehicle maintenance costs and should be motivated to make the transition to electricity where feasible. However, if there is no financial benefit to transition, there is less incentive to make the switch. Policies such as carbon pricing can be effective in encouraging industries to use more efficient and low carbon vehicles, but intervention from senior levels of government are typically required to implement such tools.

A non-traditional method that cities can use to partner with large institutions or industry is to create bulk purchase agreements. The region can create an RFP to order new vehicles fleets for itself and other organizations to reduce the overall purchase costs due to a large and consistent order. As mentioned in the table above, US Cities including Los Angeles, San Francisco, Portland, and Seattle put a group order exceeding 100,000 electric vehicles to renew their fleets.

Other methods for encouraging electric vehicles in industrial fleets include using information such as reduced energy costs, reduced time and cost on maintenance of vehicles (Figure 10), reduced particulate matter, exhaust, and pollution in closed environments (mines) that accompany heavy-duty diesel vehicles, and lower carbon mining processes.

4. EV Policy Benchmarking, Successes and Challenges

Many municipalities have begun to set electric vehicle targets and initiatives. Table 4 summarizes a varying degree of resources dedicated towards increasing EV adoption depending on community size and ambition. Larger cities featured in the table below have seen higher rates of EV uptake than smaller to this point, and have increased infrastructure available. Other cities are considering strategies for more home charing. Most cities have set a goal to convert their municipal fleet to electric.

Table 4. Electric vehicle benchmarks in other jurisdictions.

City/Region	Public EV target or / EV policy	Existing Stations [38]	Transportation Emissions	Emissions Target
Kingston[39]	• Increase charge points from 8 to 50, with 2 DC fast chargers • Add 62 Charging Stations in partnership with Tesla at Kingston University	40-50	422,000 tCO2e, representing 30% of Kingston's total emissions	Reduce emissions by 15% by 2020, and 30% by 2030
Toronto[40,41]	• Install 14 curb-side charging stations using existing telephone poles, in addition to 5 existing stations • Scale up charging stations depending on demand	80-100	6 million tCO2e, (31% of community emissions)	Reduce community emissions 80% by 2050
Guelph[42,43]	• Consider adding Home-charging stations as part of residential retrofit program • Make transit 100% electric • Incrementally green the municipal fleet	12-15	347,000 tCO2e, (32.4% of community emissions)	Net Zero Carbon by 2050
Ottawa[44,45]	• Incrementally increase the municipal fleet to 100% electric • Partner with Hydro-Ottawa to	60-70	2.1 million tCO2e (42% of community emissions)	Reduce emissions by 80% by 2050 from 2012 levels

[38] Approximate counts based on Chargehub mapping, stations can have multiple ports. "Charging Stations Map." n.d. Chargehub. https://chargehub.com/en/charging-stations-map.html.
[39] Kingston EV Strategy (2017): www.cityofkingston.ca/residents/environment-sustainability/climate-change-energy/electric-vehicle-charging-stations
[40] Transform TO Baseline Report (2016). Prepared by SSG.
[41] "Preparing Toronto for Electric Vehicles." 2017. Report to Committee. City of Toronto. https://www.toronto.ca/legdocs/mmis/2017/pw/bgrd/backgroundfile-107507.pdf.
[42] Guelph Baseline Emissions Analysis, 2016. Prepared by SSG.
[43] "Guelph Community Energy Initiative." 2018. Report to Council. Our Energy Guelph. Guelph, Ontario: City of Guelph. https://guelph.ca/wp-content/uploads/cow_agenda_050718.pdf#page=53.
[44] City of Ottawa Baseline Emissions (2016). Prepared by SSG.
[45] "Ottawa's Community Energy Transition Strategy - Phase 1." 2017. Energy Evolution. Ottawa: Planning, Infrastructure and Economic Development. https://documents.ottawa.ca/sites/default/files/energy_evol_phase1_en.pdf.

	keep pace with demand for charging stations			
Ontario[46]	• 5% of new vehicles sold are electric by 2020 • Install 500 public charging stations across the province	1400+	58.7 MtCO2e, representing 34% of provincial emissions	GHG Goal: *Currently Under Review*
Vancouver[47, 48]	• 22% of Vehicles are electric by 2050 • Install 20 curbside chargers as a pilot, 20 charging stations at community centres, and 8-10 additional stations across the city • Incrementally increase municipal vehicle fleet to 100% electric	80-100	815,000 tCO2e, representing 30% of community-wide emissions	Reduce community-wide emissions by 80% by 2050 from 2005 levels
Montreal[49]	• Install 1,000 charging stations by 2020 • 100% of new bus orders are electric by 2025[50] • Incrementally increase municipal vehicle fleet to 100% electric	400+	4.6 million tCO2e (40% of total emissions)	Reduce city GHG emissions by 30% by 2020 from 1990 levels, and 80% by 2050

EV Strategy Successes to Date

Many cities are seeing an uptake of electric vehicles and see this as an opportunity to move towards a low-carbon economy. Vancouver has seen a 70% growth in EV ownership from 2011 to 2018.[51] As a response, the city created their goals for an EV "Ecosystem" to push this trend forwards. Quebec has been consistent and aggressive with their EV policies and has led the country in EV sales other than 2017 where Ontario surpassed them.[52] Through the Electric-Circuit Initiative, Quebec has established a goal of creating charging stations throughout the province to provide options for residents to travel province-wide without risk of losing their charge. The province currently has 130 DC fast chargers and targets an additional 1,600 in 10 years.[53] The City of Montreal has targeted electric vehicles as a significant pathway to meet their climate goals, and has successively installed 200 charging stations annually, alongside being a

[46]"Ontario Long-Term Energy Plan 2017." 2017. Delivering Fairness and Choice. Ontario: Ministry of Energy. https://files.ontario.ca/books/ltep2017_0.pdf.
[47] City of Vancouver. 2015. "Renewable City Strategy- 2015-2050." http://vancouver.ca/files/cov/renewable-city-strategy-booklet-2015.pdf.
[48] "Vancouver's EV Ecosystem Strategy." 2016. Renewable Energy Strategy. City of Vancouver: Engineering and Sustainability. https://vancouver.ca/files/cov/EV-Ecosystem-Strategy.pdf.
[49] "SUSTAINABLE MONTRÉAL 2016-2020." 2016. Ville De Montreal. http://ville.montreal.qc.ca/pls/portal/docs/page/d_durable_en/media/documents/plan_de_dd_en_lr.pdf.
[50] "Electric Bus: 365 Days and 8,781 Charges Later." n.d. Transit. Société de Transport de Montréal. http://www.stm.info/en/about/major_projects/bus-network-electrification/electric-bus.
[51] Vancouver EV ecosystem strategy.
[52] Fleet Carma Outlook.
[53] "Québec Introduces Bill to Promote the Establishment of a Public Fast-Charging Service for Electric Vehicles." 2018. Government. The Electric Circuit. May 15, 2018. http://news.hydroquebec.com/en/press-releases/1356/quebec-introduces-bill-to-promote-the-establishment-of-a-public-fast-charging-service-for-electric-vehicles/.

pioneer for electric buses. Laval, QC is the first Canadian city to offer a rebate program for electric vehicles for $2,000 to enhance the provincial rebate program, and has extended the program due to its popularity.[54] More case study success stories can be found in Appendix 2.

Public Charging Stations Background

Research suggests there is a relationship between the availability of public charging infrastructure and greater uptake of EVs. Best practices from European cities show that availability of public chargers can influence buyer behaviour, especially when paired with other incentives. The figure below illustrates public charge points in various cities compared to the number of EVs and the respective population. Many European cities with older building stock do not have off-street parking for cars, thus increasing the importance of public charging infrastructure. North American cities such as San Francisco, Los Angeles, and San Jose have a newer building stock built with requirements for off-street parking, making home charging more viable.

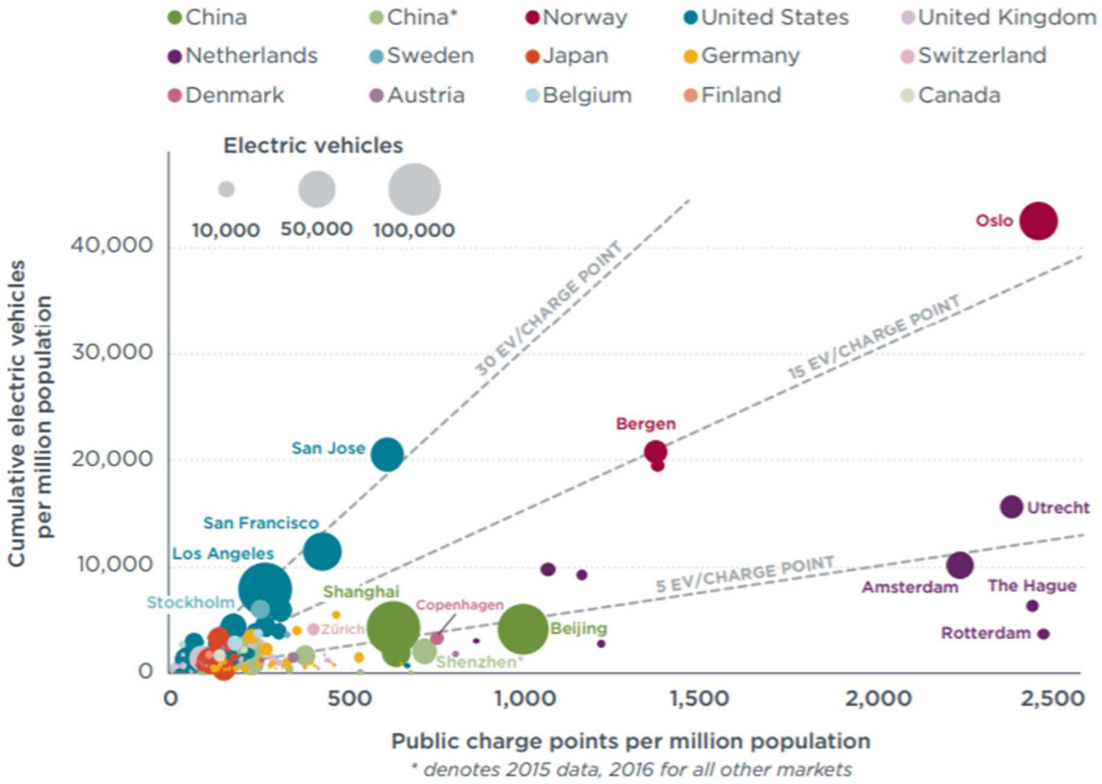

Figure 11. Charge points compared to EV cars in use.[55]

Sudbury's housing stock has a large share of single-detached housing (62.1%) enabling the City to consider initiatives such as incentivizing home charging or workplace charging in addition to public charging stations. Consultation with residents to understand the demand for EVs and how they intend to use and charge vehicles will be critical to develop a strong charging network for the city.

[54] CBC. 2018. "Laval Extends Electric-Vehicle Subsidy in Response to High Demand," October 15, 2018. https://www.cbc.ca/news/canada/montreal/laval-electric-vehicle-subsidy-demand-1.4864028.
[55] ibid.

Barriers to EV Ownership and Charging

Consumer Barriers

There are four major consumer barriers that prevent faster uptake of electric vehicles[56]:

1. **Low model diversity:** EV models are limited. Many drivers prefer light trucks, sport utility vehicles, or family-sized vehicles, which are not widely available as EVs. This barrier has decreased—and will continue to decrease—over time as vehicle manufacturers join the EV marketplace and offer additional models.

2. **Up-front cost:** EVs are more expensive to purchase than their ICE counterparts. For example, a 2017 Nissan Leaf will be priced at $36,000 CAD compared to a 2017 Honda Civic at $23,000 CAD.[57] In the absence of subsidies, this discourages EV purchases. However, providing operating cost information to drivers can help overcome this barrier.

3. **Range-Anxiety:** A fear of battery depletion before a trip or several trips are concluded may prevent consumers from choosing EVs, despite the vast majority of trips being short and the average driving distance of EVs greatly exceeding typical total daily driving distance. Furthermore, when people consider the option to purchase a new vehicle there is a tendency to think of long-distance trips (vacations, road trips) and believe that EVs are not be capable of travelling that distance.

4. **Lack of Convenient Public Charging:** Many cities are in their infancy for publicly available charging stations. As stations are not yet ubiquitous in cities, there is less signalling for drivers that they can take a number of trips in different areas of a city and be assured that they will be able to return home.

"Lock-in" Effect of Technology

In addition to these consumer barriers, there is also a charging infrastructure barrier with building owner/operators who may be resistant to upgrading buildings' charging technology (i.e. Level 1 to Level 2, Level 2 to DC Fast). This barrier may be due to a lack of willingness to pay the capital costs of the upgrades and/or the perception that charging infrastructure is bound to change in the short term and they should wait and see.

Electric Grid Capacity and Safety

EV charging has the potential to use vast amounts of power, and although it currently does not pose any substantial risk to the grid according to the IESO, this is an issue to consider by authorities as the market grows. The increasing number of DC Fast Chargers presents an upcoming challenge due to the high amounts of energy required over a short period of time (1 hour or less). This challenge can grow with greater EV uptake and if consumer demand pushes for even faster charging.

Research completed by the City of Toronto, under the TransformTO program has shown that early EV adopters tend to cluster in specific neighborhoods and share similar charging patterns,

[56] "Accelerating the Deployment of Plug-In Electric Vehicles in Canada and Ontario." 2017. Plug'ndrive Canada. http://www.plugndrive.ca/wp-content/uploads/2017/07/160159_ElectricVehicleReport_R001.pdf.
[57] "New vehicle estimates: Honda Civic, Nissan Leaf." Carcost Canada. https://carcostcanada.com/

for instance between 7pm and 9pm.[58] As a peak demand issue, multiple vehicles charging on the same street simultaneously could potentially lead to localized electrical service disruption, particularly as the number of EV owner households increase.

Toronto Hydro, as a local energy provider, is actively working on this issue and in 2016 completed the Charge TO project with its industry partners to manage local electrical impacts. Toronto Hydro has also created web-based educational material and various social media material towards encouraging EV charging to avoid local impacts. A best practice at this time is to ensure that charging stations are placed near high-capacity electrical infrastructure.

Municipal Authority and Jurisdiction

Provincial subsidies offsetting EV prices were effective in increasing uptake, however funding for these initiatives has waned. As financial incentives are considered one of the major incentives to encourage EV uptake, municipalities will find it difficult to fill this incentive gap. Although municipal subsidies could be provided, they may detract from other competing City interests such as public amenities or affordable housing.

Policies such as carbon pricing can also discourage vehicle trips, or encourage EV ownership by increasing costs related to fossil fuels and thereby tipping the scale to choose alternative modes of travel. These "push" policies are generally under the jurisdiction of the Provincial or Federal government, however.

Legal Considerations

With expanded workplace charging or privately owned curbside charging, Greater Sudbury may be required to work with the IESO and/or local utilities to ensure that businesses or individuals can (re)sell electricity on fee-based charging systems.

[58] "Preparing Toronto for Electric Vehicles." 2017. Report to Committee. City of Toronto. https://www.toronto.ca/legdocs/mmis/2017/pw/bgrd/backgroundfile-107507.pdf.

5. Analysis

EV Stock and Emission Scenarios

Three scenarios were modelled to explore energy and emissions effects of different EV uptake scenarios: Business as Usual (BAU), Moderate, and Aggressive, as detailed in Table 5.

Table 5. EV uptake scenarios and assumptions.

Vehicle Type	BAU (no extra efforts or actions)	Moderate (concerted municipal effort to increase EVs)	Aggressive (every possible municipal effort is made to increase EVs)
Passenger	Based on current market trends, EV sales constitute 3% of all new personal vehicles by 2040.	Based on 30@30 Scenario by the International Energy Agency:[59] • 30% of Vehicle sales are electric by 2030 • 40% by 2040 • 50% by 2050	A scaled up approach to the IEA projections • 50% of vehicle sales are electric by 2030 • 100% by 2050
Municipal fleet, commercial/ industrial fleets	No change	100% of municipal and industrial fleets are electric 2040	100% of municipal and industrial fleets are electric by 2030
Public transit fleet	No change	100% of transit fleet is electric by 2040	100% of transit fleet is electric by 2030

Table 6. Modelled Greater Sudbury EV stocks by scenario, 2035 and 2050.

	BAU	Moderate	Aggressive
Total 2035 modelled EV stock	2,455	16,528 (over 14,000 more than BAU)	18,936 (over 16,000 more than BAU)
Total 2050 modelled EV stock	4,612	38,012 (over 33,000 more than BAU)	82,474 (almost 78,000 more than BAU)

Both the Moderate and Aggressive Scenarios represent a vast increase in EV uptake over the BAU Scenario. A variety of EV purchasing incentives and programs, charging station implementation strategies, and promotional strategies would be required to achieve such accelerated uptakes.

[59]"Global EV Outlook." International Energy Agency, 2018. https://webstore.iea.org/download/direct/1045?fileName=Global_EV_Outlook_2018.pdf.

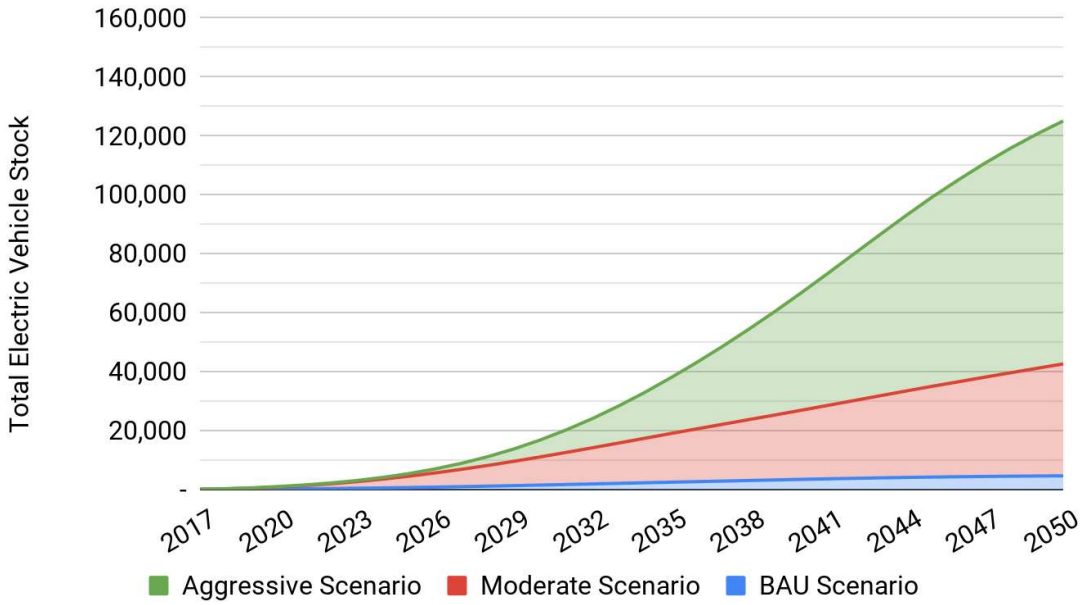

Figure 12. EV Uptake projections for the BAU, Moderate, and Aggressive Scenarios.

Under the Aggressive Scenario, a small proportion of vehicles remain as gas powered internal combustion engine by 2050, and the majority (90%) becomes electric. The figure shows the growth from 22 battery electric vehicles in 2016 to over 82,000 in 2050. In 2050, approximately 12,500 Gas powered (ICE) vehicles remain on the road.

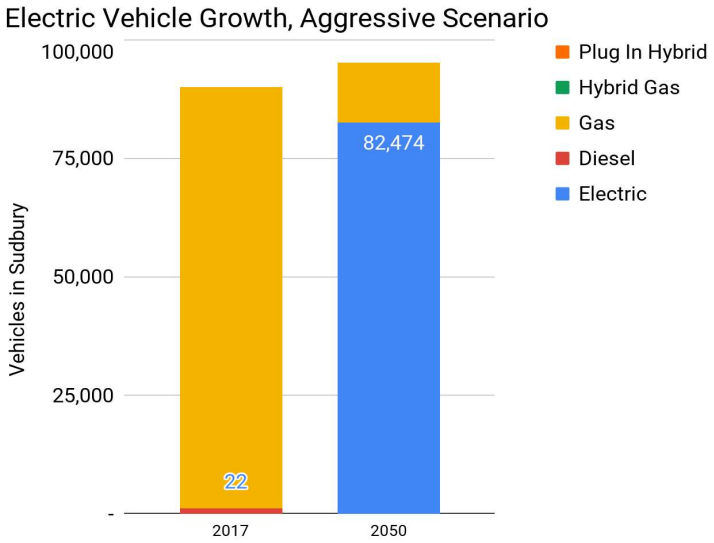

Figure 13. Modelled EV stock growth.

Energy Use and Emissions Scenarios

Energy Use

In the BAU Scenario, transportation sector energy consumption is projected to decrease by 26%, from 8.1 million GJ in 2016 to 6 million GJ in 2050. The decrease is largely due to vehicles becoming more fuel efficient and gasoline becoming less carbon-intensive under federal regulations. The BAU also includes a conservative estimate for EV update. The Moderate Scenario results in an energy use decline of 39% by 2050 to 4.9 million GJ, and the Aggressive Scenario results in a decline of 53% by 2050 to 3.8 million GJ. In the Moderate and Aggressive uptake scenarios, energy use overall declines due to the improved efficiency of electric engines over internal combustion engines. The Moderate and Aggressive Scenarios diverge in 2035 where the amount of electric cars on the road in the Aggressive Scenario double that in the Moderate Scenario.

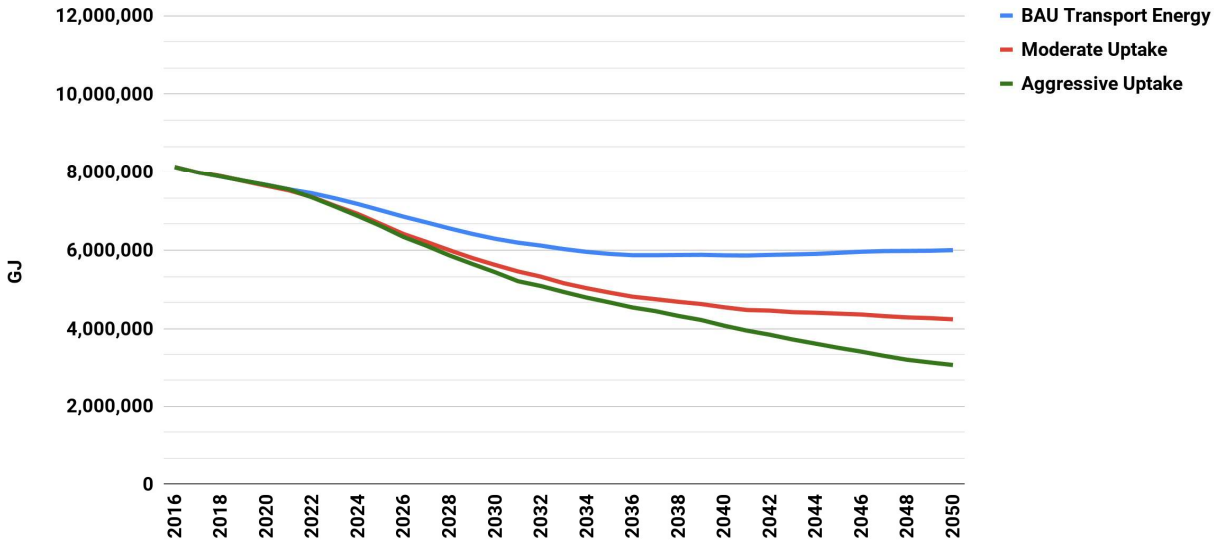

Figure 14. Modelled energy use considering EV uptake rate scenarios.

Gasoline use decreases by 50% from 2016 to 2050 in the Moderate Scenario, and 75% in the Aggressive Scenario. During this period, electricity use increases from 115 GJ to 640,000 GJ in the Moderate Scenario, and to 1.3 million GJ in the Aggressive Scenario (Figure 14).

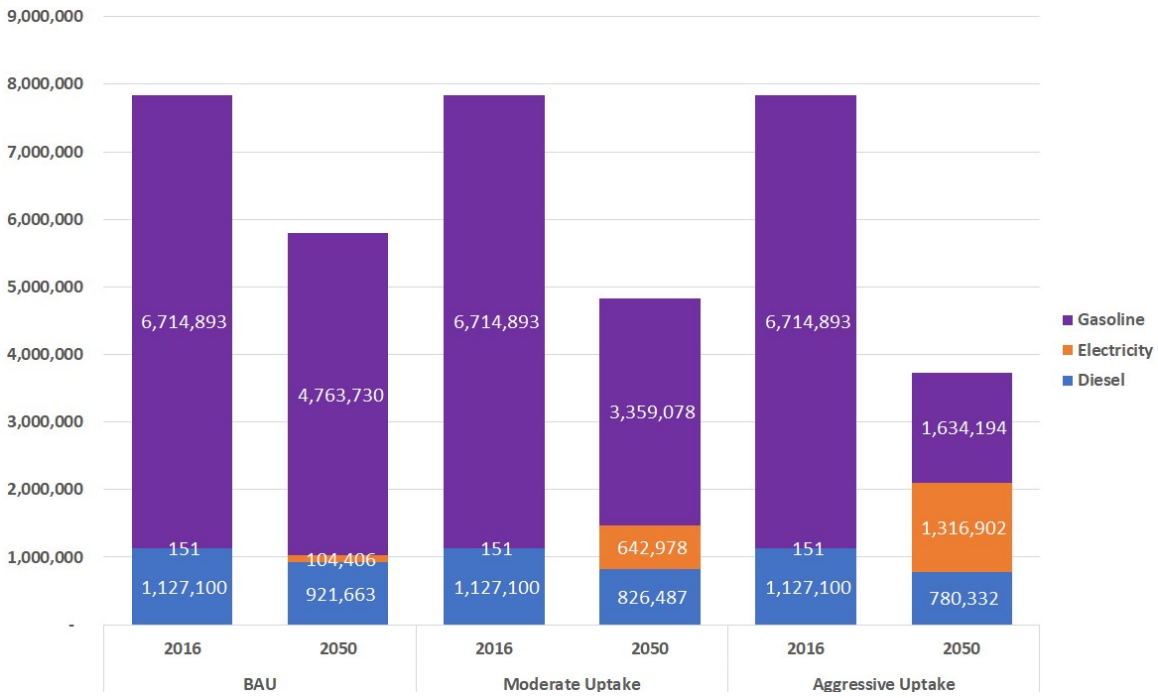

Figure 15. Energy by fuel type, 2016 and 2050.

Emissions

Transportation emissions drop by 50% compared to 2016 in the Moderate Scenario and by 72% in the Aggressive Scenario due to decreased gasoline and diesel use. Some emissions are decreased as electricity sourced from the grid starts to be generated by more renewables, decreasing the grid's emissions intensity factor. As with the energy use results, the Moderate and Aggressive Scenarios diverge in 2035 where EVs are doubled.

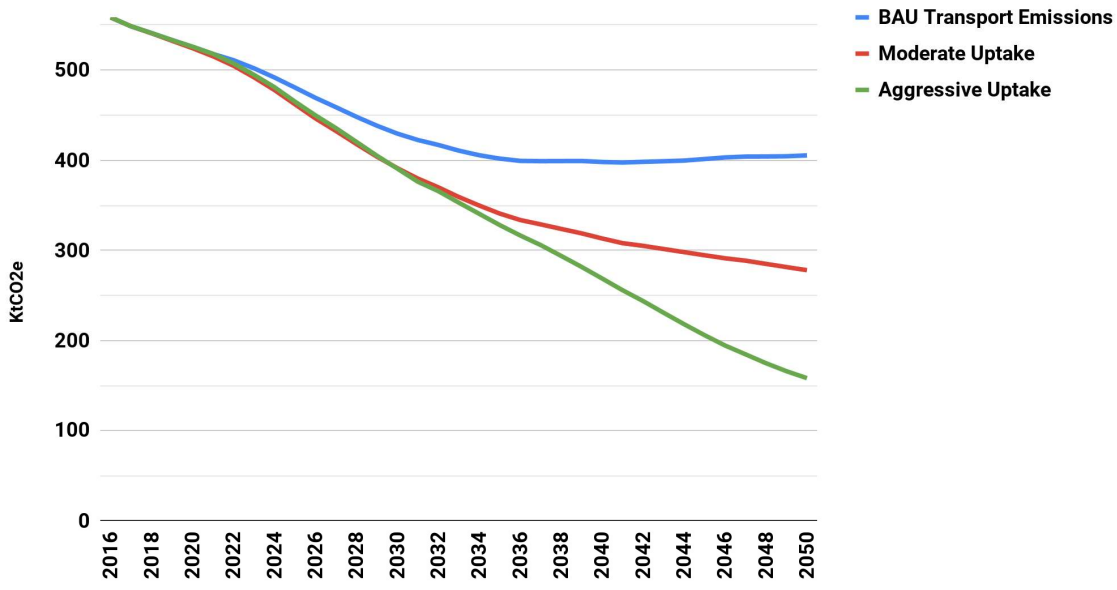

Figure 16. Emission scenarios for EV uptake.

Modelling Summary

The tables below detail the energy and emissions outcomes for each scenario. The biggest impact results from transitioning personal vehicles from internal combustion engine powered to electric. Transforming the industrial fleet has the second largest impact, followed by transit and finally the municipal fleet. The Aggressive Scenario would achieve a 72% reduction in transportation emissions under 2016 levels by 2050, with nearly 3,000 ktCO2e cumulatively mitigated by 2050. This scenario would also reduce 42.4 million GJ of energy in the transportation sector in this period—a 63% reduction.

Table 7. Moderate Scenario actions.

Action	Cumulative emissions reductions 2016-2050 (kt CO2eq)	Emissions reductions 2050 (kt CO2eq)	Cumulative energy reductions 2016-2050 (GJ Millions)	Energy reductions 2050 (GJ)
Electrify 100% of transit fleets by 2040	84.5	5.6	1.20	82,000
Electrify 100% of city fleets by 2040	46.2	2.5	0.44	20,000
• 30% of vehicle sales are electric by 2030 • Scale to 40% by 2040 • Scale to 50% by 2050	1,251.4	93.5	12.2	914,992
Electrify 100% of industrial fleets by 2040	541.6	25.6	15.8	744,000
Total	**1923.8**	**127.2**	**29.6**	**1,760,992**

Table 8. Aggressive Scenario actions.

Description	Cumulative emissions reductions 2016-2050 (kt CO2eq)	Emissions reductions 2050 (kt CO2eq)	Cumulative energy reductions 2016-2050 (GJ Millions)	Energy reductions 2050 (GJ)
Electrify 100% of transit fleets by 2040	142.7	5.8	2.10	83,966
Electrify 100% of municipal fleets by 2040	63.0	2.5	0.60	24,096
• 30% of vehicle sales are electric by 2030 • Scale to 40% by 2040 • Scale to 50% by 2050	2,147.7	212.9	21.0	2,076,300
Electrify 100% of industrial fleets by 2040	635.8	25.6	18.7	744,000
Total	**2,983.3**	**246.9**	**42.4**	**2,924,300**

6. Recommendations and Summary

Municipal EV actions can be grouped into five major themes:

- Municipal policy changes;
- Subsidies and incentives;
- Education and marketing;
- Charging infrastructure provision; and
- Governance and leadership.

A variety of actions in each area can be taken by the City of Greater Sudbury and its partners to accelerate EV uptake and reduce the city's transportation emissions.

Municipal Policy Recommendations

There are several policy-related actions that the City should consider to encourage EV uptake, including the following.

Update Building Development Applications, Building Permits, Rezoning and Retrofitting Policies

The City should create several policies to require and encourage EV charging infrastructure in new and existing buildings.

1. **New multi-family buildings**: create Zoning Bylaw and Building Code requirements for at minimum Level 2 Charger outlet provision for 50% of parking spaces in all new multi-family buildings, with minimum Level 2 Charger ready wiring installed for the remaining spaces.
2. **Existing multi-family buildings**: Provide funding through incentives or rebates to building owners and operators to encourage retrofitting 10% of buildings' parking spaces with at minimum Level 2 Chargers.
3. **New non-multi-family residential buildings**: create Zoning Bylaw and Building Code requirements for all new single family homes, duplexes, row houses, etc. to include electrical infrastructure making them at minimum Level 2 Charger ready.
4. **Existing non-multi-family residential buildings**: Provide funding through incentives or rebates to homeowners to encourage retrofitting with Level 2 Chargers at minimum.
5. **New commercial buildings**: create Zoning Bylaw and Building Code requirements for at minimum Level 2 Charger outlet provision for 25% of parking spaces, placed in preferred parking areas.
6. **Existing commercial buildings**: Provide funding through incentives or rebates to building owners and operators to encourage retrofitting 10% of buildings' parking spaces with Level 2 Chargers at minimum, placed in preferred parking areas.

Retrofitting multi-family buildings can be especially challenging, as the electrical infrastructure may not be present to support EV charging stations. One source of inspiration in this area is Metro Vancouver's Electric Vehicle Charging in Condos, Apartments and Townhomes program.[60]

[60] http://www.metrovancouver.org/services/air-quality/climate-action/transportation-programs/ev-strata-condo/Pages/default.aspx

Include EV Infrastructure Data in Building Records

If it hasn't already, the City should add EV charger record keeping policies in its development application and renovation records keeping to have a city-wide database of buildings that have installed EV charging equipment and are EV charger ready. This will provide a map of EV charging infrastructure across the City, indicating where significant gaps exist while tracking the age of the infrastructure, which will help infrastructure renewal planning.

Update Relevant City Plans

Several City bylaws and planning documents should be updated to include special provisions for EV charging infrastructure (and fees) and assignment of preferred EV parking spaces, including:

- Greater Sudbury's Official Plan's Transportation section;
- The Zoning Bylaw;
- Traffic and Parking Bylaw;
- Licensing, Regulating and Governing of Taxi, Limousine, and Shuttle Transportation Bylaw;
- The Downtown Community Improvement Plan;
- The Downtown Sudbury Master Plan; and
- Other Community Improvement and Incentive Programs.

The City can coordinate plan updates with a goal of providing a target percentage of all public parking with EV charging infrastructure by 2025 (see Charging Infrastructure section below).

Update the Licensing, Regulating and Governing of Vehicles for Hire

The City should encourage the use of electric vehicles for hire through reduced business license fees or via a new/replacement vehicle incentive program, in the short term. The City can work with vehicle for hire service providers to assess the financial implications of transitioning their fleets to EVs. The Licensing, Regulating and Governing of Taxi, Limousine, and Shuttle Transportation bylaw could also be updated to require vehicle for hire service providers to purchase EVs when updating their fleets.

Subsidies and Incentives

A variety of subsidy and incentive approaches exist to encourage EV uptake. The City can consider the following options and implement those it feels are most mutually supportive and likely to succeed.

Provide Business Licensing Subsidies

The City could offer a business license discount or similar incentive to those businesses who install charging stations (at minimum Level 2, from a selection of charger types specified by the City) in preferred parking spaces. This promotion can also be extended to other licensed entities, like campgrounds. The discount could scale by ratio of available parking spaces to charging spaces—the smaller the ratio the greater the discount. The discount could reduce or waive business license fees for a a single year or for multiple years, depending on what is considered an effective incentive.

Provide Property Tax Incentives

The City could offer a one-time annual property tax decrease incentive for property-owners, businesses and institutions if they install at minimum Level 2 Chargers for private or public use on their premises.

Provide EV Purchase Subsidies

The City should perform an accounting exercise to determine the viability of dedicating annual budget to providing EV purchase subsidies in the range of $500-$2500 per vehicle. A social cost of carbon exercise should be a part of this exploration, to compare the cost differences between action (reducing emissions) and inaction (emissions increase). If viable, a subsidy program could be developed to encourage car buyers to purchase EVs. The funding project could run as a pilot for 1-2 years, and for subsequent years, depending on the program's success. Such subsidy programs are usually offered through provincial governments, however there are municipal precedents (e.g. Laval[61]).

Coordinate EV Bulk Buying

With its business and community partners, the City should coordinate an EV bulk buying program to purchase many EVs at reduced prices for businesses and the public. Working with local car dealerships or directly with car manufacturers, the City could negotiate bulk buy discounts on select EV makes and models, as well as their associated charging infrastructure. Offering once a year opportunities to participate in a bulk buying program with limited duration encourages engagement in the program. Programs in the US have been able to discount EV purchases between $2000 and $8500 USD per vehicle. Southwest Energy Efficiency Project's The Electric Vehicle and Photovoltaic Power Purchase Handbook[62] is a good resource for establishing a bulk buying program.

Provide ICE Vehicle Retirement Incentives

The City and its community partners could offer cash refund incentives or EV purchase rebates upon the retirement of an ICE vehicle. The incentive could be applied to certain makes and models of cars, recognizing that luxury EVs need not be subsidized. This incentive program could be modelled on British Columbia's ScrapIt program, which offers $6000 for a new EV and $3000 for a used EV when ICE vehicles are retired.[63]

Education and Marketing

There is a variety of EV promotional and awareness campaigns that can be undertaken by Greater Sudbury with its community, business and industry partners. Each of the following options are important components of an overarching education and marketing strategy. Generally, campaigns targeting the public will require the most resources and realize the slowest EV uptake returns, while campaigns targeting businesses and industry require fewer resources and have the potential for quicker returns, if at a typically smaller scale. The City can establish

[61] The City of Laval offers a $2000 EV subsidy for new EV purchases: https://www.laval.ca/Pages/Fr/Citoyens/vehicule-electrique.aspx

[62] http://www.swenergy.org/data/sites/1/media/documents/publications/documents/Power_Purchase_Handbook.pdf

[63] https://scrapit.ca

and implement as many components of the overarching strategy as resources allow, prioritizing the elements felt to be the most important and opportune. Since transportation accounts for a significant amount of emissions production in Greater Sudbury, education and marketing campaigns are a crucial approach to achieving emissions reductions targets.

Develop an Overarching EV Campaign Branding Strategy

A simple branding strategy should be developed for application to all the City's EV promotional undertakings. A recognizable brand will ensure that all campaigns and promotions are readily associated with City efforts in the EV realm. The branding strategy could include:

- A logo and/or wordmark;
- Branding materials colour palette;
- Descriptive tagline; and
- Usage guidelines.

Deliver a Public EV Awareness Campaign

Deliver an EV public education and marketing campaign through EarthCare Sudbury and its partners to make the public more knowledgeable about EVs. There are many EV information campaigns from which to draw inspiration, including Plug 'n Drive in Ontario,[64] PlugIn BC's Emotive program,[65] Time to Electrify Canada,[66] Clean Technica's EV information,[67] and Electrify America.[68]

Greater Sudbury can offer general and Greater Sudbury-specific EV information via a website and through printed marketing materials at its civic institutions. Social media presence can promote the website and publish EV news stories and information resources to promote EV awareness. These communications channels can convey market research information, EV reviews, local maps indicating the dealerships selling EVs, local maps indicating EV charger locations, any City EV programs, re-posts from other EV programs (such as those mentioned above), etc.

Deliver a Car Dealership Campaign

The City should work with local dealerships to encourage them to stock EVs and be aware of any incentives, discounts and programs available that can be passed on and promoted to their customers. It is important that dealers carry a variety of EV makes and models, as well as their supporting equipment, such as home chargers. The dealers should also be aware of local home charger installation service providers to recommend, and insurance and roadside assistance options that may be specific to EVs. The City and local dealerships can set annual EV sales targets and track the makes, models and sales costs of EVs sold in Greater Sudbury. Tracking this information over time will help evolve the car dealership campaign.

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[64] https://www.plugndrive.ca/electric-vehicle-discovery-centre

[65] https://pluginbc.ca/outreach

[66] http://www.timetoelectrify.ca

[67] https://cleantechnica.com

[68] https://www.electrifyamerica.com

Deliver a Workplace EV Promotion Campaign

The City should work with local employers to achieve four EV outcomes:

1. Transitioning business fleets to EVs, where applicable;
2. Installing workplace EV charging stations for employee and visitor use;
3. Assigning preferred parking spaces to EVs; and
4. Improving employee EV awareness.

Working with community partners, the City can develop and deliver a workplace EV campaign that will help dispel EV myths, promote EV ownership and green fleets. Sample workplace campaigns from which to draw inspiration include those of Metro Vancouver,[69] the Clean Air Partnership,[70] and WorkplaceCharging.com.[71]

Deliver an Industry and Institutions Campaign

The City should also work specifically with industry to deliver industry-specific workplace EV campaigns, with a focus on helping industrial businesses transition their unique vehicle fleets to EVs. This work may involve awareness campaigns citing precedents in specific industries (such as Goldcorp's Borden mine[72]), and providing guidance on cost/benefit analysis (e.g. electric fleet capital, operation and maintenance costs versus ICE fleet costs and ventilation requirement costs in mines).

Establish Partnerships

There are many potential partners for education and awareness campaign support, as well as from which to source EV information such as market trends, EV station locations, EV assistance, etc. Greater Sudbury has EV-specific community organizations with which to partner, as well as other local environmental organizations. Other important partnerships include business and industry champions, institutions such as locally-represented higher levels of government, universities, colleges and hospitals, automobile dealerships and their support associations (e.g. CAA North and West, Trillium Automobile Dealers Association, Ontario Vehicle Sales Regulator) , and automotive writers and publications. A partnership strategy coordinated by the City should identify champions in each of these areas with which to partner in delivering its campaigns, and sign memorandums of understanding (MOUs) with them to establish campaign delivery goals, roles, responsibilities, expectations and timelines.

Charging Infrastructure Provision

The primary charging station strategy recommendation is to take a phased approach in their installation to supply visibility, encourage EV ownership, and keep pace with demand. Charging infrastructure can be installed in two phases, as summarized below and detailed in Appendix 1.

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[69] http://www.metrovancouver.org/services/air-quality/climate-action/transportation-programs/ev-workplace/Pages/index.aspx

[70] https://www.cleanairpartnership.org/wp-content/uploads/2018/11/CAP-Workplace-EV-policy.pdf

[71] http://www.workplacecharging.com

[72] https://www.goldcorp.com/English/portfolio/development-projects/borden/default.aspx

Phase 1: "Create Visibility, Generate Demand"

Under Phase 1, placing charging stations adjacent to government and institutional buildings is recommended because it creates awareness of the technology, and shows municipal support for EV use. This phase can be a quick start as the City can use its own property to install the charging stations while creating a network in key areas such as recreation centres and libraries. In Phase 1, new charging stations would be installed for public buildings, high population or driver centres (e.g. downtown) and Science North.

Phase 2: "A Connected City"

Under Phase 2, EV charging station infrastructure would scale up with additions to commercial and curbside locations. Workplaces, retail hubs and downtown centres are prime targets for added charging infrastructure, allowing charging while at work or running errands. Phase 2 is contingent on Phase 1 results; if use of public chargers installed in Phase 1 is frequent, the City should increase curbside chargers.

Other EV Charging Station Recommendations

1. **Prioritize DC Fast Charging station installation over Level 2 and Level 1 chargers.** Given the commuting trends from rural communities to the city, it is recommended that the majority of chargers at public facilities, in the downtown core, and in retail hubs are DC Fast Chargers. This will help reduce "range anxiety" of those travelling within the region.

2. **Perform ongoing financial analysis to ensure capital costs, return on investments, and charging fees are up to date and appropriate as charging infrastructure costs change** The cost of procuring and installing a DC Fast Charger is approximately $4,000-5,000.[73] 14 new charging stations in the city core could cost between $56,000 and $70,000, which could be recouped through charging fees. For example, Vancouver charges $16.00 per hour to use DC Fast Chargers and anticipates a payback period of 25 years under low-moderate EV uptake. See Appendix 3 for this calculation.

3. **Engage with Hydro Sudbury for optimal charging station locations, and potentially cluster charging stations near Science North to capitalize on the Smart Micro Grid.** To ensure effectiveness and reliability in public charging stations, particularly DC Fast Chargers, engagement with Hydro Sudbury or other local utilities is recommended. Hydro Sudbury has developed a Smart Micro Grid at Science North to support and facilitate the number of local renewable energy producers in Greater Sudbury. A major goal of the micro grid is to provide energy to the community in the case of increased demand or power outages. This centre can also serve as a promotional area for EVs and their charging.

4. **Continuously monitor EV uptake and charging station use to enable proactive municipal programming that increases EV uptake** Before increasing the number of public charging stations, such as in Phase 2, monitoring of

[73] Vancouver's EV Ecosystem Strategy." 2016. Renewable Energy Strategy. City of Vancouver: Engineering and Sustainability. https://vancouver.ca/files/cov/EV-Ecosystem-Strategy.pdf.

uptake can provide information on the number of stations needed and whether to charge fees/what fees to charge. If there is low charge frequency and duration at public stations but the number of EVs increases, then drivers may be charging at home or work. If there is consistent charging in the city centres or recreation centres, then the City can consider increasing the number of stations and/or charging higher rates.

More detailed charging station analysis and recommendations rationale can be found in Appendix 1.

Governance and Leadership

Greater Sudbury can reduce its corporate emissions and lead by example by taking EV initiatives in its fleet and public buildings. Using EVs and providing charging infrastructure makes the viability of EVs visible to the public and signals the City's support in transitioning to a new era of vehicles.

Update City Fleet Purchasing and Replacement Policies

An accounting exercise should be performed for the City fleet (including public transit vehicles) that assesses the operation and maintenance costs of current vehicles and the timing and cost options for their anticipated replacement. This information can be compared to the costs of new and replacement EVs, as well as their operation and maintenance costs. This exercise will provide an accurate schedule of costs and fleet turnover. The study may find that replacing some combustion engine vehicles before their end of life with EVs is a money-saving approach. The City can seek out funding from sources like FCM to transition its fleet. The City can also approach car dealers for bulk purchase pricing, and/or issue an RFP for EV purchase to collect bids from EV sellers.

The City should perform an inventory of vehicle fuel use for non-vehicle energy end use. This will yield information on energy requirements for mobile City operations, and how these requirements might be met by renewable energy. For example, portable rechargeable lithium-ion batteries and vehicle-mounted or mobile solar panel arrays can be installed in City vehicles whose power source is required to operate non-vehicle equipment, thus avoiding reliance on combustion engine vehicles (typically idling engines to power equipment). These power supplies could also provide backup power for EVs themselves.

Showcase City Fleet EVs and Charging Stations

As part of the education and marketing campaigns, the City should make its EV fleet and charging stations visible using the City's EV strategy branding. Charging stations are an opportunity to provide more information about EVs; websites and printed materials can be displayed in charging areas.

Update City Purchasing Policies

The City should update all purchasing policies and practices to favour EV use and encourage uptake. This includes specifying preference for couriers and other service providers with EV fleets, and including statements of EV preference in City tenders and requests for proposals (RFPs).

Hire an EV Strategy Manager in the Planning Services Division

Having dedicated staff is one of the best approaches to ensuring a consistent and coordinated approach to the City's EV strategy. An EV Strategy Manager in the Planning Services Division could oversee changes to Greater Sudbury policies and bylaws, coordinate marketing and education campaigns, and lead the development of subsidy and incentive programs.

Summary

As battery manufacture costs decrease and acceptability increases, the electric vehicle market will grow over the coming decades. Greater Sudbury is expected to have 2,455 EVs by 2035 and 4,612 by 2050 at current estimated market uptake rates. Despite increasing sales, however, the rate of transition from internal combustion engine vehicles to electric vehicles is insufficient to have a major contribution to reducing transportation emissions over the short term, as demonstrated by the EV uptake scenario modelling summarized in this report. The City of Greater Sudbury can help accelerate the EV transition with strategies and actions that are mostly low cost.

Greater Sudbury can achieve emissions reductions of over 1900 ktCO2e (50% under 2016 transportation emissions) and energy use reductions of almost 30 million GJ under a moderate effort scenario that sees almost 19,000 EVs on the road by 2050. With more aggressive actions, the city can realize almost 3000 ktCO2e in emissions reductions (72% under 2016 transportation emissions) and over 42 million GJ in energy savings, with over 82,000 EVs on the road by 2050.

The EV strategy action options are many. In implementing this strategy, the City should consider which actions are complementary and mutually beneficial in light of its municipal powers, leadership on the issue, and community and business partnerships. Once a branding strategy is developed, many quick win actions can be implemented on short timelines with small budgets. WIth support from its partners, the City should be able to achieve substantial emissions reductions in the transportation sector by making EVs visible and viable throughout the city.

Appendix 1: Public Charging Stations Strategy

A public charging strategy, when compared to home and workplace charging, can be seen as a more aggressive approach to encouraging EV uptake. Public charging stations make the upcoming EV technology more visible and show residents that they are able to meet their daily travel demands without fear of losing charge. Recommendations on phasing for charging stations are provided below where efforts are scaled up depending upon use of stations. The city can, in tandem, provide incentives for home and workplace charging infrastructure.

Phase 1: "Create Visibility, Generate Demand"

Strategy: Increase public infrastructure, and concentrate charging stations in high density population areas.

Making charging available and visible is a primary EV encouragement approach for the City. Priority areas for charging stations include:

- City public facilities;
- Recreation facilities;
- Libraries;
- Retail hubs;
- Employment hubs;
- Hospitals; and
- High-visibility curbside locations.

The downtown core will host the highest density of charging stations due to greater population and employment density, and the number of residents without off-street parking.

Charging infrastructure planning will have to consider electrical loads to ensure increased demand for electricity will interface well with capacity.

Phase 1 Rationale

Phase 1 promotes visibility and encourages early EV uptake, providing several benefits including:

- Ensuring there are visible and ample charging stations in key locations throughout the city;
- Cost analysis that provides charger installation costs;
- Broad visibility due to wide charger distribution among destinations and land-use types; and
- Providing consumer confidence via charging station presence.

Phase 1 Location Criteria

The following locations are prioritized for EV Charging stations:

Table 9. Location criteria for Phase 1 EV infrastructure.

Location	Description
Public Buildings	Museums, theatres, recreation centres, libraries, City and senior government administration buildings.
High Population Centres	EV charging stations placed no more than 5km from one another in dense neighbourhoods, where population density exceeds 1,500 person per km^2. This area can be generally bounded by City Centre in Sudbury.
Clustering at Science North	In this phase, an EV charging cluster at Science north should be considered as the micro grid can provide local renewable power and act as a solution to future issues resulting from high demand causing peaks in the electrical grid.

Phase 1 Analysis

Phase 1 greatly increases the charging infrastructure available. 34 additional stations are suggested, for a total of 45. Key Phase 1 statistics are summarized in Table 10. A complete list of charger locations is summarized in Table 11.

Table 10. Phase 1 EV statistics.

Description	Statistic
Number of new stations	34
Total stations	45
Average distance between stations	10-12 km (Rural) 2-5 km (Urban)
Number of stations in city core*	16
Public Charging Stations per 10,000 residents	2.7

*There are currently 8 charging stations in the City Core.

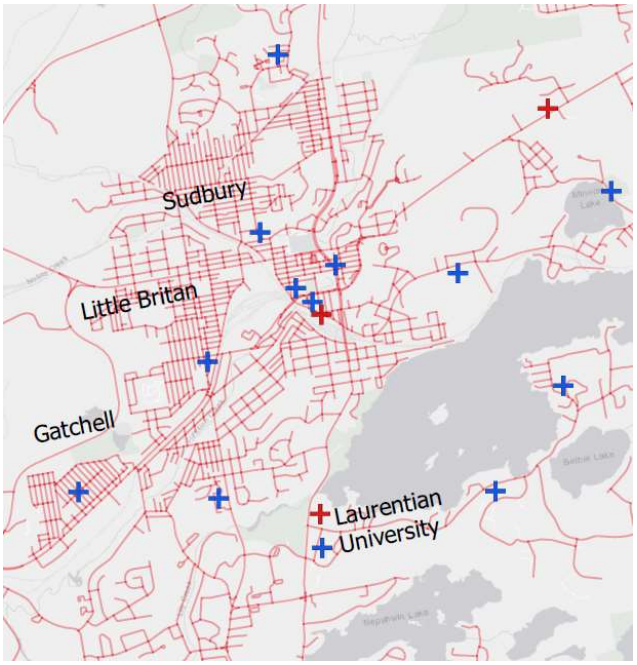

Figure 17. Phase 1 charging locations (City Core).

Table 11. Phase 1 locations for EV charging stations.

Location	Address	City
BarryDowne College	1390 1400 BARRYDOWNE RD	Sudbury
College Boreal	21 LASALLE BLVD	Sudbury
Laurentian University	935 RAMSEY LAKE RD	Sudbury
Workplace Safety North	60 RED CROSS BLVD	Sudbury
Sudbury Outpatient Health Centre	865 REGENT ST	Sudbury
Health Sciences North	41 RAMSEY LAKE RD	Sudbury
Health Sciences North	680 KIRKWOOD DR	Sudbury
The Parkside Centre	140 DURHAM ST	Sudbury
Sudbury Curling	300 WESSEX ST	Sudbury
Carmichael Arena	1298 BANCROFT DR	Sudbury
Cambrian Arena	795 CAMBRIAN HEIGHTS DR	Sudbury
Gatchell Pool	43 IRVING ST	Sudbury
Sudbury Community Arena	240 ELGIN ST	Sudbury
Gerry McCrory Countryside Sports Complex	235 COUNTRYSIDE DR	Sudbury
TM Davies Community Centre	325 ANDERSON DR	Sudbury
Greater Sudbury Airport	5000 AIR TERMINAL DR	Sudbury
Greater Sudbury Public Library	Main Library 74 MACKENZIE ST	Sudbury
Rayside-Balfour Museum & Public Library	158 ST AGNES ST	Sudbury
Raymond Plourde Arena	1919 HELENE ST	Sudbury
Centennial Arena	4333 CENTENNIAL DR	Sudbury
Howard Armstrong Rec Centre	4040 ELMVIEW DR	Hanmer
New Sudbury Public Library (GSPL)	1346 LASALLE BLVD	Sudbury
South End Public Library (GSPL)	1991 REGENT ST	Sudbury
Capreol Arena	20 MEEHAN AVE	Capreol
Garson Community Centre	100 CHURCH ST	Garson
Coniston Community Centre	70 GOVERNMENT RD	Coniston
Raymond Plourde Arena	334 REGENT ST	Raymond
Onaping Pool	2 2R0, HILLSIDE AVE	Onaping
McLelland Arena	11 BALSAM ST	Copper Cliff
Skead Community Centre	3971 SKEAD RD	Skead
Dowling Library	79 MAIN ST W	Dowling
I J Coady Memorial Arena	13 SECOND AVE N	Levack
Chelmsford Community Centre	215 EDWARD AVE	Chelmsford
Chelmsford Library	3502 ERRINGTON AVE	Chelmsford

Phase 2: "A Connected City"

Strategy: Scale up EV charging stations, target curbside locations near commercial areas, and reduce distances between stations to 10 minutes driving.

This phase will meet increased charging demand by adding curbside charging stations and stations near commercial and curbside locations. Consistent with current practice and consumer preference, charging stations could be targeted to be no more than 10 minutes driving (at 50 km/h) distance apart.[74] This practice is based on surveying done by the City of Vancouver relating to how likely a consumer would switch from a gas powered to an electric vehicle. The caveat here is that Vancouver has different urban densities which results in different travel patterns. Phase 2 actions should be implemented in balance with any significant increase in home and workplace charging station installations; if there are large gains in these locations, the need for public charging will be reduced.

Phase 2: Rationale

This phase continues to create more charging capacity in the city to meet demand. It includes:

- Meeting a target of installing charging stations no more than 10 minutes drive apart;
- Increasing commercial destinations' charging stations;
- Expanding infrastructure to provide options for commuters in different towns in Greater Sudbury; and
- Increasing charging stations in the city core as population and employment density increase.

[74] Based on current practice in City of Vancouver to have DC fast chargers in 10 minutes drive distance within city boundaries.

Phase 2: Location Criteria

Charging station priority locations are summarized in Table 12.

Table 12. Location criteria for Phase 2 EV infrastructure.

Location	Description
City-Wide	Charging stations placed no more than 9km apart (based on 10 minutes of driving at 50km/h) at curbside and commercial locations.

Phase 2: Analysis

A city-wide map of charger locations is found in Appendix 2. Key statistics for this phase are summarized in Table 13. A list of charger locations is provided in Table 14.

Table 13. Phase 2 EV statistics.

Description	Statistics
Number of new stations	15
Total stations	60
Average distance between stations	8-10 km (Rural) 2-4 km (Urban)
Number of Stations in city core*	21
Public Charging Stations per 10,000 residents	3.63

*There are currently 8 charging stations in the city core

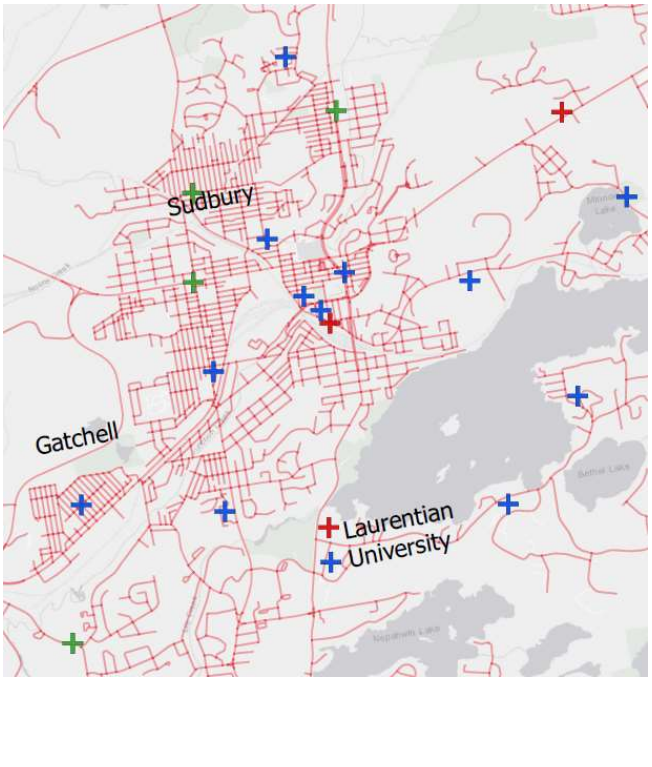

Figure 18. Phase 2 EV charging stations (city core).

Table 14. Approximate locations of Phase 2 curbside charging stations.

Street / Commercial Centre	City
CONCESSION STREET	Nickel Centre
2ND AVE	Sudbury
ELM STREET	Sudbury
KATHLEEN STREET	Sudbury
NOTRE DAME AVENUE	Sudbury
KELLY LAKE ROAD	Sudbury
ERRINGTON AVENUE	Chelmsford
MAIN ST W	Dowling
ST JAMES ST	Onaping
15 RIX ST	Falconbridge
OLD HWY 69	Hanmer
MAIN ST	Val Caron
METHE ST	Chelmsford
OLD HIGHWAY 17	Whitefish
OLD WANUP ROAD	Wanup

Appendix 2: Municipal Case Studies

Kingston EV Strategy Strategic Actions[75]

1. Convert appropriate light duty municipal fleet vehicles to EVs upon their scheduled replacement dates;
2. Continue monitoring opportunities for electrification of heavy duty municipal fleet vehicles;
3. Install and operate public EV charging stations on municipal property throughout the City;
4. Promote the environmental and economic benefits of EV use to Kingstonians and monitor uptake of EVs locally;
5. Ready local infrastructure for increasing EV charging demand; and
6. Determine demand for EV charging among municipal employees commuting to work

Toronto EV Parking Requirements[76]

A required component of the Toronto Green Standard (TGS) – Tier 1 which applies to all new mid to high-rise residential development and all industrial, commercial and institutional (ICI) development, requires the physical provision for electric vehicle charging when excess parking is being provided above the required number of parking spaces denoted in the Zoning Bylaw. These required parking spaces must be distributed on each parking level of the building.

In the case of the ICI sector, when exceeding the required minimum number of parking spaces required under the Zoning bylaw, any excess spaces must be dedicated as priority parking spaces for low emitting vehicles (LEV), carpooling or car sharing.

A voluntary component of the TGS – Tier 2 encourages electrical provision for at least 2% of residential parking spaces for future EV charging.

[75] "Kingston EV Strategy." 2018. City of Kingston. 2018. https://www.cityofkingston.ca/residents/environment-sustainability/climate-change-energy/electric-vehicle-charging-stations.
[76] Preparing Toronto for Electric Vehicles: https://www.toronto.ca/legdocs/mmis/2017/pw/bgrd/backgroundfile-107507.pdf

City of Vancouver EV Ecosystem Strategy for Homeowners and Businesses[77]

Goals:

The City will expand access to home and workplace charging, supporting Aims 1, 2, 3 and 5.
1. Maximize access to EV charging (Have DC fast Chargers within 10 minutes drive of one another.)
2. Improve community experience and knowledge in vehicle charging
3. Displace fossil fuel kilometres travelled with electric kilometres
4. Establish an electric vehicle ecosystem to support the transition to 100% renewable transportation before 2050.

Residential The residential pilot program will be limited to "garage orphan" homeowners (one- and two-family homes with no access to off-street parking). In this case, a homeowner will be permitted to install a Level 1 or Level 2 charger (equivalent to a typical electrical outlet of 120V or 240V) at the back of curb, which will be fed from the house's utility panel. The charger will only be available to the homeowner. Parking will be limited to a maximum of three hours between 9am and 10pm; however the City reserves the right to amend the parking restrictions as required. The cost to buy, install, maintain and remove the EV charger will be borne by the homeowner. The homeowner will be required to enter into a license agreement with the City and the City will retain the right to remove the station. Neighbours within the residential block will be notified prior to the installation.

Non-Residential For non-residential applications (e.g., retail businesses), the applicant will be enabled to install an EV charging station in front of their business that will be fed off the business's power supply. Charging will be available to the public and free of charge (under the B.C. Utilities Act, a private company can't resell Curbside Electric Vehicle Charging Pilot Program – RTS 12046 5 electricity). The parking space will be metered, to ensure reasonable turnover at the charging station. The cost to buy, install, maintain and remove the EV charger will be borne by the applicant. Advertising will not be permitted. Accepted applicants will be required to enter into a license agreement with the City and will be responsible for all costs of installation and maintenance. Adjacent businesses will be notified prior to the installation.

User Costs
The following introductory rates are additional to the parking rate at a given location, although the two fees will likely be collected at the charging station. Fees are charged in addition to regular on-street charges.

- Level 2: $2.00/hr
- DC Fast Charging (50kW): $16/hr.

[77] Vancouver EV Ecosystem Strategy: https://vancouver.ca/files/cov/EV-Ecosystem-Strategy.pdf

Appendix 3: Payback Analysis for DC fast Chargers[78]

Item	Unit	Qty.	Per Session Monthly
Typical Session Energy (kWh)		25	
Installed Capacity (kW)	50		
# Sessions	-	1	125
Usage Length (regardless of energy consumption) (hours)	0.5	0.5	62.5
Fixed Costs			
Capital cost	$40,000		
Labour & Installation	$50,000		
Annual Network Fee	$225		$18.75
Basic Daily Utility Charge	$0.24		$7.39
Annual Maintenance	$200.00		$16.67
Variable			
Electricity Cost ($/kWh)	0.088	$2.20	$275.00
Demand Charge ($/kW)	4.92		$246.00
Rate Rider	5%		$26.42
Swipe Transaction Fee ($/txn)	0.91	0.91	$113.75
Total Variable Costs		$3.11	$661.17
Total Operating Costs			$703.97
User Fees Revenue	$16.00	$8.00	$1,000.00
Net Revenue over operating			$296.03
Annual Revenue over operating			$3,552.31
Simple Payback (yrs)			25.336

[78]"User Fees for City Owned and Operated Public Electric Vehicle Charging." 2017. Council Meeting. Vancouver EV Ecosystem. City of Vancouver. https://council.vancouver.ca/20170627/documents/rr1d.pdf.

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Appendix 3

Greater Sudbury CEEP

Public Engagement Summary

Prepared by SSG

August 2019

POWER NOW
GREATER SUDBURY
Our energy future.

Contents

Introduction

The Greater Sudbury CEEP community engagement process aims to answer the question “What are the elements of Greater Sudbury’s low carbon future and how will we get there?”

The engagement process component of CEEP development is called PowerNow! And focuses on five key objectives:

- Producing outcomes that reflect the values, priorities and aspirations of a diversity of Greater Sudbury residents and stakeholders;
- Encouraging a sense of ownership among residents and stakeholders, leading to a sustainable and legitimate path forward;
- Supporting residents’ and stakeholders’ understanding of critical issues and contexts for this project, as well as relevant trade-offs;
- Building community connections and capacity, supporting increased social capital and long-term benefit; and
- Building and enhancing trust between residents, stakeholders and local government.

The process has four major engagement streams:

1. In-person public events;
2. On-line public engagement;
3. Stakeholder Working Group (SWG) meetings; and
4. Interviews and meetings with City Directors.

In-person Public Events Summary

Public Workshop #1 | October 4, 2018

Attendance: 43 people

The session was attended by representatives from the City of Greater Sudbury, Laurentian University, Greater Sudbury Utilities, ReThink Green, Science North, the Sudbury Star, Glencore, as well as interested Greater Sudbury residents.

The goals of the first engagement session were to take stock of Sudbury's current state of energy and emissions, develop a collective vision of Greater Sudbury in the future, and to discuss actions to reduce emissions.

Greater Sudbury's 2016 energy and emissions baseline information and the results of modelling a business-as-usual energy and emissions scenario between 2016 and 2050 were presented to participants.

A Future Greater Sudbury
Grouped in tables of five to seven people, workshop participants were asked to discuss how they envisioned a low-carbon, healthy, and vibrant Greater Sudbury in the future.

Most participants wished to see more affordable and accessible active transit, with better bike lane connectivity, as well as a more expansive network that could reach from major commercial centres, downtown, and to trail networks. Safety was noted as an important component of a successful system, as some participants currently felt discouraged by vehicular traffic to use bike lanes.

Similarly, many participants expressed a desire for greater walkability in neighbourhoods. Many found this to be the case in the downtown core, where there is greater density and walking access to amenities. This was expressed as something that could be widely expanded across the city. A desire for greater urban intensification and mixed-use neighbourhoods to improve walkability in Greater Sudbury was noted.

High efficiency homes and buildings were also noted as important to participants. There was interest in buildings that included rooftop solar energy generation or green roofs, which could also support a local food supply system.

Participants also commented on building a thriving local business sector, and the importance of supporting local supply chains and operations. Again, this complemented a greater reliance on locally sourced foods, accessible in grocery stores, schools, and across the city. Furthermore, with an economy strongly rooted in mining, participants noted that Greater Sudbury could become a leader in using renewable energy in the mining sector.

The vision of the future city saw greater use of renewable energy for its energy needs. Electrification was cited as an important component of the vision, including greater use of electric vehicles, building electrification (for heating and cooling), as well as electric mining operations. Electricity would be supplied by both the Ontario electricity grid and local solar PV on rooftops and in rural areas.

Many participants felt that technology could empower new energy use patterns and greater energy use efficiency. This included car sharing programs, traffic controlled lighting systems to reduce idling, building heat systems that could be remotely controlled, and accessible electric charging stations, among other technologies.

Ultimately, the visioning exercise showed great ambition of Greater Sudbury residents in achieving a low-carbon city.

Wedge Analysis

The final portion of the workshop explored how Sudbury could meaningfully reduce emissions. Provided with the city's BAU emissions projection and specific actions with their respective emissions reductions, participants were asked to choose the actions that they felt could reasonably occur in the City by the year 2050 to achieve their vision and typical municipal emissions reduction goals (80% reduction by 2050).. In contrast to the visioning session, the wedge analysis brought on greater critique of possible actions, outlining key barriers to the envisioned future City.

Actions for existing buildings were related to retrofits. Two participant groups thought that 50% of homes could be 50% more efficient by 2050. Other groups saw considerable difficulties in high rates of retrofits, and felt as though reaching 25% of homes would be more feasible. All groups highlighted the importance of improving the energy efficiency of the building stock, but perceived that it would be hard to implement in practice, due to the upfront financial capital required, and because retrofits are generally pursued through individual decision making.

In contrast, many felt that introducing heat pumps into buildings to replace natural gas heating was more feasible. Half of the groups thought that 25% of homes could use heat pumps. The other half felt that 10% penetration was a more realistic number. Participants noted the currently low natural gas prices in the province, which disincentivizes uptake of heat pumps.

Most participants had very high ambition for increasing the share of electric vehicles. All groups decided that 25% market share of electric vehicles was possible by 2050, and most thought that it

could be even higher. Electric vehicles were perceived to be an inevitable future for Greater Sudbury, mostly through changing market factors.

Implementing active transit was perceived to be difficult, despite strong desire for greater active transit in the visioning exercise. Participants felt as though the City's land-use patterns are too sprawling to meaningfully introduce active transit because average trip distances are too high.

Reducing emissions in industry divided participants. Some felt as though industry has made important strides, but finding greater efficiencies in the system could be difficult. Additionally, participants noted that the City actively promotes new mining operations, which could play a role in increasing total industry emissions. The Vale smelter project was noted as an example of transformative emissions reductions in the industry. Overall, most groups felt that industry could be 25% more efficient by 2050.

Finally, participants analyzed the feasibility of local solar PV and wind projects. Many felt as though historical political contention could limit the uptake of larger renewable energy projects. Solar PV on rooftops was considered to be more politically feasible. Ultimately, most tables thought that rooftop PV could supply 25% of buildings energy requirements by 2050.

The overall emissions reduction scenarios developed by tables were between 359 and 650 kilotonnes carbon dioxide equivalent (ktCO2e) total emissions in 2050. With current emissions estimated at 1,302 ktCO2e in 2016, the scenarios were associated with a 49.9% to 72.4% reduction in emissions.

In-person Workshop #2 | April 24, 2019

Attendance: 40 people

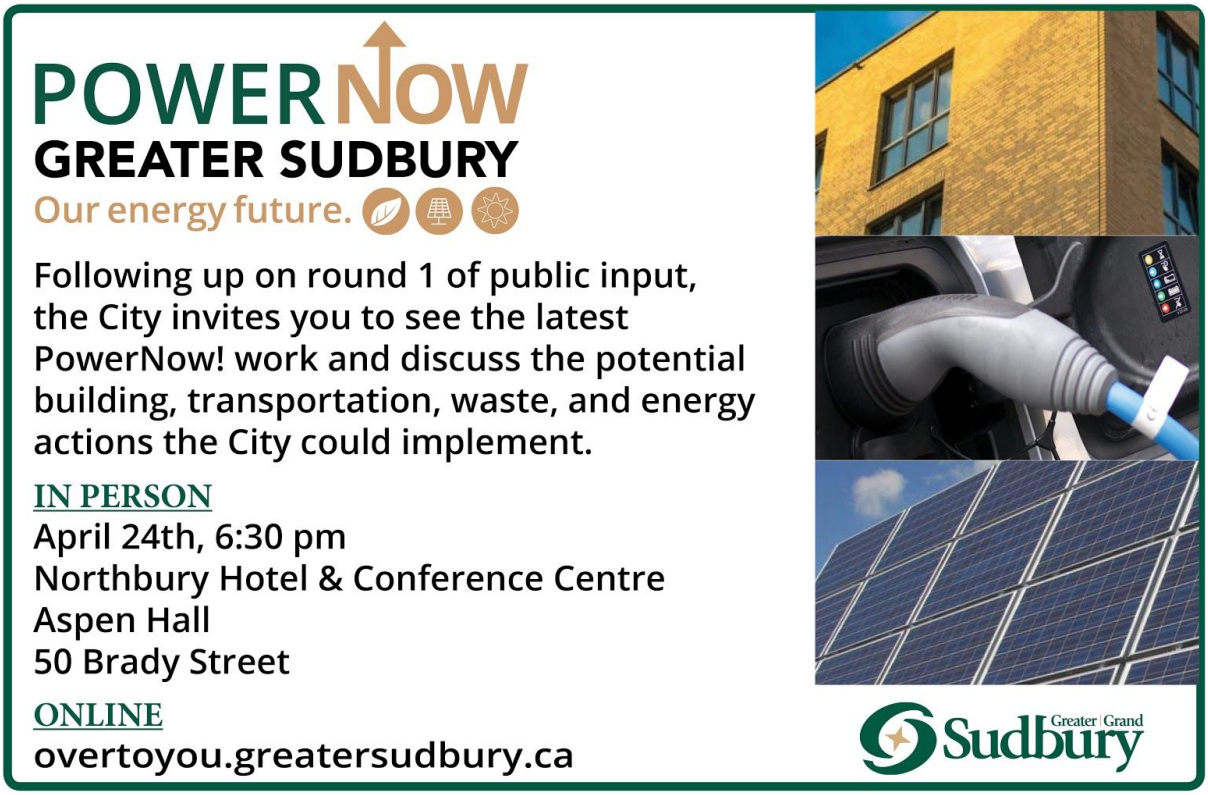
The second in-person workshop was attended by 45 people and had some media presence. The modelling results of a moderate ambition low-carbon scenario (LCS) were presented, in which actions to achieve an emissions reduction target of 65% below 2050 levels were explored. This target was based on the outputs of the first public engagement session in which an ambitious low-carbon vision was expressed for Greater Sudbury, but a less ambitious emissions reduction target was arrived at in performing the actions wedges exercise.

In small groups of 5-7 people, participants discussed the LCS results by topic:

- Personal electric vehicles;
- Home retrofits, heat pumps, and water efficiency;
- Commercial building retrofits and recommissioning;
- Solar energy and energy storage;
- Increased transit, walking, and biking; and
- New homes.

Participants rated the actions presented in each topic for their priority (low, medium, high) and level of ambition (too low, about right, too high). Potential partners in delivering the actions and priority places to implement the actions were identified. Opportunities and precedents for the actions were discussed, as were the potential challenges with their implementation.

Summaries of the table topic discussions can be found in Appendix 1. Participants typically felt that the level of priority for most actions should be high and the stated level of ambition was too low. Many felt that a 65% emissions reduction by 2050 was insufficient, and thus the actions modelled to achieve this target needed to be strengthened to achieve a high emissions reduction target of at least 80% by 2050. This attitude marked a shift from the first public engagement workshop, at which most participants felt a 65% emissions reduction was reasonable.



Stakeholder Working Group Engagement

November 21, 2017 | 23 people
April 18, 2018 | 32 members
December 5, 2018 | 22 people

A Stakeholder Working Group (SWG) met twice during the project to date. Organizations invited to participate on the SWG include: City of Greater Sudbury, Greater Sudbury Utilities, Hydro One, Union Gas, Laurentian University, Collège Boréal, Cambrian College, NORCAT, the four local school boards, Atikameksheng Anishnabek, Wahnapitae First Nation, United Way, reThink Green, Greater Sudbury Chamber of Commerce, Greater Sudbury Housing Corporation, Sudbury and District Home Builders Association, Glencore, and Vale.

The first meeting engaged SWG members to discuss potential actions to be considered in the CEEP, as well as potential barriers to actions implementation. Many members felt that the CEEP should be well-integrated into other City plans and decision-making processes to bring about conditions that have considered energy and emissions outcomes. Many members focused on the importance of engaging the mining sector. Transportation was seen as an important area of focus, with increased EV uptake and transit as key actions to investigate. Buildings energy efficiency and renewable energy generation (especially solar) were seen as economic and sustainability opportunities on which the community could capitalize, becoming a leader in Northern Ontario in these areas. The SWG felt that action should be taken quickly.

Action barriers identified by the SWG included lack of political will, challenges for small businesses to act, lack of education on sustainability issues amongst residents and business owners, achieving deviation from the status quo, and financing the actions. Some discussion centred on whether important energy and emissions actions could be planned and taken regardless of political context.

The second SWG session involved a multi-criteria analysis (MCA) exercise in which members weighed the importance and priority of eight potential actions in each of the transportation, building, energy, and land-use sectors (32 actions total). The exercise outputs present the SWG's prioritization of actions in each of the four sectors. These aren't necessarily the most effective actions to take or the "best bang for the buck" actions to take, but rather a balanced consideration of the actions resulting in their preference ranking - the actions that have the most support from the group. The MCA outputs helped determine what actions were investigated and modelled by the consulting team. The MCA outputs are summarized in Appendix 2.

Directors Engagement

February - April 2019

Interviews were held with directors of several City departments, including:

- Water and Wastewater
- Environmental Services
- Planning Services
- Transit Assets and Services
- Assets and Fleets
- Housing Operations
- Housing Services
- Leisure Services
- North East Centre of Excellence Senior Health
- Building Services

The interviews provided insights on Greater Sudbury's current energy efficiency and production, and emissions reduction efforts. Salient points from the interviews follow.

Environmental Services

- Many waste reduction efforts are underway.
- Percentage diversion rate targets have not been set as achieving them is too far out of the City's control (i.e. much of waste diversion and treatment is under provincially jurisdiction).
- There is room for improvement on industrial, commercial, and institutional (ICI) waste diversion.
- Waste diversion from multi-family buildings is typically expensive and challenging.
- The landfill is looking to expand its life through a variety of programs. It is also looking at better ICI diversion programs and expanding its landfill gas capture rate.

Water and Wastewater

- Water pumps are being periodically replaced with more efficient models.
- The City water rebate programs are effective in reducing costs.
- Water treatment facilities are currently at secondary treatment levels with activated sludge.
- Looking at water and wastewater metering systems for improved data and automation of water efficiency processes.
- National and provincial facility benchmarking initiatives are useful for best practices knowledge sharing.

Planning Services

- Greater Sudbury projects low population growth over the next 30 years.
- Ageing population is resulting in denser housing.
- 80% of building permit growth is occurring within the growth boundary.
- There are some redevelopment and adaptive reuse projects underway.
- The recently updated Official Plan has climate-updated policies.
- Residential and commercial renovations of existing structures are more common than new builds.
- The regreening tree planting program has been largely successful.

- There is some room for improvement on direction for energy efficiency and emissions reduction in neighbourhood development, as well as in transportation integration.

Transit Assets and Services

- Transit is currently a 'hub and spoke' system, with routes emanating from the downtown hub.
- The recent Transit Action Plan has been adopted, increasing service to high-demand areas, reducing infrequently used routes, and offering service on Sundays.
- There is an upward trend in transit use and revenues over the last few years.
- Park and ride lots are well used.
- There is room for improvement in the promotion and effectiveness of the TransCab and Handi-Transit programs.
- The Employer Pass Program needs more resources to be successful.
- RIght-sizing the fleet is under consideration.

Assets and Fleets

- Energy is considered in decisions on a case by case basis
- The wastewater treatment plants are large energy users.
- Early replacement of assets to improve energy efficiency and paybacks can be considered on a case-by-case basis.
- Building energy improvement upgrades happen as a result of benchmarking against similar buildings in other cities and monitoring.
- There is currently no plan to electrify the City fleet.
- The City fleet is being right-sized.
- Distributed EV charging infrastructure would alleviate some EV use concerns.
- Some heavy equipment vehicles may be difficult to electrify.

Housing Operations

- Social housing: 1843 units, 384 buildings.
- Housing Revitalization Plan includes:
    - Selling 145 scattered houses - getting rid of 3-5 bedroom homes.
    - Building more single bedroom homes (10 year wait for these currently).
    - Helping to subsidize tenants to live where they want.
    - Targeting ⅓ market, ⅓ rented, ⅓ affordable for new buildings.
- Selling current assets can help pay for retrofitting remaining assets.

Housing Services

- The seniors centre underwent upgrades several years ago and was successful at significantly reducing its energy and water use.
- A 245kW solar PV system is part of the upgrades.
- The social housing portfolio has just under 5000 units - half owned by the City, half owned/run by non-profits and cooperatives.
- There is high demand for social housing units.
- Most of the stock needs to be updated to 2019 building code standards.

Leisure Services

- Greater Sudbury has 14 arenas, 5 pools, playfields and rinks.
- Most facilities have upgraded lighting (LED) and arenas have low-emission roofs.

- One community arena has a 245kW solar PV array.
- Building condition assessments determine energy efficiency needs - every 5 years.
- There is a need to develop more of an organizational culture about energy efficiency - need energy champions, real-time data for facilities

Directors Engagement Session

April 25, 2019

The City Directors were engaged in a 2 hour session in which a project presentation was given outlining the modelling results for the Business as Usual and Low-carbon scenarios. In groups of 5-8, the Directors then discussed 5 topics, guided by lists of associated questions (Appendix 3). Topics included:

- Municipal and personal electric vehicles;
- Transit and active mobility;
- Solar PV and district energy;
- Waste, wastewater, and renewable natural gas; and
- Buildings.

Directors discussed the challenges, opportunities, implementation details, and next steps associated with potential actions and policies in each of the areas. Next steps for many of the actions involved updating City policies, standards, and plans. Opportunities involved finding funding for infrastructure and programs, and engaging existing and new staff to implement actions. Potential challenges identified included resistance to change, the dissipated geography of Greater Sudbury, lack of political will, and investments required. More details on the directors engagement session can be found in Appendix 4.

Draft CEEP Public Engagement Session

November 28, 2019 | 23 people

The final public engagement of the CEEP process asked for feedback on some of the CEEP actions by asking participants how they will engage in implementing the actions and what they think it will take for the wider community to engage.

The CEEP's increased transit, walking and biking theme garnered support for:

- Allocation of road space and proper infrastructure to bicycles
- Less parking and higher cost of parking downtown
- Carpool lanes
- Connected and complete streets and communities
- Improved trails
- Improved transit efficiency and frequency
- Promotion of active transportation benefits
- Inexpensive or free transit fares and passes
- Learning from successful approaches of other cities
- Partnering with schools on active transportation to and from school programs
- Investigating other transit options like rapid rail

The CEEP's home retrofits, heat pumps, and water efficiency theme garnered support for:

- Retrofit incentives
- Energy tracking display platforms
- Certified trades people/companies and evaluators to perform the work
- Higher fuel prices
- Community-wide energy efficiency competitions
- Retrofitting guidebooks from the City
- Retrofitting entire neighbourhoods
- Stepped regulations
- City-led retrofit programs
- Modifying the building permitting process
- Educational workshops and information distribution
- Tax rebates
- Tieing retrofits to affordable housing goals

The CEEP's solar energy systems theme garnered support for:

- Adding hydrogen generation and storage
- Directing carbon tax revenues to fund solar system installations on civic and institutional buildings
- Reduced costs and fast paybacks of systems
- Various solar power system types
- Installation and maintenance service organizations

- Addressing roof load considerations
- Education and outreach programs on purchase and installation
- Access to grant and subsidy programs
- Insurance options
- Financing mechanisms
- Learning from other cities with solar programs
- Improving the mechanisms and fees to tie into the electricity grid
- Focusing on low-income households

The CEEP's personal electric vehicles theme garnered support for:

- Dedicated EV lanes
- Local and long distance charging infrastructure
- Improvement to EV lifecycle costs
- Proven distance and cold weather performance
- Information on price, maintenance costs, operating costs, resale value
- Incentives and subsidies
- Financing programs
- Vehicle exchange programs
- Increased gasoline/diesel costs and fuel taxes
- Demonstrations and information/education programs
- Partnering with local dealerships to stock EVs
- Gas to EV conversion options

Event participants were also polled to gauge their interest in participating in CEEP related actions, as summarized in the following table.

CEEP Action Element	**Number of people interested in participating**
Partake in a solar PV system bulk buy program	2
Partake in a heat pump bulk buy program for your home and/or business	3
Partake in a home EV charging station and installation bulk buy program	5
Make your next vehicle purchase a fully electric model or trade your current vehicle for an EV model	4
Make the majority of your trips by walking, biking, or transit	3
Purchase renewable electricity and/or renewable natural	2

gas (biogas) for your home and/or business	
Work or volunteer with a community group helping to implement CEEP actions	8
Upgrade your home insulation and windows	3
Replace faucets, showerheads, and toilets in your home with low-flow versions	5
Support the construction of large energy projects in the community (e.g. utility-scale solar PV)	5
Decrease your waste by avoiding packaged products and being an excellent recycler	8
Join a City working group focused on delivering an element of the CEEP	4
Participate in tree planting programs	7

Online Engagement

Project information was posted on the CIty website under the Clean Energy page of the Environment and Sustainability Department at the outset of the project. Project information and surveys were posted leading up to, in parallel with, and following in-person public engagements via the "Over To You" area of the website. Between September 2018 and April 2019 the site received 535 unique visitors. 22 visitors participated in a survey about energy and emissions in Greater Sudbury, contributing ideas on:

- Where we live (buildings);
- How we move around (transportation);
- Where our energy comes from (energy generation);
- Our waste (solid waste and wastewater); and
- Our forest and natural areas.

The survey results showed support for electrifying personal and transit vehicles, offering incentives, programs and regulations for energy efficiency in new and existing buildings, and residential solar panels purchasing. 18 actions were suggested as well. Online engagement is summarized in Appendix 5.

Engagement Summary

There has been a noticeable shift in climate change awareness and in the sense of urgency for action over the course of the project engagement events, as evidenced by a recent citizens' petition to declare a municipal climate emergency, and the adoption of that declaration by council. The first public engagement session demonstrated the public's appetite for action in achieving a sustainable future for Greater Sudbury, although participants struggled to achieve an 80% emissions reduction target by 2050, expressing doubts that some actions could realistically be implemented. The second public engagement showed more ambition in achieving the 80% emissions reduction by 2050 target and participants' contributions to the actions discussion demonstrated strong support for action by the City and the community. Media presence at the event demonstrated the level of community concern for the topics discussed.

The Stakeholder Working Group provided important guidance on actions consideration and modelling. The diversity of members - representing community groups, businesses, industry associations, institutions, and residents - contributed to a balanced perspective on what considerations to make in their sectors.

The Directors provided valuable insights into actions that are already being taken in Greater Sudbury, as well as direction on what gaps currently exist in the City's and community's approach to addressing climate change. Their involvement in the project will be crucial to the CEEP's successful implementation.

Engagement of various groups and individuals over the course of the project has shown that there is wide support for energy and emissions action in Greater Sudbury, especially when actions support the well-being and economic development of residents and businesses. It has also shown that there are legitimate concerns in how policy and action will be successfully implemented given a range of challenges. The engagements indicate that with strong leadership from the City, business, industry, and residents are keen to participate in addressing climate change issues by taking ambitious action.

Engagement Summary Appendix 1: Public Workshop #2 Discussion Notes

Personal Electric Vehicles

All new personal vehicle sales will be electric by 2030. Some internal combustion engine vehicles will still be on the road, but they will no longer be cost competitive or widely available for purchase.

Priority – High **Ambition** – Too Low

Potential Partners

- Public school system (education)
- All levels of government
- MSM
- Auto retailers / servicers (CAA / tow's / mechanics)
- NGO's – reThink Green, Coalition for a Liveable Sudbury, Bike Sudbury, CCL, EVOGS, Fridays for Future

Priority Places to Implement

- Hotels, malls, 4-5 chargers (LV3)
- Libraries, civic buildings, schools
- Airports, outlying community malls
- Small business EV fleets
- School buses
- Initiatives for business to install a charging station
- Charging stations at church

Opportunities and Precedents

- Government grants (vehicles / charging stations)
- Carbon pricing (gas $) → at the municipal level too!
- Public events (Earth Day)
- Restructure our tax system (streamline) tax the 0.1%
- Find political champions!
- Incentives to make this transition happen more quickly

Potential Challenges

- Regulations
- Charging stations
- What will we replace the gas tax for infrastructure maintenance?
- Some politicians
- Manufacturing retooling
- Battery technology
- Disinformation campaigns, social media
- Industry lobbyist
- Charging stations need to be everywhere
- Grid capacity – transformer upgrades required in areas that add EVS

Home retrofits, heat pumps, and water efficiency

Home retrofits save 50% heating/cooling energy and 30% electrical energy (e.g. appliance and wall plug energy use.) 70% of the remaining home heating/cooling demand is supplied by heat pumps. Water efficiency improves by 2% per year for 30 years.

Priority – High **Ambition** - Too Low

Potential Partners

- United Way
- reThink Green
- SUN Coop
- Province + Feds + industry + contractors
- LCBS – Low Carbon Building Skills
- Green On
- Certification & Standards
- LU School of Architecture, Colleges, Post-secondary (qualified labor)
- GSU, Union Gas, EnergyStar
- Municipal Green Bank + incentives
- “Energysproing”
- Building code
- CMHC
- Home Builders Association
- Partner = affordable housing targets + keep senior in home, heating = affordable

Priority Places to Implement

- Social housing + low-med income + rental housing + student housing
- Multi-family housing + institutions, large landlords + seniors home (Pioneer)
- Provincial + Federal incentives??

Opportunities and Precedents

- Rising fuel prices
- Carbon tax
- Packages for insulation
- House wrapping
- Bring back old programs
- Opportunities → better house, quick wins for City
- Precedents → Heat source expertise, community-wide retrofit effort
- Regreening for energy “do it again” grey water
- At mortgage renewal have lender demand retrofitting of some sort

Potential Challenges

- Old housing
- Cold weather – risk for heat pumps
- Flooding and rain storms
- Zoning by-laws for tiny/laneway housing

- Very expensive to do but worth it
- Costs – competing with family priorities
- Low insulation
- → Commun*ity-wide retrofit effort*

Other notes
- + house durability
- Encourage space for vegetable gardens – reduce – grassy
- Make water bills more reflective of water usage
- Stop using potable water for toilets
- Very important – need concerted effort to bring parties together to make it happen
- CIty must (1) declare a climate emergency (2) appoint a climate adaptation coordinator
- Water is wasted every time you turn on the hot water tap. There is a solution using a recirculation pump available in US but not in Canada. Why not?

Commercial building retrofits and recommissioning

80% of all commercial buildings are retrofit to use 50% less heating/cooling energy and 30% less electricity. Large buildings' heating, ventilation, air conditioning, and energy systems are recommissioned (recalibrated) every 5 years to optimal energy efficiency operation.

Priority – Medium **Ambition** – Too Low

Potential Partners
- Chamber of Commerce
- Real estate developers
- Trade schools (technologies) / Unions
- Architects / engineering firms
- Banks / insurance companies
- Builders associations
- Utility companies
- Telecom companies
- City – make building standards that require this
- This is a union town – unions must be made partners
- Lack of technical & service industry
- Green Economy North (program of reThink Green)

Priority Places to Implement
- Institutional & healthcare – larger impact
- City-owned buildings – can model and lead by example
- Retail (big box) (malls)
- Schools

Opportunities and Precedents
- IESO – up to 2020 provincial
- Federal incentives?
- Aging equipment / replacement education

- Broader Energy Star type program
- Regulation target
- Rising prices for energy
- Municipal pollution taxes could help pay for institutional retrofits

Potential Challenges

- Leased buildings
- Technology sizing
- Capital costs
- Lack of accessible info / complex
- Aging grid / system constraints
- Making maintenance a priority
- Effect on taxes
- No supports technical skills
- Poor building codes
- Lack a 4-year Full Civil Engineering Program at LU
- Challenge non-locally owned businesses. National companies (e.g. Tim Hortons, TD Bank, etc.)
- Leased building is a huge challenge because you need landlord and tenants to cooperate.

Increased transit, walking, and biking

By 2050, 20% of trips are made by walking or biking (these typically are less than 5 km long). Also, another 25% of trips are made by transit (bus, taxibus). These actions involve increasing transit frequency on popular routes, adding bus routes, and installing walking and biking infrastructure like sidewalks and bike lanes.

Priority – High **Ambition** – Low

Potential Partners

- Transit – CGS – Schools – RRA – Hospital – Post Secondary
- Bike Sudbury
- Employers, developers / real estate / land use planning / so people can walk to where they need to go

Priority Places to Implement

- Master Plan – densification of town centers
- Inter Centre Transit
- Transit Action Plan implementation
- Support city densification
- All major streets = complete streets
- All community and neighbourhoods connected by transit & AT infrastructure
- Smart growth!
- Areas in town – not accessible by walking – no sidewalks

Opportunities and Precedents

- Greater recognition of climate change crisis
- TDM plan (transportation demand management)
- Culture shift at CGS provides opportunity for updated planning, but more shift needed
- Bike share – car sharing
- Make prices for good equitable across venues
- Encourage employees to have cars for professional use so I can take the bus instead of my car

Potential Challenges

- City takes $ out of dense areas making it hard to upgrade centers for walking
- Resistance to change
- Lack of downtown plan
- Many outlying towns widespread
- Winter -40°C
- Please clear sand out of bike lanes at the end of winter. I can't ride my bike. Pot holes are a serious concern too.

Solar energy and energy storage

Add 10MW of solar farm energy (equivalent to the Capreol solar farm) each year from 2022 to 2050, feeding into the Ontario electricity grid for distribution, avoiding some use of electricity produced by natural gas plants. Also 50WM of electricity storage is proposed, for use during peak electricity demand periods, also avoiding natural gas powered electricity production.

Priority – Medium-High **Ambition** – About Right

Potential Partners

- GSU
- Hydro One must be on board
- SUN Coop
- Private industry investment
- N-VIRO biosolids → carbon capture → Wastewater gas capture (e.g. Calgary) → use solar to lift H2O into dams
- Small nuclear?
- C. capture also lots of trees

Priority Places to Implement

- Solar for home heating
- Strategically placed in new developments for local distribution
- Storage and renewable at landfill
- Store energy at Hydro Dams, e.g. Coniston Dam, Stinson Dam
- Sudbury dump to power water treatment plant
- Need transmission line

Opportunities & Precedents

- Utilize old mining sites

- Learn from others
- Lots of land for solar farm
- Job creation?
- Incentives to finance building (return on investment)
- Industrial heat recovery
- Solar enabled building code
- Local generation = less risk from the grid going down
- More use of solar hot water

Potential Challenges

- Time to build?
- Capacity of the grid → Hydro One
- Aging infrastructure on roofs → Solar enabled building code
- Snow on solar panels
- Upfront capital is high
- Buy-in from community to invest $ in this (importance)
- Tradeoff of emissions to create solar panels

New homes

New homes will be 15% more efficient every 5 years, approaching 90% more efficient by 2050 (i.e. Passive House Standard efficiency). The amount of new single family detached homes built each year will decrease toward 2050 – in that year only 10% of new homes will be single family. Thus most new homes will be smaller, more energy efficient row/townhomes and apartments.

Priority – Medium **Ambition** – Too Low

Potential Partners

- Home Builders
- Province (building codes, regs.)
- City – zoning, building, OP, dev. fees, codes
- Real Estate Board
- Downtown core (condos)
- Assisted living, long-term care
- Affordable housing planners strategy and those stakeholders
- Have lenders (mortgage) operators to increase efficiencies

Priority Places to Implement

- Downtown – for attractions, living, condos
- Subdivisions not yet finalized
- Around community hubs, groceries (South End, New Sudbury)
- Decommissioned buildings = use land
- Social housing & affordable housing & senior house build
- Education about smaller homes
- Increase town density

Opportunities and Precedents

- Industry promotes efficient homes, condos
- Home care programs (stay at home longer)
- Planning subdivisions to include stages of life (apartment → house → condo)
- Economies of scale / bulk pricing
- Connect home builders with retrofit needs & initiatives / targets
- Incentives / partner with utilities
- Property tax break for efficient homes
- Provincial subsidies – windows
- Funding opportunities (FCM, etc. – especially if we have a plan)
- Be a leader in the field
- Land-use planning connecting it all – located so that transportation is also low carbon for residents in their new homes
- Tiny homes to rethink houses
- Smaller homes in co-housing settings
- Smaller houses are easier to clean

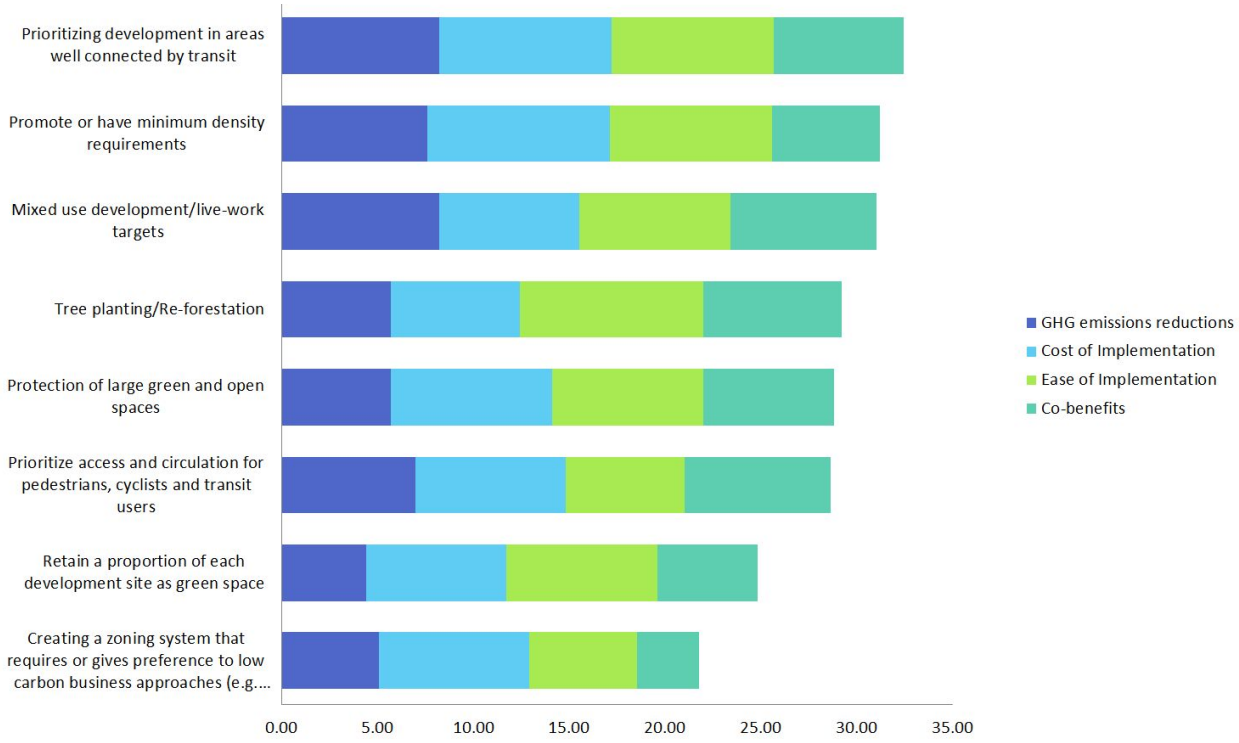
Potential Challenges

What conditions or competing interests might interfere with implementing this action?

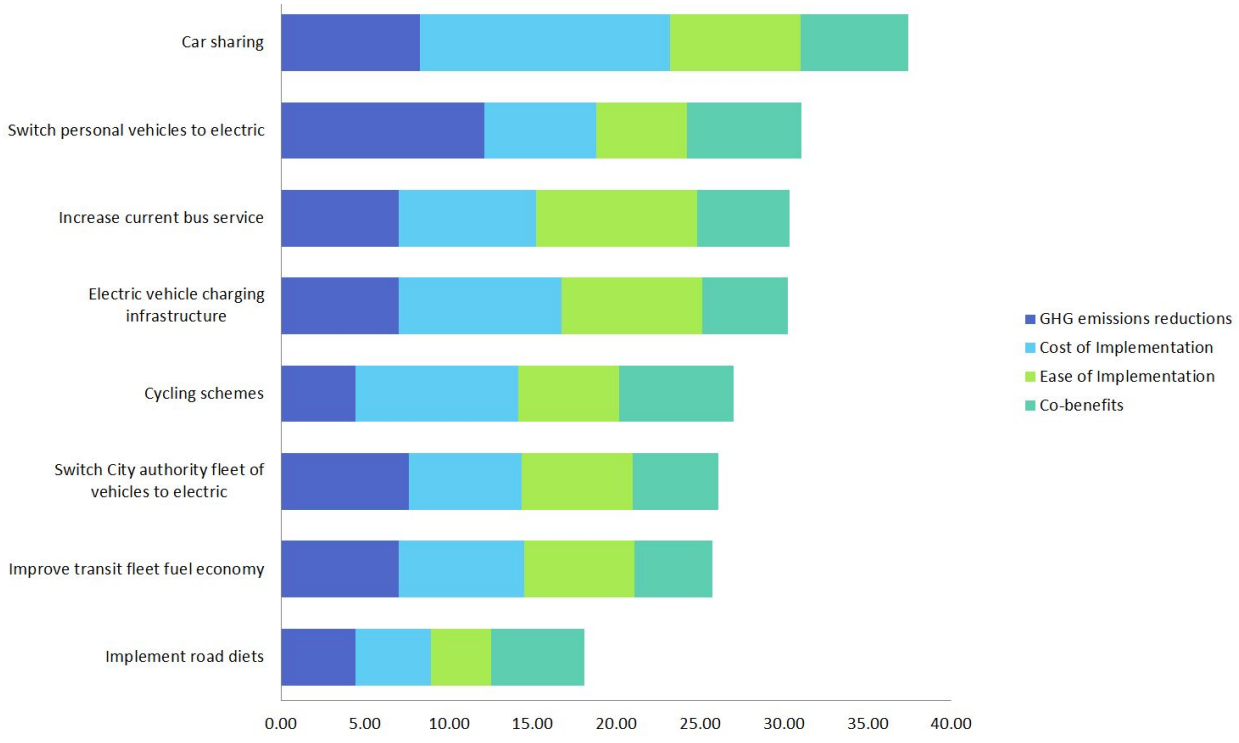
- Culture change away from single detached
- Cost of building efficient
- Acceptance of technology
- Cap on # of solar approved on grid
- Smaller homes should be some kind of financial benefit

Engagement Summary Appendix 2: Stakeholder Working Group Multi-criteria Analysis Action Prioritization Outputs

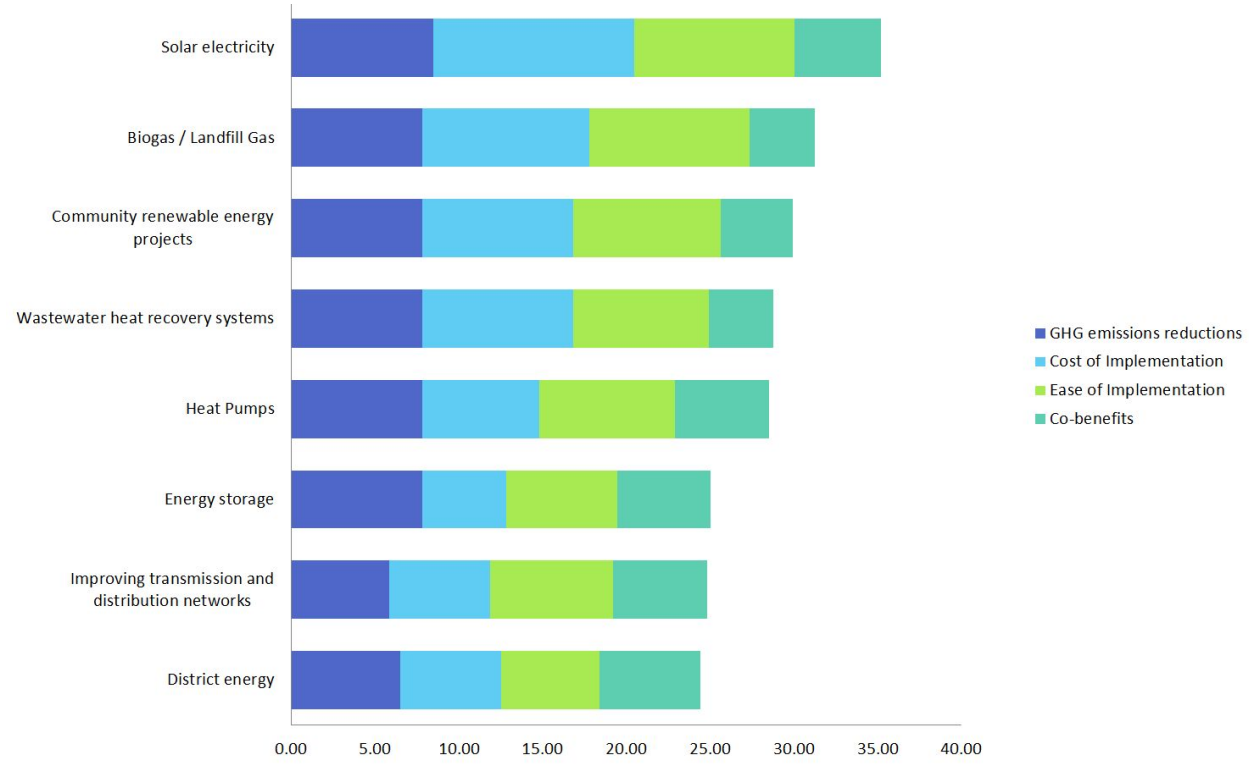
Land-use



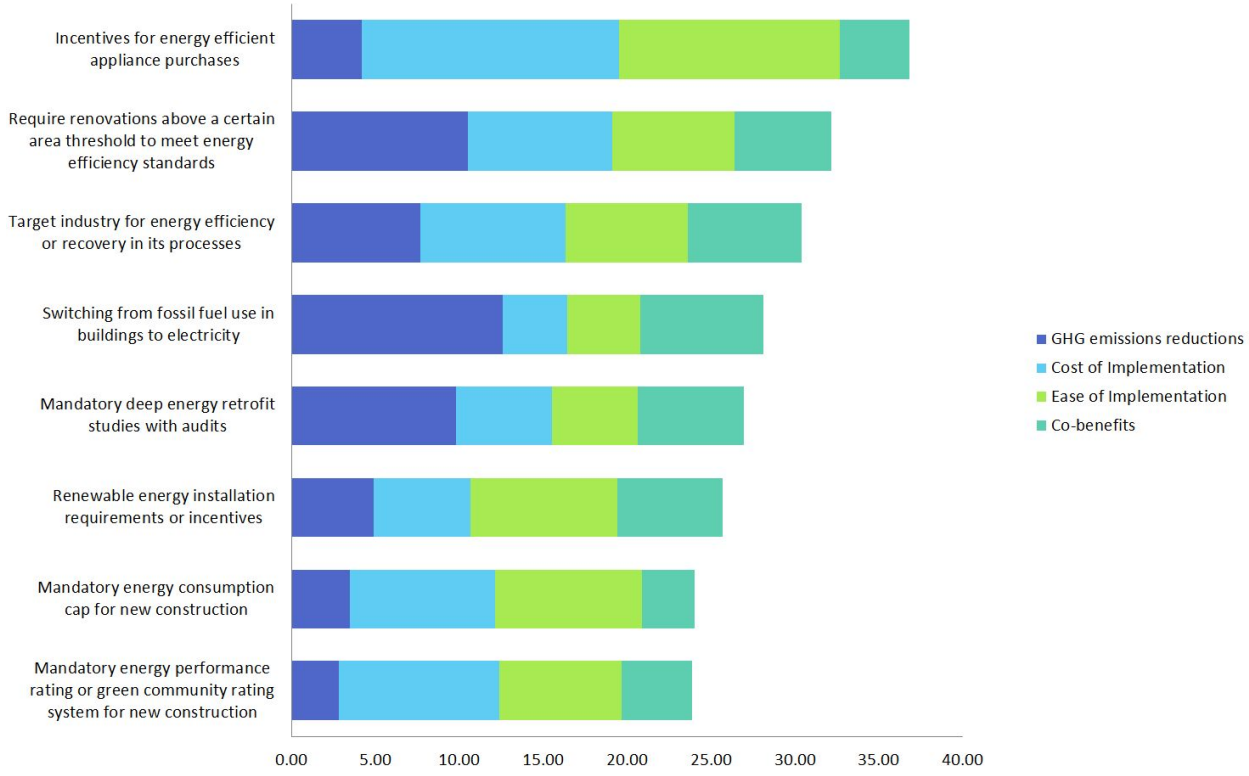
Transportation



Energy Supply



Buildings



Engagement Summary Appendix 3: Directors Engagement Session Questions

Solar PV and District Energy Groups

+10MW solar install every year starting in 2022 (i.e. Capreol size)

•What is the arrangement with utilities?
•Who has to be involved?
•Where to install?
•Who will own and operate the facilities? Who will keep the revenues?

12MW solar array on civic buildings

•What are the priority buildings?
•How could this be combined with a public bulk solar purchase program?
•What are the next steps?

Expand District Energy Systems

•What is required to connect more existing and future buildings up to existing DE systems?
•Where is there opportunity for new DE systems?

Electric Vehicles Groups

All new personal vehicles are electric by 2035
All new commercial vehicles are electric by 2030
Municipal fleet is electrified by 2035
Mining vehicles are electrified by 2035
Transit vehicles are electrified by 2040

Civic charging infrastructure

•What are the priority buildings?
•Where is curbside priority areas?
•What parking, traffic and land-use bylaws need to be considered?
•How would the City charge fees?

Personal/business charging infrastructure

•How can the City partner with employers to encourage charger installations?

Municipal fleet and transit

•What needs to change in the turnover/purchasing strategy to electrify the fleet?

Personal vehicles

•Can the City provide EV purchase incentive programs? Can it partner with dealers to encourage stocking EVs?

Transit and Active Mobility Groups

25% of trips made by public transit by 2050
20% of trips are made by walking and cycling by 2050

Increased transit service and use
•How can frequency and routes be further increased and optimized?
•How can the City partner with employers to offer transit incentive programs?
•What infrastructure improvements are needed?
•What mobile technology improvements could be made?

Walking and cycling
•Where can bike lane and sidewalk infrastructure be improved/implemented?
•What enhancements can be made to active mobility encouragement programs?
•How can the City partner with employers to offer incentive programs to employees?

Buildings Groups

Retrofit 80% of buildings to reduce 50% thermal energy demand & 30% electricity demand
Recommission large building systems every 5 years
New buildings are 15% more efficient every 5 years (90% by 2050)
Detached homes are 10% of new building stock by 2050 (focus on row/townhomes and apartments in infill areas)

Retrofit incentives
•What rebate programs can the City offer? (e.g. LED lights, low flow fixtures, windows & doors, energy audits, etc.)
•How could a PACE (property assessed clean energy) financing program be implemented?
•How can partnerships with utilities help?

Policy
•How can the local building code be updated every 5 years with improved energy efficiency requirements?
•What needs to be done to restrict suburban development and focus on infill?

Waste, Wastewater and RNG Groups

Waste diversion
•How can the City increase recycling and composting rates?
•How can the City partner with retailers in producing less packaging?
•How can the City partner with ICI groups to decrease their waste?
•What is the best solution for organic waste? How can the City implement it?

Renewable natural gas
•What are the opportunities to generate renewable natural gas for use in current natural gas systems? What volumes could be produced?
•How can current landfill methane capture be increased? Is it viable to supply the WWTP with methane for its operations?

Wastewater
•What are the most useful policies to implement to reduce wastewater volumes? How can they be implemented?
•How can the timeline for water pump replacement be accelerated?

Appendix 4: Directors Engagement Session Outputs

Municipal and personal electric vehicles

Priority Buildings

- Lorne St. garage, transit depot
- All roads/linear depots
- TDS
- LEL, emergency service depots
- Arenas, libraries, parks, customer service centres
- Pioneer Manor

Priority Curbside Areas

- Downtown
- Police satellite stations
- Potential problem with installation of charging infrastructure
- Could be low priority

Personal/Business Charging Infrastructure

- Incentivize through CIP areas
- User pay: infrastructure set up by private sector based on market
- Requirement by zoning, parking bylaw, and subdivision plans for new installations
- Tax on combustion engines to encourage switching to EVs = fund new infrastructure
- Educate on “range anxiety”
- One-time grant
- Tax exemption for certain number of years for each charging spot

Municipal Fleet and Transit

- Seek authority for electrification. Seek sources of funding for increased costs, 2035 time frame.
- Partner with other municipalities and by sector (e.g. EMS vehicles)
- Update the turnover/purchasing policy
- Bulk purchasing with other municipalities

Personal vehicles

- Provide resident incentives
- Partner with provincial and federal governments
- Link to PTIF or other programs
- Economic development incentives for parking or structures that accommodate EVs
- Credit in building permits for providing EV chargers

Fees

- User fee per kW - tax subsidy for civic vehicles
- Pay by plate technology
- Employee lots through payroll deduction
- Included in pay parking fees
- Possibility to provide via third party

Transit and Active Mobility

Opportunities

- TAP
- Funding ICIP
- Aligning HR policies to support transit
- Plan and build necessary infrastructure (e.g. priority lanes)
- TDM
- Active transportation coordinator position
- Revisit transit/action transportation priority in capital prioritization tool
- Sidewalk priority index
- Grow ridesharing
- Make transit cheaper to use than parking downtown

Challenges

- Cultural change
- Distances
- Investment
- Political will, resource constraints, competing priorities
- Lack of sidewalks and inconsistent approach for sidewalks in new developments
- Climate

Implementation Details

- 10-year plan for bus rapid transit
- Amend official plan and zoning
- Implement actions that grow ridership
- Mobile technology for on-demand service
- Monitor transit trends

Partners

- Employers
- Post secondary
- Secondary schools/consortium

Next Steps

- Update and create programs
- Update and create development standards
- Capital prioritization

Solar PV and District Energy

- All new buildings should be considered for new PV installations
- KED/Junction and other 640 CGS buildings should be evaluated
- Buy in bulk for discounts and lower payback periods
- Update building policies to encourage/require solar PV systems

Waste, Wastewater and RNG

- Consider landfill bans to increase diversion of organics and recyclables
- Increase composting rates
- Cap waste pickup amounts at 1 bag/household
- Consult ICI groups on how to reduce waste, increase waste diversion
- CIty should develop an organics action plan
- Existing landfill could be expanded or additional landfills created with methane capture systems to increase RNG production
- New homes could have heat recovery systems (greywater)
- Biodigesters and biosolids carbon capture methods could be employed at wastewater treatment plants
- Advanced metering could provide better water and wastewater data
- Create a water reservoir for greywater
- Encourage use of phosphate free biodegradable products
- Improve water pumping efficiency

Buildings

Opportunities

- Affordable housing retrofits have been effective but were reliant on grant funding
- LIC/Pace program of interest; has not been evaluated in Sudbury as of yet
- Bulk retrofits as economic development could be a powerful approach
- New dwellings are not cheap (~$400k); incremental costs of low carbon options may not be too expensive
- Possibility of using land-use policy to require/incentivise high performance new construction
- Some dwellings are in a rough condition and would benefit from retrofits

Challenges

- Lack of interest
- Low cost housing (small envelope from which to finance retrofits)
- Expertise of contractors
- Limited number of new dwellings/buildings

Next Steps

- Evaluate an LIC program
- Investigate strategies for new construction

Coalition for a Liveable Sudbury

Making connections. Working toward sustainability.

April 7, 2020

Coalition for a Liveable Sudbury letter of support for Greater Sudbury's Community Energy and Emissions Plan

Coalition for a Liveable Sudbury strongly supports Greater Sudbury's Community Energy and Emissions Plan to achieve net zero carbon emissions.

Addressing climate change is a strategic priority for Greater Sudbury. Action 3.2 of the Strategic Plan is to "Develop and Strengthen Strategies and Policies to Mitigate Impact of Climate Change," including to "Complete and implement Community Energy and Emissions Plan that will provide guidance to reduce greenhouse gas emissions."

On May 28, 2019 Council voted to declare a climate emergency and set a target of net zero carbon emissions by 2050, in line with science-based targets to avoid the worst impacts of climate change, and in response to a Climate Action Petition signed by over 2000 residents from every part of Greater Sudbury. Three hundred citizens from all over Greater Sudbury, mums & babies, families, students, and seniors were in attendance to support the vote. In September 2019, eight hundred residents of all ages, including hundreds of students from all schoolboards, attended Fridays for Future Sudbury youth's Earth Rally and Climate March, and the Rainbow District School Board declared a climate emergency. This is indicative of the strong support for climate action that we see in the community as a grassroots organization.

EarthCare Sudbury's December 2019 citizen survey quantified that support. Overall, 82% of Greater Sudbury residents are concerned or very concerned about climate change, and climate change is the top environmental issue for Greater Sudbury residents (48% of all residents; 76% of young adults). The great majority of residents (79%) support declaring a climate emergency and achieving net zero. Public support for climate action is strong and growing in Greater Sudbury.

The Greater Sudbury Community Energy and Emissions Plan (CEEP) sets out the actions we need to take as a City and community to achieve the target of net zero emissions by 2050. CEEP provides a path to a low-carbon future for Greater Sudbury with actions to reduce energy use and greenhouse gas emissions over the next 30 years while developing a low- carbon economy that saves on energy costs and creates green jobs. Net savings are expected by 2025, with a total of 7.33 billion dollars cost savings in net present value by 2050. It is anticipated that 40,000 person years of employment would be added to the community over the next 30 years.

Approximately 70% of global emissions are under the control or influence of municipal governments, and cities are recognized as crucial for climate action. Around the world, cities are taking action and doing their part to avoid climate catastrophe. Greater Sudbury, known for its environmental leadership in regreening, now shows its leadership in the defining challenge of our time. All communities face this challenge: the solutions we forge here in Greater Sudbury will benefit communities around the world. Likewise, we have the opportunity to learn and benefit from progress being made in other cities, as we collectively make this shift.

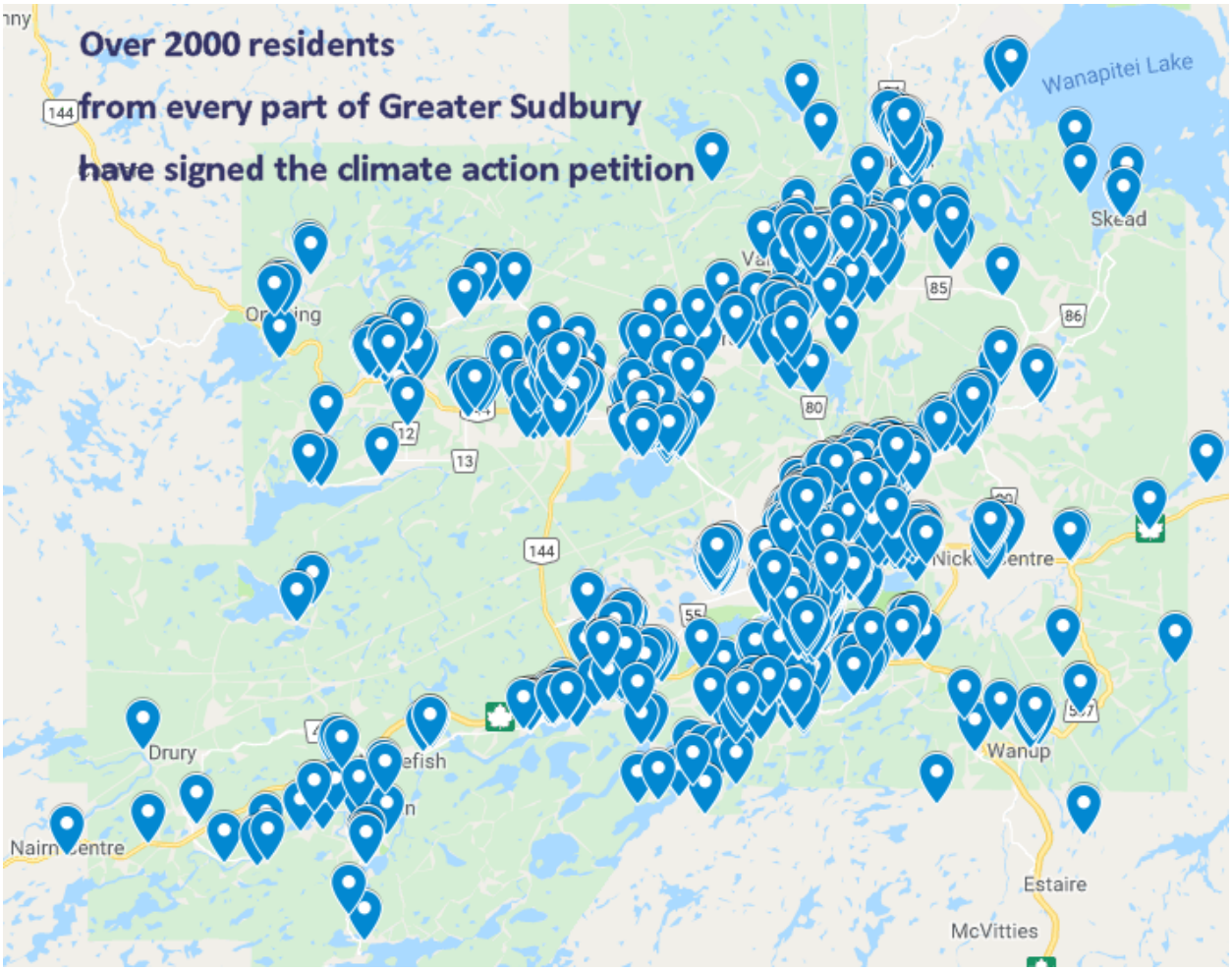
We thank Council for their leadership in acting on the climate emergency and moving the Community Energy and Emissions Plan forward. Around the world municipalities are facing the challenge of climate change, and Greater Sudbury is rising to that challenge. Around the world, community leaders carry the responsibility to do what is necessary for the sake of present and future generations, and Greater Sudbury Council is taking on that responsibility. It is exciting to have a plan to move forward in undertaking the necessary changes, within which there are not only challenges but great opportunity.

Just as we pulled together to re-green our landscape and heal our lakes when many thought it impossible, we will now lead the way to reduce our emissions and prepare for the changes already here, and for the bigger changes that are coming, to protect our community and give a good future to our children and grandchildren. As with regreening, this will take a coordinated community effort.

As a grassroots organization that supports citizens in taking action on the issues that matter to them, Coalition for a Liveable Sudbury is a part of this community effort. We support residents in voicing their support for climate action, and taking personal action. We have been doing this through hosting climate cafés and educational events, encouraging residents to sign a climate pledge and supporting them in taking follow-up action, and providing easy to understand information on CEEP and achieving net zero through postcards, flyers, social media posts, and an article series in English and French. This educational material is also distributed through other local organizations. As CEEP is implemented, we will continue to engage residents, support them in doing their part, and help coordinate efforts by local environmental organizations. As always, we will continue to be strong advocates for the necessary science-based climate action, implemented in an effective and equitable manner to the benefit of our community now and into the future.

At this time of heightened awareness on the value of science-based preventative action in the face of crisis, we look forward to Greater Sudbury's leadership and commitment on climate action.

Regards,
Naomi Grant
Co-Chair, Coalition for a Liveable Sudbury



Petitioners from every Ward and area of Greater Sudbury supported the declaration of a Climate Emergency and a target of net zero by 2050.

Conseil scolaire public du Grand Nord de l'Ontario
Parce que je vois grand

296, rue Van Horne, Sudbury ON P3B 1H9
Tél: (705) 671-1533
Téléc: (705) 671-1720
CSPGNO.ca

Le 15 avril 2020

Ville du Grand Sudbury
200, rue Brady
Sudbury ON P3A 5P3

Monsieur, madame,

La raison d'être du Conseil scolaire public du Grand Nord de l'Ontario (CSPGNO) est le bien-être et la réussite de chaque élève. Promouvoir et maintenir un environnement sain est une partie intégrale de la mission du CSPGNO. Tout comme la ville du Grand Sudbury, en ce qui concerne les changements climatiques, le conseil constate qu'il y a une urgence d'agir. Le CSPGNO a décidé au cours de l'année 2019-2020 d'officiellement mettre sur pied un comité sur l'environnement.

Comme le *Community Energy and Emission Plan* (CEEP) du Grand Sudbury le souligne, selon la trajectoire actuelle, Sudbury émettra dans l'atmosphère approximativement 1 303 900 tonnes de CO2 en 2020 et passera à 1 163 000 tonnes en 2050. Cette réduction est bien trop peu si l'on considère les recommandations de l'Accord de Paris sur le climat qui a été signé et ratifié par plus de 183 pays, dont le Canada.

Le gouvernement du Canada s'est engagé à ce que le pays réduise ses émissions de gaz à effet de serre de 30 % d'ici 2030. Ces mesures sont prises dans l'espoir de réduire le réchauffement climatique à 1, 5 ^{0}c maximum. Il est alors évident qu'il y a urgence d'agir. Le CSPGNO a une responsabilité, et croit fermement que collectivement nous parviendrons à l'objectif fixé par le CEEP au niveau local et éventuellement par l'Accord de Paris au niveau international.

Le CSPGNO reconnait le grand travail amorcé par les consultations communautaires dans le cadre d'Énergisons le Grand Sudbury et qu'il est important de prioriser :

1. *de rendre nos déplacements et nos immeubles plus écoénergétiques;*
2. *de tirer profit des possibilités d'énergie renouvelable;*
3. *de faire de bons investissements dans l'énergie et la communauté;*
4. *de réduire la consommation d'énergie et les dépenses liées à l'énergie;*
5. *de réduire les émissions de gaz à effet de serre;*
6. *de créer d'autres emplois et d'améliorer l'aménagement de notre ville.*

— Extrait d'Énergisons le Grand Sudbury - 2020

Dans le dossier de l'environnement, la question du leadership demeure extrêmement importante et le CSPGNO se réjouit du rôle que la ville du Grand Sudbury propose prendre au sein de notre communauté. La municipalité est sans doute très bien positionnée pour être un leader dans la lutte

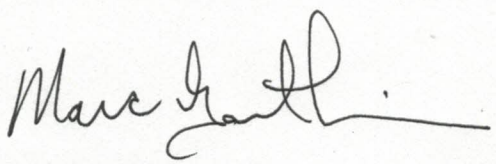
aux changements climatiques. Avec son leadership et l'appui des autres partenaires communautaires, la ville du Grand Sudbury pourrait initier plusieurs grands changements. Selon le CEEP, la ville souhaite mener les actions nécessaires pour réduire l'émission de gaz à effet de serre de 100 % d'ici 2050. Comme la devise du CSPGNO l'indique, « *parce que je vois grand* », cette cible est ambitieuse, mais réaliste et soutenue par des gens de grande qualité.

L'expertise et l'ingéniosité que l'atteinte de cet objectif exige, peut devenir un grand projet collectif pour lequel le CSPGNO se réjouirait de prendre part. Le CEEP nécessite l'engagement communautaire, et tout comme la ville du Grand Sudbury, le CSPGNO considère que les grands projets de société se réalisent lorsqu'une collectivité travaille de concert.

Cette lettre d'appui est avant tout un engagement du CSPGNO à collaborer avec la ville du Grand Sudbury ainsi qu'avec l'ensemble de la communauté pour réduire notre empreinte environnementale. Le CSPGNO réitère sa volonté d'être partenaire du changement en matière d'environnement.

Messieurs, Mesdames, veuillez recevoir mes plus respectueuses salutations.

Directeur de l'éducation



Marc Gauthier

Dalron
SINCE 1969 130 Elm St., Sudbury, ON P3C1T6 Tel: (705)560-9770 Fax: (705)560-9800 www.dalron.com

July 7, 2020

Stephen Monet
Manager of Environmental Planning Initiatives
City of Greater Sudbury
P.O Box 5000, Station A
Sudbury, ON P3A5P3

RE: CEEP Program Support

Dalron is a proud supporter of the CEEP program concept's 30 year plan. We believe this program to be absolutely warranted and also to be an incredible initiative.

Around the world, all human beings have relied on the earth and the environment in the past for their well being and we cannot take this for granted. Many expect our environment to remain healthy for ours and future generations.

Dalron believes however that this cannot be achieved without commitment, effort, resetting our priorities and sacrifice.

Dalron has supported this kind of belief by modifying our standard procedures step by step since 1975. Among other changes, in 1975, blanketing our structures with continuous insulation became standardized. 42 years later, in 2017, the Ontario Building Code demanded this.

We completed the first R2000 home in Ontario and second in Canada in 1983. This home reduced heating fuel consumption at the time by 75%, We have completed 2 energy efficiency research homes since then.

Reducing energy consumption and pollution/carbon emissions is paramount and work hand in hand. This is what CEEP is all about !

What we have learned since 1975 is that people have their limits and that many will prioritize their spending on other things. The cause of CEEP is extremely important. To truly support that cause will

require the commitment of city staff and their leadership however unpopular it may be. It will require new ideas, passion and commitment. It will require your constituents to jump on board.

1 small step at a time can go a long way in 30 years. For the city and community to reduce GHC emissions to Net "0" by 2050 is a lofty goal. If you try hard and only get part way there, won't it still be a win for our environment and for the future?

We have been given so much. Time to appreciate and give a little back.

Sincerely,

Dave Arnold
Vice President, the Dalron Group
darnold@dalron.com
C. 705 691 3119

Enbridge
500 Consumers Road
North York, Ontario M2J 1P8
Canada

March 25, 2020

Jennifer Babin-Fenske, Ph.D.
Coordinator of EarthCare Sudbury Initiatives
City of Greater Sudbury
200 Brady St.
Sudbury, ON, P3A 5P3

Dear Jennifer,

Re: Letter of Support for the Community Energy & Emissions Plan

On behalf of Enbridge Gas Inc. ("Enbridge Gas"), I am pleased to provide a letter of support for the development of a Community Energy & Emissions Plan (CEEP) for the City of Greater Sudbury.

The development of a Community Energy & Emissions Plan will enable the community to:

- assess broader Municipal energy use and greenhouse gas emissions
- identify opportunities to conserve
- improve energy efficiency and reduce greenhouse gas emissions
- consider the impact of future growth and options for local clean energy generation, fuel switching and storage; and
- support local economic development

Enbridge Gas will support the development of a Greater Sudbury Community Energy & Emissions Plan through:

- the provision of aggregated Municipal consumption data at two geographical levels, through the Data Usage Agreement and License prepared by Enbridge Gas and signed by Greater Sudbury:
    - Total municipality – segmented by residential, commercial and industrial users (including large contracts)
    - By six digit postal code - segmented by residential, commercial and industrial users (excluding large contracts) in accordance with Enbridge Gas's protocols
- Participation in the Steering Committee

Furthermore, we will provide information on our Demand Side Management (DSM) programs as well as energy efficient technologies and alternative fuel solutions as appropriate. With more than 20 years' experience in energy conservation, we have the expertise to help the City of Greater Sudbury identify energy saving opportunities for inclusion in the Community Energy & Emissions Plan.

We are pleased to support this initiative and to be an active participant in the process.

Yours truly,

Chris Hamilton

Chris Hamilton
Supervisor, Municipal Energy Solutions

ENBRIDGE
TEL: 416-495-6990
500 Consumers Rd., North York, Ontario, M2J 1P8

enbridge.com
Integrity. Safety. Respect.

Health Sciences North
Horizon Santé-Nord

May 14, 2020

Jennifer Babin-Fenske
Coordinator, EarthCare Sudbury Initiatives
City of Greater Sudbury
200 Brady St.
Sudbury, ON
P3A 5P3

Jennifer, Dear Jennifer,

This is a letter of support for the Greater Sudbury Community Energy Plan (CEEP) on behalf of Health Sciences North.

The Greater Sudbury Community Energy Plan (CEEP) stems from years of energy and emissions reduction initiatives in our community. Many local organizations have already made significant investments in reducing energy use, which have led to Green House Gas (GHG) reductions, and they continue to be committed to further reductions as part of their corporate sustainability initiatives.

The CEEP's implementation will rely on City political and staff leadership. It will also rely on stakeholders from industry, institutions, and the community to come together to share their passion, ideas and commitments. Health Sciences North supports this notion and is working towards achieving many of the same goals as the CEEP.

Health Sciences North's energy management program aims to reduce operating costs while enabling us to provide innovative patient-centered care to a greater number of persons in the community. Since 2013, in partnership with Greater Sudbury Utilities and the SaveOnEnergy program, Health Sciences North has been able to reduce its electricity consumption at the Ramsey Lake Health Centre by 15%, Sudbury Outpatient Centre by 32% and 31% at the Kirkwood Site through a number of projects.

Some of the projects that Health Sciences North has been working on to reduce our energy consumption are as follows:

- Installation of 5-star energy efficient filters
- Replacement of exit signs to running man
- VFD installations
- Mechanical room and other occupancy sensors
- Replacement of standard T8 bulbs to LED

.../2

In completing these projects along with others, Health Sciences North has been able to reduce its energy consumption over the past few years and will continue to do so in the years to come as new incentives become available and as newer technologies arise. Some of the future projects Health Sciences North could potentially move forward with are as follows:

- Exterior Windows Replacements
- Increased Lighting Controls
- Geothermal / Ice Storage
- Thermal Storage
- Solar
- Building Automation Upgrades
- Steam Boiler Optimization

Health Sciences North agrees with the direction of the CEEP and plans to continue to align with Greater Sudbury's efforts and with those of hundreds of other municipalities across the globe who are taking action for a better future.

Sincerely,

Dominic Giroux
President & CEO,
HSN & HSNRI

LaurentianUniversity
UniversitéLaurentienne
McEWEN SCHOOL OF ARCHITECTURE ÉCOLE D'ARCHITECTURE

McEwen School of Architecture
École d'architecture McEwen
Tel/Tél.: 705-673-6500
architecture@laurentian.ca
architecture@laurentienne.ca

McEwen School of Architecture
Laurentian University
85 Elm Street
Sudbury, ON P3C 1T3

July 9, 2020

Your Worship Mayor Bigger,
Members of Council,

The City of Greater Sudbury Council's May 28, 2019 Climate Emergency Declaration set a strong direction for the City and Community to reduce GHG emissions to net-zero by 2050.

The McEwen School of Architecture (MSoA) in Downtown Sudbury wishes to applaud this bold initiative. We were honoured to participate in the CEEP Stakeholder Meeting in November 2019. It was clear that this is a plan with a vision being taken very seriously by City departments and the Community. Tangible goals and metrics were discussed to enable the community to see very soon that real CEEP projects are being planned, implemented, and results achieved. Most impressive was the sense of collaborative urgency in the room. City, mining, environmental, education and housing representatives were all there, enthused to discuss ideas for following through on the Declaration commitment.

At the same time, MSoA was also honoured to have Jason McLennan, founder of the internationally renowned Living Building Challenge, MSoA board member and Sudbury son present his vision for new challenges to continue to build on the successes of Living Building. Follow-up workshop sessions included consideration of studies of the School building to look at ways to continue to increase its sustainable performance and reduce GHG's. This is in addition to the studios and core courses of the architecture program that are designed to nurture our gifted relationship with nature through a respectful approach to realizing our built environment through design.

For the summer of 2020, MSoA also launched the Sudbury 2050 Urban Design Ideas Competition to mark a watershed moment in the history of Greater Sudbury. The Competition sets out a bold challenge to the international design community to offer an inspiring, sustainable vision for the City looking toward 2050 when the City's Community Energy and Emissions Plan will be fully implemented. Together, such initiatives will inevitably lead to an enviable, truly sustainable community for all.

We at the McEwen School of Architecture will be doing our part to support our Community's inspiring journey toward a net-zero community in the 21st century through the Greater Sudbury Community Energy and Emissions Plan.

Regards,

David T. Fortin
Director, MSoA

Terrance Galvin
Founding Director, MSoA

Ted Wilson
Master Lecturer, MSoA

NORCAT SKILLS TRAINING FOR THE FUTURE

Ms. Jennifer Babin-Fenske, Ph.D
Coordinator of EarthCare Sudbury Initiatives
City of Greater Sudbury

RE: Support for Greater Sudbury Community Energy and Emissions Plan

Dear Jennifer,

On behalf of NORCAT, I am pleased to offer support to the Greater Sudbury Community Energy and Emissions Plan (CEEP).

NORCAT shares the CEEP's vision for a local energy future that supports jobs and local economic development while improving quality of life. The CEEP's goal to use energy, emissions, land-use and financial modelling to determine the community wide efforts required to meet a 2050 net-zero emissions target is a commendable one. After reviewing the plan, we feel the recommendations are achievable and lay an important foundation to meeting this goal.

The Greater Sudbury Community Energy and Emissions Plan will have profound beneficial impacts on the health and quality of life of current and future citizens of the City of Greater Sudbury, as well as the local economy, with 40,000 person years of employment expected to be created through the new local economy of renewable energy and construction goods. Many components of the plan recommend collaboration between energy experts, City staff and officials, local business and institutions, not-for-profit organizations, and the community to further develop and enhance energy reduction programs for the residential, industrial, commercial and institutional sectors. NORCAT fully supports this co-operative approach and NORCAT is committed to further reductions as part of our corporate sustainability initiatives.

Sincerely,

Don Duval, CEO

NORCAT

SUDBURY
INTEGRATED NICKEL
OPERATIONS
A GLENCORE COMPANY

April 20, 2020

Stephen Monet,
Manager of Environmental
Planning Initiatives
City of Greater Sudbury
P.O. Box 5000, Station 'A'
Sudbury, ON Canada
P3A 5P3

Dear Stephen Monet:

RE: Greater Sudbury – Community Energy and Emissions Plan

Thank you for the opportunity to comment on the City of Greater Sudbury Community Energy and Emissions Plan (CEEP). Although ambitious, the Reduce-Improve-Switch paradigm is both sound and innovative, and truly addresses the 'northern' municipalities' need to remain operationally and financially sustainable. More energy efficient buildings and the electrification of public and private transportation continue to be the main drivers to effectively mitigate Climate change, especially with a view of the next 20-30 years.

Glencore, as one of the world's large diversified resource companies, operates more than 150 sites and offices in over 35 countries, and employs more than 160,000 employees and contractors worldwide. The scale and diversity of our operations varies by location. Glencore has a definite role to play in enabling the transition to a lower carbon economy. We have adopted the principals and goals of the Paris Accord along with supporting the UN Sustainable Development goals of ensuring universal access to affordable energy.

Glencore's Sudbury Integrated Nickel Operations (Sudbury INO) has been providing safe and world class sustainable operations for almost a century while generating significant economic benefit in the country, and playing a very crucial role in Northern Ontario.

Sudbury Integrated Nickel Operations
6 Edison Road, Falconbridge, Ontario, Canada P0M 1S0
Tel +1 705-693-2761 Fax +1 705-699-3431

Glencore Canada Corporation
100 King Street West, Suite 7200, P.O. Box 405, Toronto, Ontario, Canada M3X 1E3
Tel +1 416-775-1200 Fax +1 416-775-1290 www.glencorexstrata.com

At Sudbury INO, energy remains one of our highest production costs; therefore for viability, it is incumbent on our operations to continually improve on energy efficiency as well as reducing our greenhouse gas (GHG) emissions.

Over the last two decades, we have concentrated on the continued reduction of those parameters (i.e, S02 and metals) directly related to community health risks and the environment. However, we face the challenge that the available technology to reduce S02 largely conflicts with the concept of GHG reduction.

As part of our smelting operations, the calciner was commissioned for the pre-treatment of secondary feeds, such as spent batteries, in order to contribute to the sustainable re-use of metals. The oxidation of plastics and other organic material require treatment for the gas through secondary combustion, thus leading to an increase in over-all Smelter C02 emissions. As a result, Sudbury INO continues to research available technology to address these challenges moving forward.

One of the keys to the future of Sudbury INO is positioning the business to advance deep mining projects known as the Craig Mine - Onaping Depth (OD) and Nickel Rim Depth (NRD) projects. In order to evolve these projects into sustainable and viable mining operations, Glencore is investing in innovation and technology to build the 'mines of the future'. Once built, our mine projects will turn into modern ultra-deep mines, using battery electric equipment along with digital technology throughout the mines. The benefits of this technology include direct and indirect GHG reductions, heat and noise reductions, and improved working conditions for the employees and contractors. In all, Sudbury INO has demonstrated a history of incorporating energy-efficient and GHG reducing technology into its operations. Our Nickel Rim South mine utilizes ventilation on demand (VOD) to reduce energy, and the on-site administrative building is certified LEED Gold.

With 1,300 employees at our Sudbury operations, we take matters of climate change very seriously. Initiated 10 years ago, a basin-wide Climate Change Adaptation Working Group was formed, with the mandate of completing extensive scenario-driven risk assessments based on projections from global climate models and shorter-term weather patterns. These initiatives have directed projects to continually improve site water management and infrastructure integrity, differentiating between seasonal 'coping' mechanisms and longer term adaptation planning. In summary, we now evaluate all aspects of our integrated operations with a climate change lens.

As always, we welcome the opportunity to expand on our work with interested parties.

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SUDBURY
INTEGRATED NICKEL
OPERATIONS
A GLENCORE COMPANY

Please contact me if you have any questions or comments. I can be reached at marc.butler@glencore.ca or by telephone at 705 693-2761 ext. 3356.

Sincerely,

Marc Butler
Director of Regulatory Affairs
Sudbury Integrated Nickel Operations

Sudbury Integrated Nickel Operations
6 Edison Road, Falconbridge, Ontario, Canada P0M 1S0
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March 19, 2020

Dr. Stephen Monet
Director of Environmental Planning Initiatives
City of Greater Sudbury
200 Brady Street
P.O. Box 5000 Stn. A
Sudbury, Ontario
P3A 5P3

Re: Greater Sudbury Community Energy and Emissions Plan

Dear Dr. Monet,

Please consider this letter as enthusiastic support for the City of Greater Sudbury's implementation of the Community Energy and Emissions Plan (CEEP).

As you know, Vale has initiated several projects, such as the replacement of some of our underground diesel-powered equipment with battery-electric vehicles, that will help to reduce our greenhouse gas emissions now and into the future.

Recently, Vale declared its alignment with the Paris Agreement, with a commitment to a 33% reduction of greenhouse gases from our 2017 baseline by 2030 and being carbon neutral, globally, by 2050. This ambitious goal necessitates the development of an aggressive and disciplined carbon reduction plan that will inevitably rely, in part, on the support of other stakeholders, such as the City of Greater Sudbury.

We are encouraged to see the City's commitment to reducing energy use and reducing greenhouse gas emissions. We recognize the importance of a coordinated approach in the community to develop effective strategies that will ensure a sustainable future and we look forward to working with you to ensure success.

Sincerely,

Glen Watson
Specialist – Sustainability & Regulatory Affairs

Vale Canada Limited
Sudbury Operations
337 Power Street, Sudbury, ON P0M 1N0

Sudbury Student Services
Consortium
de services aux élèves de Sudbury

199 Travers Street • Sudbury • Ontario • P3C 3K2 • Tel./ Tél. (705) 521-1234 • Fax / Téléc. (705) 521-1344

March 26, 2020

Jennifer Babin-Fenske
Coordinator of EarthCare Sudbury Initiatives
200 Brady Street
Sudbury Ontario
P3A 5P3

Re: Support for the Greater Sudbury Community Energy and Emissions Plan

Dear Ms. Babin-Fenske:

I write of behalf of the Sudbury Student Services Consortium in support of the Greater Sudbury Community Energy & Emissions Plan. The Sudbury Student Services Consortium is a non-for-profit organization that coordinates daily school purpose transportation for 20,000 students on 400 school buses, for the four local school boards as well as for a coterminous school board and four First Nations.

The Community Energy & Emissions Plan employs three key concepts in determining its recommended actions: The Reduce-Improve-Switch paradigm (reduce energy use, improve efficiency, and switch to low-carbon energy sources). This concept is directly in-line with the Sudbury Student Services Consortium's mission, "providing a safe and efficient transportation system (…)" and the reason why we truly support this plan.

Reduce
As an organization which regularly reviews the efficiency of school bus routes, I can attest that our work has reduced the amount of school buses travelling our roads by over 100 since our inception. We have also implemented a policy in order to reduce children's exposure to diesel exhaust by limiting school bus idling.

Improve Efficiency
The Sudbury Student Services Consortium is committed to continue reviewing school bus routes by proposing bell time changes and by improving route logistics in order to remain efficient in its operations. Our Consortium has the highest percentage of shared routes among its school boards in the province and will strive to remain top of the list.

Switch
We will continue to encourage our contracted school bus operators to switch to cleaner fuels, such as moving towards gas powered vehicles rather than diesel and we will continue to look at the feasibility studies of cleaner energy for the future.

We look forward to working with other CEEP stakeholders in reducing the community's overall energy use and greenhouse gas emissions, in order to address climate change, improve local air quality and improve health and community livability.

If you require additional information please contact me. Thanking you in advance for your continued cooperation in ensuring the safety of our students.

Sincerely,

Renée Boucher

Renée Boucher
Executive Director

Hydro One Networks Inc.
TCT - Hydro One Head Office
483 Bay Street,
Toronto, ON, M5G 2P5
www.HydroOne.com

Tel: (416) 345 5000

August 27, 2020

Dr. Jennifer Babin-Fenske
EarthCare Sudbury Initiatives
City of Greater Sudbury
200 Brady Street
Sudbury, ON, P3A 5P3

Dear Sir/Madam:

RE: Letter of Support for the Greater Sudbury Community Energy and Emission Plan (CEEP)

On behalf of Hydro One Networks Inc., it is my pleasure to provide this letter of support for the development of the Greater Sudbury Community Energy and Emission Plan (CEEP) for the City of Greater Sudbury.

This Plan responds to City Council's May 28, 2019 Climate Emergency declaration, which sets a strong direction for the City and community to reduce GHG emissions to net-zero by 2050. It aims to explore energy opportunities for the community and create a vision for a local energy future that supports jobs and local economic development while improving quality of life and addressing climate change impacts.

We are pleased to support this initiative as an active LDC program participant.

Should you have any questions, please feel free to contact Nasreddine Guerfala in our office at Nasreddine.Guerfala@hydroone.com.

Sincerely,

S. Lisa Lee
Director, Customer Solutions
Hydro One Networks Inc.

Presented To:	City Council
Presented:	Tuesday, Sep 22, 2020
Report Date	Friday, Aug 21, 2020
Type:	Managers' Reports

For Information Only

Playground Revitalization Update 2020

Resolution

For Information Only

Relationship to the Strategic Plan / Health Impact Assessment

This report supports Council's Strategic Plan in the area of Quality of Life and Place as it aligns with the Population Health Priorities of Families, Play Opportunities and Age Friendly Strategy. Revitalization of playgrounds provides inviting, safe play spaces for all residents to enjoy.

Report Summary

This report provides an update on the 15 playground sites included in phase two of the Playground Revitalization Project.

The report also provides an update on the capital fundraising campaign United Way Centraide North Eastern Ontario (UWCNEO) committed to during the 2018 budget deliberations.

Financial Implications

As part of the 2018 budget process, Council approved $2.3 million for Playground Revitalization with an annual contribution from the Healthy Community Initiative funds in the amount of $150,000 per year to fund debt payments for 25 years. Also during deliberations, the UWCNEO committed to match the City's investment in Playground Revitalization. Due to COVID-19, this fundraising has been deferred until the Summer of 2021.

Signed By

Report Prepared By
Jeff Pafford
Director of Leisure Services
Digitally Signed Aug 21, 20

Division Review
Jeff Pafford
Director of Leisure Services
Digitally Signed Aug 21, 20

Financial Implications
Steve Facey
Manager of Financial Planning & Budgeting
Digitally Signed Aug 21, 20

Recommended by the Department
Steve Jacques
General Manager of Community Development
Digitally Signed Aug 21, 20

Recommended by the C.A.O.
Ed Archer
Chief Administrative Officer
Digitally Signed Sep 9, 20

Executive Summary

This report provides an update on the 15 playground sites included in phase two of the Playground Revitalization Project.

The report also provides an update on the capital fundraising campaign United Way Centraide North Eastern Ontario (UWCNEO) committed to during the 2018 budget deliberations. Due to limited staffing resources and challenges presented by the COVID-19 situation, UWCNEO has stated they will be deferring any fundraising efforts towards the project until the summer of 2021.

As a result, no further playground sites will be revitalized until the City of Greater Sudbury receives funds or a commitment in the form of an agreement.

Background

As part of the 2018 budget deliberation process, a business case for the revitalization of 58 playground sites identified as being in poor condition was included for Council's consideration. The business case outlined capital investment to upgrade 58 playground sites at an estimated cost of $40,000 per site for a total of $2,320,000.

During the budget deliberation process, Council was also informed about the United Way Centraide North East Ontario's commitment to match the City's investment in Playground Revitalization through a fundraising campaign. The United Way's contribution would supplement the City's budget and result in an average investment of $80,000 per playground site. The Finance and Administration Committee approved $2.3 million for Playground Revitalization with an annual contribution from the Healthy Community Initiative (HCI) funds in the amount of $150,000 per year to cover debt payments for 25 years.

At the May 11, 2019 Community Services Committee meeting, Council received a report titled "Playground Revitalization Update 2019". The report provided an update on the twelve playgrounds which were identified for revitalization as part of the first phase of the project. The report also informed Council on the Standing Offer issued for the design, supply and installation of playground equipment to advance future phases of the project and other playground builds. The report identified the following locations to be included as part of phase two of the project which were to be initiated in 2019:

- Participation Tot Lot (Byng Street, Sudbury)
- Queen's Athletic Sports Complex (30 Cypress Street, Sudbury)
- Meatbird Lake Tot Lot (785 Municipal Road 24, Lively)
- Algoma Tot Lot (Main Street East, Chelmsford)
- Russell Beaudry Playground (10 Juniper Avenue, Onaping)
- Birch Tot Lot (2450 Birch Street, Azilda)
- MacMillan Tot Lot (MacMillan Drive, Val Caron)
- Catherine Park (Catherine Drive, Garson)
- Doug Mohns Sports Complex (100 Field Street, Capreol)
- Ravine Park (Garson)
- Paquette Tot Lot (Paquette Street, Sudbury)
- Ray Street Tot Lot (Ray Street, Wahnapitae)
- Cedar Park Playground (47 Normandy Court, Sudbury)

- Columbus Tot Lot (Melvin Avenue, Sudbury)
- Eyre Playground (243 Ferndale Avenue, Sudbury)

Playground Revitalization Phase Two Update

Following the award of Contract CDD19-22 (Request for Proposal for Standing Offers (RFPSO) for the design, supply and installation of playground equipment), community consultation sessions were hosted in the summer of 2019 for each of the 15 locations identified for phase two of the project.

Due to COVID-19, there have been delays with respect to the ability to obtain equipment and installation of structures. The following is an update of phase two locations:

- Participation Tot Lot (to be completed October 2020)
- Queen's Athletic Sports Complex (to be completed November 2020)
- Meatbird Lake Tot Lot (see below)
- Algoma Tot Lot (completed)
- Russell Beaudry Playground (completed)
- Birch Tot Lot (completed)
- MacMillan Tot Lot (completed)
- Catherine Park (completed)
- Doug Mohns Sports Complex (to be completed October 2020)
- Ravine Park (substantial completion, installation of basketball hoop remains)
- Paquette Tot Lot (completed)
- Ray Street Tot Lot (completed)
- Cedar Park Playground (completed)
- Columbus Tot Lot (substantial completion, landscaping work remains)
- Eyre Playground (substantial completion, installation of independent play equipment remains)

United Way Centraide Update

In January 2020, City staff reached out to United Way Centraide North East Ontario (UNWCNEO) for an update on their capital fundraising campaign towards the project. In February 2020, City staff met with the UWCNEO Executive Director to discuss the need for a more formal contribution agreement and it was agreed that the City would provide a framework, which would outline options regarding potential payment schedules and project responsibilities.

Following the COVID-19 pandemic, UNWCNEO representatives advised the City that it is unable to commit to entering into a contract with the City of Greater Sudbury for the funding of the revitalization of playgrounds, however, are committed to work alongside the City in order to make this project a success.

UNWCNEO cited the significant reductions in their staffing resources as a factor. United Way Centraide North East Ontario operates across six Districts (Sudbury, Cochrane, Timiskaming, Nipissing, Parry Sound and Manitoulin) and have had their full time compliment of employees reduced from 16 in 2018 to a current level of eight full time employees. Currently UWCNEO employs one fundraiser in Sudbury and one in Timmins; both work primarily on workplace campaigns.

The need for funding of programs and services in the community has more than doubled since March 2020 (Appendix A) and is expected to continue into 2021 and 2022. UNWCNEO has also stated COVID-19 has also had significant impacts on their ability to fundraise as typical funding sources are not generating anticipated revenue:

- Loss of Sudbury Wolves United/ Sudbury 5 revenue in 2020 expected to be $300,000 gross. Permanent loss of this revenue stream expected in spring 2021.
- Expected negative impact on workplace campaigns into 2021 of between 15% and 30% ($300,000 to $600,000).

During the pandemic UNWCNEO has shifted its focus on addressing urgent needs for food, shelter, hygiene and personal protection equipment in our community with responsibilities for the distribution of Government of Canada funds to support charities and municipalities with focus on supporting seniors and vulnerable populations.

For these reasons, UNWCNEO representatives have expressed the organization will be deferring the Playground Revitalization Project conversation until the summer of 2021 to allow for a better understanding of the impact of COVID-19 on UWCNEO revenue generation and the urgent needs of our community/funded partners in the coming months. This will allow the organization to present a more accurate partnership plan for solicitation of funds for the project.

Future Phases of Playground Revitalization

To date, all but $75,000 of the City's $2.3M contribution has been spent or committed on the first two phases of the Playground Revitalization Project. UWCNEO collaborated with the City for a $7,000 grant towards the project. The project will be suspended until future funds are committed through a formal agreement or alternate funds are received.

The following sites remain to be completed (playgrounds which have been rated in poor condition and require replacement). City staff have established a revitalization budget for each site based on existing amenities:

Playground	Ward	Estimated Replacement Cost
St. Charles Park	1	$ 140,000
VLA Playground	2	42,000
Simon Lake Playground	2	65,000
Black Lake	2	42,000
Penage Road Community Centre	2	10,000
Den Lou Playground	2	65,000
Centennial Park	2	150,000
Whitefish Playground	2	75,000
Gill Loop	3	45,000
Pine and Fir	3	10,000
Onaping Tot Lot	3	42,000
Shawn Tot Lot	4	50,000
Grandview Playground	5	70,000
Daniel Tot Lot	5	80,000
Pine Street	7	60,000
Central Lane	7	50,000

Brighton Tot Lot	7	37,000
Thomas Tot Lot	7	70,000
Parkinson Tot Lot	7	80,000
Rose Marie Playground	8	45,000
Don Lita	8	150,000
Lebel Playground	8	120,000
Mountainview Playground	9	60,000
Moonlight Beach	11	150,000
	Total	$ 1,708,000
	Contingency	15%
	Estimated Total Replacement Costs	$ 1,964,000

Total replacement costs for the sites noted above is $1,708,000. When adding a 15% contingency, at total estimated amount of $1,964,000 is required to complete the Playground Revitalization Project.

The following locations, originally identified for playground revitalization, are not included above due to recent developments:

- Centennial Arena Playground (potential of Valley East Twin Pad Project)
- Meatbird Lake Park (potential land disposition)
- Raymond Plourde Playground (potential of Valley East Twin Pad Project)
- Summerhill Park (to be replaced through insurance coverage due to vehicle collision)

Annual inspections on play equipment will continue to take place. Should individual components fail inspection, equipment will be safeguarded and placed out of service until funding can be secured for replacement.

Next Steps

United Way Centraide North East Ontario has expressed their commitment to this project and City staff will work with the organization with the aims of their capital fundraising campaign being restarted in the summer of 2021. Staff will provide updates on developments of playground revitalization efforts to the Community Services Committee.

References

Playground Revitalization Update 2019, Community Services Committee (May 11, 2019)
https://agendasonline.greatersudbury.ca/index.cfm?pg=feed&action=file&agenda=report&itemid=7&id=1353

Playground Revitalization Update, Community Services Committee (September 25, 2018)
http://agendasonline.greatersudbury.ca/index.cfm?pg=agenda&action=navigator&id=1247&itemid=15433&lang=en

Playground Revitalization Final Report, Community Services Committee (December 5, 2017)
http://agendasonline.greatersudbury.ca/index.cfm?pg=feed&action=file&agenda=report&itemid=3&id=1155

Playground Revitalization Incremental Report #1, Community Services Committee (June 19, 2017)
http://agendasonline.greatersudbury.ca/index.cfm?pg=feed&action=file&agenda=report&itemid=5&id=1152

Playground Revitalization Report, Finance and Administration Committee (April 12, 2017)
http://agendasonline.greatersudbury.ca/index.cfm?pg=agenda&action=navigator&lang=en&id=1169&itemid=12145

Playgrounds Report, Finance and Administration Committee (September 20, 2016)
http://agendasonline.greatersudbury.ca/index.cfm?pg=feed&action=file&agenda=report&itemid=7&id=973

United Way Centraide
North East Ontario
Nord-est de l'Ontario

Report to City of Greater Sudbury, Funding since March 31, 2020

UWCNEO Sudbury Allocations: supporting our community partners

AGENCY	PROGRAM	AMOUNT
Association des jeunes de la rue	Community Outreach Program	25,500
Better Beginnings, Better Futures	Baby's Breath Program	21,000
Better Beginnings, Better Futures	Good Food Box Program	20,000
Better Beginnings, Better Futures	Pre-Teen Program	15,000
Big Brothers, Big Sisters	Matching Program	50,000
Carrefour francophone de Sudbury	Arts et culture	12,750
Carrefour francophone de Sudbury	Camps d'été	12,750
Elizabeth Fry Society	On-Going Support & Volunteer Service	45,000
Elizabeth Fry Society	Open Arts Studio Program	15,000
Health Sciences North	VOICES For Women Sexual Assault Centre	41,000
Inner City Home Of Sudbury	Life Skills & Hospitality Workshops	10,000
John Howard Society	Community Support Initiative	51,000
John Howard Society	Dads Matter Program	15,000
Learning Disabilities Association	Coaching Program & Assistive Technology	12,500
Learning Disabilities Association	Community Outreach & Awareness	12,500
Learning Disabilities Association	Community Resources Program	30,000
Maison McCulloch Hospice	Supportive Care Program	30,000
March Of Dimes	Assistive Devices Program	28,000
Meals On Wheels	Hot Meal Program	25,000
St John's Ambulance	Community Service Patient Care Division	25,000
YMCA Sudbury	Building Strong Kids Program	58,000
YWCA Sudbury Genevra House	Community Outreach Program	40,000
	Total	**595,000**

Community Response Fund: Greater Sudbury Only: (Emergency funds, funding continues)

AGENCY	PROGRAM	AMOUNT
Inner City Home	Food	$2,500.00
Sudbury Women's Centre	Basic supplies for 50 families	$1,000.00
CMHA - Sudbury/Manitoulin	Off the Street Shelter	$3,000.00
Sudbury Better Beginnings Better Futures	Home delivery of boxes for 60 clients	$600.00
Elizabeth Fry Society of Northeastern Ontario	various basic needs for those in community and jail	$3,000.00
Sudbury Women's Centre	Basic Needs Care Packages	$8,744.00
Health Sciences North Foundation (VOICES for Women)	Grocery cards/resource relief packages	$8,500.00
Our Children Our Future Family Resources	Grocery cards/Good Food Bags	$10,000.00

N'Swakamok Native Friendship Centre	grocery gift cards	$10,000.00
Sudbury Better Beginnings	hygiene items	$1,500.00
Big Brothers Big Sisters of the City of Greater Sudbury	food hampers and PPE	$5,000.00
Brain Injury Association of Sudbury District (BIASD)	food and essentials	$3,925.00
The Canadian Mental Health Association-Sudbury/Manitoulin	Room Dividers for the shelter	$20,000.00
United Way Centraide North East Ontario – lead agency and funder of community partnership	Purchase and distribute reusable and disposable masks for organizations supporting vulnerable populations	$25,000.00
	Total	**$102,769.00**

New Horizon Seniors Funding, Government of Canada - Greater Sudbury Only

AGENCY	PROGRAM	DESCRIPTION	AMOUNT
Valleyview Community Church	Financial aid for travel and PPE for volunteers	deliver groceries to seniors/families in partnership with Metro and Helping Hands Family Missions	$2,500
Sudbury Women's Centre	Supplemental care packages	35 women over 55 - food, hygiene items, activity sheets/references	$1,500
CNIB	Virtual Vison Mate (seniors)	connect with blind seniors - pick up groceries and prescriptions	$2,000
Inner City Home of Sudbury	Emergency Food Bank	provisions and delivery to seniors	$1,500
City of Greater Sudbury	Meal prep and delivery	to seniors in Onaping Falls (Lions Club)	$5,000
City of Greater Sudbury	Grocery gift cards	To seniors in Minnow Lake (Lions Club)	$3,000
City of Greater Sudbury	Metro/Food Basics gift cards	partner with Food Banks to identify low income seniors in Valley East (Lions Club)	$3,000
Sudbury Finnish Rest Home Society Inc	Care packages	paper towels, soap, sanitizer, snack items for 230 tenants x $50	$11,500
Brain Injury Association of Sudbury	Groceries	$100 for groceries for 12 seniors	$1,200
N'Swakamok Native Friendship Centre	food and medical supplies	first aid kits, gift cards, groceries, medical supplies for 65 seniors	$6,500
Northern Initiative for Social Action	food support - grocery or gift card	connecting seniors to peer support and warm line	$950
City of Greater Sudbury	meals	Hot meals delivered to seniors twice each week in Lockerby (Legion)	$5,946
Alzheimer's Sudbury Manitoulin North Bay and District	Therapeutic Activation Kits	physical and cognitive activities	$9,000
		Total	**$53,596**

ECSF Emergency Community Support Fund: Government of Canada - Greater Sudbury only

AGENCY	PROGRAM	DESCRIPTION	AMOUNT
Association des jeunes de la rue	Enhancing the Outreach Support Program during Covid-19	Ensure that vital outreach services are continued safely (new staff, food and clothing vouchers for clients)	$48,425
Compass, Boussole, Akii-Izhinoogan Mental Health, Developmental and Community Services for Children, Youth and Families	Providing Child and Youth Mental Health Services in a Covid-19 environment	Acquire PPE and software needed to safely provide mental health and psychological assessment and treatment for youth	$14,300
John Howard Society of Sudbury	Expansion of support services due to COVID-19	Provide expanded supportive services to clients	$15,800
New Hope Outreach Services	Drop-in services	Computer, phone, internet services and staffing for homeless services	$50,000
Older Adult Centre Sudbury/Centre des Aines de Sudbury	Decreasing Social Isolation of Seniors through the expansion of ParkSide Centre Without Walls	Increase the capacity of ParkSide Centre Without Walls to offer recreational, educational, and social programming to seniors in Greater Sudbury (technology)	$32,500
Sudbury Better Beginnings Educational Fund	Food for Families	Food for families in need throughout the region	$38,038
Sudbury Multicultural - Folk Arts Association	Virtual Learning for English or French	Provide online English and French language lessons to newcomers and the community at large	$24,729
Sudbury Women's Centre	Basic Needs Curbside Pickup	Provide clothing, non-perishable food, hygiene, and baby items	$32,507
The Elizabeth Fry Society of Northeastern Ontario - La Société Elizabeth Fry du nord-est de l'Ontario	Service Navigation and Wellness Supports	Conduct wellness check ins and outreach for clients and assistance to navigate appropriate services	$50,000
Victorian Order of Nurses for Canada (Sudbury)	Extension of SMART and Meals on Wheels Programs	Group exercise program (connecting virtually) and meal delivery for seniors	$57,000
Special Olympics Ontario Inc.	Mental Health & Wellness	Enable individuals with an intellectual disability to remain connected, informed, healthy and active (purchase of computers)	$20,000
		Total	**$345,261**

Total $ funding allocated to City of Greater Sudbury charities and Municipality since March 31, 2020;

$1,096,626

Presented To:	City Council
Presented:	Tuesday, Sep 22, 2020
Report Date	Monday, Aug 31, 2020
Type:	Referred & Deferred Matters

Request for Decision

Commercial Parking Standards - Draft Zoning By-Law

Resolution

THAT the City of Greater Sudbury directs staff to undertake a public hearing under the Planning Act for the by-law as outlined in the report entitled “Commercial Parking Standards - Draft Zoning By-law”, from the General Manager of Growth and Infrastructure, presented at the City Council meeting on September 22, 2020.”

Relationship to the Strategic Plan / Health Impact Assessment

Reviewing and updating the City’s Commercial Parking Standards is consistent with the following Strategic Objectives of Council: Asset Management and Service Excellence; Business Attraction, Development and Retention; Climate Change; and, Create a Healthier Community.

Specifically, reviewing and updating the parking standards represents innovative and responsive system improvements in support of the Transit Action Plan (item 1.5 B). The study is also a next step in the Nodes and Corridor Strategy (item 2.4 B).

Report Summary

This report presents a zoning by-law amendment framework to implement the findings and recommendations of the Commercial Parking Study, presented at the February 19, 2020 and July 6, 2020 Planning Committee Meetings.

Financial Implications

There are no financial implications associated with this report.

Signed By

Report Prepared By
Ed Landry
Senior Planner
Digitally Signed Aug 31, 20

Manager Review
Kris Longston
Manager of Community and Strategic Planning
Digitally Signed Aug 31, 20

Division Review
Jason Ferrigan
Director of Planning Services
Digitally Signed Aug 31, 20

Financial Implications
Apryl Lukezic
Co-ordinator of Budgets
Digitally Signed Sep 4, 20

Recommended by the Department
Tony Cecutti
General Manager of Growth and Infrastructure
Digitally Signed Sep 8, 20

Recommended by the C.A.O.
Ed Archer
Chief Administrative Officer
Digitally Signed Sep 9, 20

Report on the Commercial Parking Study
Planning Services Division
August 31, 2020

BACKGROUND

The City of Greater Sudbury adopted a Nodes and Corridors Strategy in September 2016 (See Reference 1). This Nodes and Corridors Strategy is intended to help revitalize and better connect our Downtown, the Town Centres, strategic core areas and corridors of the City. The strategy will also help create new and distinctive corridors and town centres, all featuring mixed uses, public realm improvements and public transit.

The LaSalle Boulevard Corridor Plan and Strategy (the "LBCPS") was endorsed by the City in July, 2018 (See Reference 2). It introduces policy recommendations to standardize land uses and zoning, to provide additional amenities for transit, cycling and walking, and to enhance the street through landscaping, bringing buildings closer to the street and creating distinct nodes of activity.

During the course of undertaking the LBCPS, the consultant (WSP) conducted a number of key stakeholder interviews regarding redevelopment on LaSalle Boulevard. These interviews highlighted the commercial parking standards in the City's Zoning By-law as a potential barrier to redevelopment. To further investigate this issue staff commissioned a study that examined best practices for commercial parking ratios. The study identified opportunities to update certain commercial parking ratios to bring them in line with other municipalities and to encourage and facilitate investment and redevelopment along the LaSalle corridor and other commercial zones. The study was undertaken to complement the LBCPS, the Transportation Master Plan, the Transit Action Plan, the Complete Streets Policy and other Active Transportation initiatives.

The Commercial Parking Study findings were presented to Planning Committee in February, 2020 (See Reference 3). A decision on the matter was deferred pending further information, which was presented in July, 2020 (See Reference 4). In July, 2020, Council directed staff to initiate an amendment to the zoning by-law to implement the findings and recommendations of the study no later than the end of Q3, 2020.

Study Findings

The City commissioned the study entitled "Best Practice Review: Commercial Parking Requirements" (the "Study" - See Attachment A) which;

- compared Greater Sudbury's parking standards to other municipalities;
- examined Greater Sudbury's experience with parking;
- considered Greater Sudbury's recent initiatives regarding active transportation and the Transit Action Plan;
- outlined parking strategies used elsewhere; and,
- provided parking management strategies for the City's consideration.

The Study found that Greater Sudbury's requirements for commercial parking spaces are higher than the requirements in comparator municipalities, particularly for retail uses, restaurants, personal service shops and shopping malls (see Table 1 on page 5 of the Study).

The Study recommended that the City maintain its current parking strategies, including the reduction of spaces for underground spaces, the provision of parking spaces on another lot, and cash-in-lieu of parking.

The Study also identified other best practices from other municipalities for the City's consideration. These include:

- reducing the number of vehicular parking spaces when a bus lay-by or bicycle parking are provided;
- allowing reductions on a site specific basis, based on an approved parking study; and,
- including shared parking provisions which takes into consideration the mixed use and multiple use nature of sites (e.g. shopping mall example).

As mentioned in the February, 2020 report, these strategies will have to be balanced with the current zoning requirements (e.g. zoning currently requires bicycle parking in certain circumstances) and operational considerations (e.g. bus lay by on City or on private property; impact of additional on-street parking, etc) (See Reference 3).

In addition to the above, staff recommended that the City consider a 10% percent reduction of parking for properties fronting onto Routes 1 and 2 (the Main Line and Barry Downe – Cambrian, respectively) (See Reference 6). This recommendation is based on the findings of the Study, which examined transit supportive parking reductions in other Ontario municipalities. Staff have prepared a draft amendment to the City's Zoning By-law (Attachment B) based on the above.

Other Considerations

During the July Planning Committee Meeting there was discussion around achieving land use planning objectives through further changes to the City's parking regulations, primarily the elimination of minimum parking requirements and the introduction of maximum parking standards. Specifically, the Committee discussed:

- reducing the minimum parking standards for properties within 200 metres of the City's Nodes and Corridors by 50%;

- establishing a maximum parking standard for properties within 200 metres of the City's Nodes and Corridors that is 110-150% percent of the minimum parking requirements;

- harmonizing reductions to minimum parking standards for commercial land uses by up to 25%, consistent with the LaSalle Boulevard Corridor Plan and Strategy;

- eliminating minimum parking standards for multi-residential uses in the C5 Zone.

In investigating these concepts, staff has found that there are approximately 20,000 properties in or within 200 metres of a node or corridor. These include all types of zoning, from residential, commercial, institutional to industrial.

As noted in the July, 2020 report, the elimination of minimum parking standards is uncommon in North America and only one major Canadian municipality (Edmonton) has taken this policy approach. The imposition of a maximum parking standards was also found to be somewhat

uncommon, with the July review uncovering that determining the correct maximum is problematic and could lead to many requests for variances. Staff also found that the path that many municipalities take to reducing parking requirements is a phased approach that sees the elimination of parking in the core areas first, followed by the reduction of parking requirements along major transit corridors.

Greater Sudbury is currently following this approach as parking requirements have been eliminated in the City's downtown and parking requirements have been reduced to facilitate affordable housing projects. The City is now taking another step with the proposed amendment by reviewing and updating its commercial parking ratios to ensure they are in line with other municipalities and is introducing the concept of parking reductions along major transit corridors.

Public Consultation Strategy

Staff recommends that the City now proceed to a public hearing as the proposed changes to the Zoning By-law are minor and technical in nature. This approach would be similar to the steps taken with recent zoning by-law amendments associated with Brewpubs and Recreational Cannabis.

Staff would recommend a more robust consultation strategy should we receive direction to implement the elimination of minimum parking standards or introduce a maximum parking standard. Since these changes would represent a significant change to the City's land use planning policy framework, per the City's Official Plan, public consultation would consist of a minimum of two open houses and a public meeting.

PPS and GROWTH PLAN for NORTHERN ONTARIO.

These recommendations are consistent with the Provincial Policy Statement, 2014 (2014 PPS) which states that land use patterns within settlement areas shall be based on densities and a mix of land uses which efficiently use land and resources, support active transportation and are transit-supportive. The 2014 PPS also promotes public streets that meet the needs of pedestrians and facilitate active transportation. A reduction of commercial parking standards would also promote the use of active transportation and transit in and between residential, employment and institutional uses (See also Section 2.1 on page 1 of the Study).

SUMMARY AND NEXT STEPS

The Commercial Parking Review was commissioned to address the concerns from stakeholders that the City's commercial parking ratios were a technical barrier to commercial development. As a result the Study was focused on those uses that may be located in commercial plazas (i.e. suburban, strip-mall and shopping centre-type development). In July 2020, Council directed staff to initiate an amendment to the zoning by-law to incorporate the findings and recommendations of the Study. The proposed by-law represents a technical amendment to bring certain commercial parking rations in line with comparator municipalities. Staff recommend that they receive direction to initiate the required Planning Act process to adopt the draft by-law.

RESOURCES CITED

1. Nodes and Corridors Strategy
   https://agendasonline.greatersudbury.ca/index.cfm?pg=agenda&action=navigator&lang=en&id=992&itemid=11977

2. LaSalle Boulevard Corridor Plan and Strategy
   https://agendasonline.greatersudbury.ca/index.cfm?pg=feed&action=file&agenda=report&itemid=8&id=1227

3. “Report on the Commercial Parking Study”, report presented at the February 19, 2020 Planning Committee Meeting
   https://agendasonline.greatersudbury.ca/index.cfm?pg=feed&action=file&agenda=report&itemid=11&id=1443

4. “Supplemental Information Regarding the Commercial Parking Study”, presented at the at July 6, 2020 Planning Committee Meeting
   https://agendasonline.greatersudbury.ca/index.cfm?pg=feed&action=file&agenda=report&itemid=11&id=1452

Attachments

A. Commercial Standards Parking Study
B. Draft Proposed Zoning By-Law Amendment

Best Practices Review:
Commercial Parking Requirements

December 2019

Prepared for:

CITY OF GREATER SUDBURY
200 Brady Street
PO Box 500 Station A
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Prepared by:

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J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

Table of Contents

List of Appendices

1.0 Introduction

The objective of this report is to provide the City of Greater Sudbury (Sudbury) with an overview of types of policy frameworks and zoning regulations related to parking requirements for commercial uses, focusing on those uses that might be located in commercial plazas (i.e. suburban, strip-mall and shopping centre-type development). From there, the report will provide options for consideration with respect to potential strategies to amend the City's current policy and zoning regulations regarding parking.

The report will look at:

- Parking requirements in comparable municipalities;
- Sudbury's experience with parking;
- Sudbury's related plans for public and active transportation;
- Strategies related to parking that have been employed elsewhere; and
- Recommended parking management strategies for consideration.

This report focuses on commercial uses that could reasonably be found in the Regional Centres identified in Sudbury's Official Plan (Plan or OP), i.e. the Four Corners, the Kingsway, and New Sudbury Shopping Centre area, and the Mixed Use Commercial designation located predominantly along arterial roads. Regional Centres are local and regional retail and tourism destinations and strategic core areas in northern Ontario. The Plan provides that:

> *"Traditionally linked to retail and business services, Regional Centres may include other uses such as medium and high density residential, as a means of utilizing existing infrastructure and achieving increased urban intensification. The intent of this Plan is to encourage planning for these areas to function as vibrant, walkable, mixed use districts that can accommodate higher densities and provide a broader range of amenities accessible to residents and visitors."*

To implement such a vision of vibrant, mixed-use development areas, specific matters such as access and parking need to be addressed through a comprehensive planning effort and related regulations. New ideas and revisions to current regulations may need to be considered.

Most zoning regulations were developed by municipalities throughout North America in the 1980's. These were derived from research initiated by the American Planning Association from the mid-1960's. There has been little research undertaken in the recent past to examine the efficacy of regulations that are used in developed urban centres and changes to trends in automobile use, transit, and active transportation.

2.0 Current Provincial and Municipal Policy Related to Parking

2.1 Provincial Policy Statement (2014)

Sustainability is becoming a theme in most municipal planning approaches. This is reflected in the Provincial Policy Statement (PPS), 2014, which notes in Part IV: Vision for Ontario's Land Use Planning System that: "*The long-term prosperity and social well-being of Ontario depends*

upon planning for strong, sustainable and resilient communities for people of all ages, a clean and healthy environment, and a strong and competitive economy."

"*Efficient development patterns optimize the use of land, resources and public investment in infrastructure and public service facilities. These land use patterns promote … transportation choices that increase the use of active transportation and transit before other modes of travel. They … minimize the undesirable effects of development, including impacts on air, water and other resources. Strong, liveable and healthy communities promote and enhance human health and social well-being, are economically and environmentally sound, and are resilient to climate change.*"

While not specific to parking requirements, statements of sustainability, efficient development patterns, transportation choice, impacts on air and water, and liveable communities are impacted by choices made related to provision of and requirements for parking.

It should be noted that the PPS is currently being reviewed by the Province, and while no specific considerations are included for parking in the draft, the policies do place further emphasis on transit-supportive development.

2.2 City of Greater Sudbury Official Plan, as amended 2018

Sudbury's OP, as amended 2018, has policies which relate to sustainability and the above-noted themes. The OP also has guiding policies related to the provision of parking. In reference to employment areas such as the Regional Centres and Mixed Use Commercial designation, the OP requires that "parking can be adequately provided". Phrased as such, the OP leaves the determination of adequate parking amounts to be elucidated at the Zoning By-law and Site Plan stages of development.

The OP provides the following guidance specifically on parking:

11.4 Parking

> *The supply and cost of parking play a key role in the operation of the transportation network. These factors also influence the choices we make each day, on how we get to work and even where we shop. Parking policies may even impact preferences as to where we live, an important consideration in the promotion of residential uses in the Downtown.*

Parking includes metered and unmetered spaces, private off-street lots, and general purpose off-street lots. The City operates a system of municipal parking lots at moderate short-term rates, most notably in the Downtown core. The majority of the parking supply, however, is provided by private operators who establish rates in accordance with market demand.

> ***Policies***
> *1. New developments generally must provide an adequate supply of parking to meet anticipated demands.*
> *2. Based on a review of parking standards for various land uses in the City, parking requirements may be reduced in those areas that have sufficient capacity, such as the Downtown and other major Employment Areas.*

3. Opportunities to reduce parking standards for development and intensification supported by a transportation demand management strategy will be reviewed and implemented if feasible.
4. Payment-in-lieu of providing parking spaces may be maintained provided that any revenue will be used for the construction of consolidated parking facilities in the general area of the development.
5. Standards for the provision of accessible parking will be reviewed to ensure an adequate supply of parking spaces for persons with disabilities, including additional on-street barrier-free parking in the Downtown.
6. Parking areas are subject to site plan control and Chapter 14.0, Urban Design.

The above-noted policies, and in particular Policies 2 and 3, provide the City with the opportunity to review and confirm or alter parking requirements.

3.0 Current Municipal Parking Standards

This section will examine Sudbury's current parking standards for commercial uses permitted within Sudbury's Commercial Zones, namely the following:

- Local Commercial (C1)
- General Commercial (C2)
- Limited General Commercial (C3)
- Office Commercial (C4)
- Shopping Centre Commercial (C5)

Parking in commercial areas is meant to provide for visitors and customers, and the provision of parking for employees also plays a role for the number and allocation of parking spaces at commercial centres.
A wide range of uses are permitted in the above zones. For the purposes of this report and to compare with other municipalities, a subset of uses has been selected, for which Sudbury's parking requirements are noted below:

- Automotive Service Station: 1/30 sqm
- Business Office: 1/30 sqm
- Convenience Store: 1/20 sqm
- Hotel: 1/guest room + 1/10 sqm public space
- Medical Office: 1/20 sqm or 5 spaces, whichever is greater
- Personal Service Shop: 1/20 sqm
- Commercial Recreation Centre: 1/6 persons capacity, plus 1/20 sqm for accessory use
- Restaurant: 1/10 sqm or 1/3 persons seating capacity
- Restaurant, Take Out: 3 spaces plus 1/10 sqm
- Retail Store: 1/20 sqm
- Shopping Centre: 1/20 sqm

Sudbury's standards have been compared to identified candidate municipalities. The municipalities selected in the peer review have been chosen because they represent a subset that is variable in terms of both geography and size, and include the following:

- North Bay, ON
- Sault Ste. Marie, ON
- Thunder Bay, ON
- Newmarket, ON
- Ottawa, ON
- Burlington, ON
- Edmonton, AB
- Surrey, BC
- Victoria, BC

Large municipalities may provide for insight into innovative, and transit-required parking strategies, whereas northern municipalities will account for region-specific considerations such as a greater proportion of larger vehicles (i.e. pick-up trucks) and significant winter snowfall.

Rates for each use are compared to determine how Sudbury's current parking rates relate to those in other municipalities (See Table 1). Parking rates have been standardized to account for the number of spaces required per 100 sqm of a particular use or per person capacity. A more detailed comparison table of the current parking standards is provided in Appendix A.

It should be noted that parking requirements for Ottawa and Victoria, BC, vary by use as well as by area of the municipality. For instance, there are generally less stringent parking requirements the closer a subject site is to the downtown, with greater minimum parking spaces required the further away a site is from the core. For the purposes of this section, parking standards are identified for only for specific areas, most comparable to Sudbury's Mixed Use Commercial designation and Regional Centres.

Best Practices Review:
Commercial Parking Requirements

Table 1: Comparison of Current Parking Standards, Selected Uses and Municipalities

Use	City of Greater Sudbury Standards	North Bay	Sault Ste. Marie	Thunder Bay	Newmarket	Ottawa Avg[1]	Burlington	Edmonton, AB[2]	Surrey, BC	Victoria, BC Avg[3]	Average
Automotive Service Shop[4] (per 100 sqm)	3.3	3.3	3.5	-	-	1	4	2.5[5]	-	2.5	N/A
Convenience Store (per 100 sqm)	5	-	3.5	2.7	2.5	3.0	-	2.5[5]	2.75	-	3.1
Business Office (per 100 sqm)	3.3	3.3	4.5	3.3	3.7	2.2	3.5	3.4	2.5	1.9	3.2
Hotel (per guest room)	1 + 1/10sqm for public use	1 + 1/10sqm for public use	1.25	1 + greater of 1/10sqm or 1/25squm	0.5 + 1/4.5sqm for public and administrative uses	-	1	1	1 + parking for accessory uses	0.5	0.9 N/A
Medical Office	5	3.5	4.5	4.3	5.9	4	6	4.5	3.5	2.5	4.37
Personal Service Shop (per 100 sqm)	5	1.3	4.5	5	2.5	3.0	4	2.5[5]	3	2.6	3.3
Recreational/Fitness Centre (person capacity)	1/6	-	1/5	-	-	4 per game surface	1/6		-	-	N/A
(per 100 sqm)	+5 for any accessory use[6]	3.3	-	4	3.6	plus 10	-	10[7]	3.6	5	4.9
Restaurant (person capacity) (per 100 sqm)	1/3	-	1/5	-	-		1/4		-	-	1/4
	10	6.7	-	16.7	2	9	-	10.4	3 (>150sqm) 10 per 100 sqm (>950 sqm) 14 per 100sqm (<950 sqm)	4	8.5
Restaurant – Take-out (per 100 sqm)	10 +3	-	4.5	10	-	4	25	10.4	-	-	10.8
Retail Store (per 100 sqm)	5	1.3	4.5	2.1 [8]	2.5	3.0	4	2.5 (<4500sqm) 3 (<9000 sqm) 3.5 (<28000 sqm) 4 (>28000 sqm)	2.75 (<372 sqm); 3(<4645 sqm); 2.5 (>4645 sqm)	2.3	3.1
Shopping Mall (per 100 sqm)	5	-	4.5	4	4.8 (leasable area)	3.5	5.25			-	4.1

= greatest requirement
= least requirement

Notes:

(1) in the City of Ottawa, Areas B and C (i.e. Outer Urban/Inner Suburban and Suburban areas) on Schedule 1A to Zoning By-law 2008-250 were used.
(2) in Edmonton, AB some uses based only on commercial use not specifically listed, by floor area.
(3) in Victoria, BC, the average of the Village/Centre areas (where much of the shopping centre development is located) and "Other Areas" was used
(4) Parking requirements based on service bays have been excluded as this data is not directly comparable.
(5) Automotive service shop, convenience store, and personal service shop assumed to have less than 4,500 sqm.
(6) Applies to commercial recreation centres only
(7) health and fitness club
(8) Two different rates apply based on size, the average for these rates is included.

Overall Sudbury's requirements for commercial parking spaces are generally higher than the requirements in peer municipalities. The following can be seen:

- Sudbury is on par with peer municipalities for automotive service shops, business offices, hotels, and medical offices.
- Sudbury has a higher requirement for convenience store parking than most, with some municipalities having half the requirement (2.5 versus 5 spaces per 100 sqm).
- Requirements for medical offices are higher than those required for business offices.
- Hotel space requirements are generally based on 1 space per room with most municipalities also applying additional requirements for areas devoted to public and/or administrative uses.
- Sudbury has the highest requirement for parking for personal service shops.
- Restaurants have the highest parking requirement overall, and rates vary widely between municipalities, with some further differentiation between different types of restaurants.
- Sudbury is on the high end of the requirement for both retail stores and shopping malls.

With a few exceptions, Sudbury has generally applied the same parking rate (i.e. 5 per 100 sqm (or 1 per 20 sqm, as written in the By-law) of net floor space) for different commercial uses. In fact, 1 per 20 sqm is the rate applied generally in the Sudbury By-law for unspecified uses. There appears to be a trend for providing differential parking rates based on the type of commercial use amongst these municipalities. Generally the highest parking rate requirement is for a standard restaurant with a convenience store ranking last. See Figure 1.

Figure 1: Relationship between parking rates and commercial use

Parking rates for medical offices are higher than those required for business offices. In both instances, parking for staff would generally be similar; however, a medical office will typically draw customers on a consistent basis throughout the day. This is because the clientele turnover is greater for medical appointments compared to meetings scheduled for a professional business or consulting firm, for example. Comparatively there are also greater waiting times for medical appointments, which leads to more time spent on site for patients, compared to typical business clients. The greater parking demand of medical offices is reflected in Sudbury's By-law, with its current rate relatively on par with peer municipalities.

The method by which parking rates are calculated for recreational/fitness centres varies widely across peer municipalities. Slightly more than half of the municipalities base their rates on floor space alone, whereas others will rely on a set number of spaces per person capacity/game

surface, or include both capacity and floor space. A commercial recreation/fitness centre varies greatly in both size and composition. For example, this land use category would capture both small scale fitness businesses such as a yoga studio or a large scale fitness centre inclusive of pools, fitness rooms, gyms, courts, etc. Applying the most appropriate standard is therefore difficult to assess given the variance in this type of land use. Sudbury's per person capacity rate is on par with peer municipalities. Sudbury, however, also applies an additional requirement for commercial recreation centres, wherein additional parking spaces will be required for any accessory use (5/100 sqm). This additional requirement may be appropriate in certain situations where the accessory use could generate its own clientele and therefore parking; however it may be double-counting if the accessory space is also used by patrons of the recreational centre.

Sudbury, Thunder Bay and Ottawa provide different rates for a standard restaurant versus a take-out restaurant. With the exception of Sudbury, there are fewer parking spaces required for a take-out restaurant compared to a standard restaurant, with Ottawa cutting parking requirements by half for the former.

Standard restaurants rank first with regards to parking space requirements. What is notable is that restaurants are often located in shopping malls. Ottawa, for example, provides that where a restaurant comprises more than 30 per cent of the gross leasable area of the shopping centre the minimum parking for that use will be calculated at the rate given for a restaurant. The same argument cannot be made for a fast food restaurant as this type of restaurant would be considered complimentary to the mall retail use of the facility. In other words a customer eating at the food court typically would not have made a special trip to the mall for the purposes of having a meal but instead would have done so for shopping. The high turnover of this type of restaurant would also likely not extend a customers stay on site.

Reduced rates for take-out style restaurants are appropriate as restaurant parking demand is related to customer turnover, such that the longer a patron remains on site, the higher the parking demand. In other words, the invested time on site is greater for a patron seeking a leisurely dining experience compared to fast-food, and even greater compared to a dedicated take-out and drive-through restaurants. If Sudbury considers a reduction for fast-food or take out restaurants, it would allow for a reconsideration of space and site layout restrictions related to drive-through (queuing) space requirements.

It should also be noted that although the City of Burlington currently ranks amongst the highest with regard to standard restaurant parking and shopping mall rates, a recent parking study completed for the City of Burlington (IBI Group, July 21, 2017) recommended that the rates be reduced for these type of uses. The study identified that existing retail centres within Burlington provide for an oversupply of parking. Based on site observations for three retail centres, the study found that during the busiest weekly peak periods the retail centre parking spaces were only 62% occupied. This occupancy rate was converted into a parking rate of 2.9 spaces/100 sqm GFA which is considerably less compared to Burlington's existing requirement of 5.25 spaces/100 sqm GFA.

4.0 Sudbury's Experience with Parking

4.1 Variances and Amendments Related to Parking

Since 2010, Sudbury has approved 17 minor variances to facilitate a reduction in commercial parking spaces. Of note, 67% of those within Sudbury's Regional Centres were approved for multi-use commercial type development such as commercial plazas and complexes. It would therefore appear that multi-tenant developments generally have a lower parking demand than what is currently required by Sudbury's By-law, the result of which can be explained by a variance in temporal parking demands. For instance, individual land uses will have unique parking patterns with peak demands at different times of the day. When multiple types of uses are combined, peak demands will occur at different times of the day.

Sudbury does not currently include a provision for shared parking areas; therefore the inclusion of this approach to calculate parking could reduce the need to seek zoning relief for commercial parking spaces within those areas. In addition, several of the variances were related to parking reductions for hotel developments.

A brief search was done to identify instances when a Zoning By-law Amendment (ZBA) application was made for parking relief. No specific applications for such relief were evident. It should be noted though, that ZBA applications to permit commercial use have been typically scoped or limited in the permitted uses recommended for approval by staff, driven by the amount of parking that could reasonably be accommodated on site through the inclusion of a site plan in the rezoning process.

4.2 Stakeholder Input

As part of the research, stakeholder interviews were conducted with persons familiar with Sudbury's parking requirements and their implementation in commercial plaza and shopping mall type developments. These included property owners and managers, real estate professionals, and City transportation staff.

The surveys are insightful to provide anecdotal commentary, understanding, and experience with how several different commercial properties with various tenancies operate in Sudbury. Noted herein are some of the general findings:

1) Parking is a Driving Factor in Development Potential

- Parking is definitely a factor in leasing tenant space; multiple respondents noted **turning down a potential business opportunity due to lack of parking as required by the By-law**
- One of the most common challenges to securing tenants is being able to provide the required parking, as per the City's By-law
- The goal in land development is to maximize the ratio of land to building while ensuring 'adequate' parking and therefore the ability to lease/sell property
- Most respondents noted they had submitted a planning application (ZBA or minor variance) for parking reduction or would consider it for prospective tenants. It was noted that some leasing opportunities will seek other locations due to the time and effort that a planning application takes and the uncertainty in the outcome.

2) Current parking requirements are generally too high and inflexible

Opinions were mixed as to the appropriateness of Sudbury's current minimum parking requirements, with the majority of respondents indicating that the current requirements are likely too high, resulting in an oversupply of parking, while some felt that the current requirements work well.

Regarding specific uses, in general business office, restaurant and retail were noted as having requirements that were too high, while the requirements for medical offices were felt to be justified.

Other comments related to potential changes to the requirements included the following:

- Reduction in parking requirements would allow for additional leasable space
- Flexibility is needed, not a one-size-fits-all approach
- Requirements which take into account time-of-use for multi-use buildings would be helpful
- Requirements which better reflect number of employees, and visitor potential would be helpful
- There is no ability to account for the proximity to public and active transportation
- Reduction in parking requirements may allow for aesthetic improvements to parking areas, i.e. greater potential for landscaping and less asphalt, in particular for larger (i.e. shopping centre and big box retail) developments

3) Maximum parking requirements are not necessary

Respondents generally felt that maximum parking requirements were not necessary, particularly when minimum parking requirements are often determining GFA and potential tenancies. Other comments related to potential changes to the requirements included the following:

- Additional landscaping requirements for large parking lots should be looked at instead
- Respondents felt that maximum parking requirements in Sudbury are 'not really relevant here' would be 'ridiculous'.

4) Shopping centres have overlapping uses; Commercial plazas have 'destination' uses

It was felt that the larger shopping centre uses had visitors who frequently visited more than one tenant or commercial use; whereas commercial plazas did not typically lend themselves to visits of multiple tenants. In contrast, it was felt that the smaller commercial plazas have visitors to 'destination' locations, whereby a visitor would attend one store or use for a particular purpose only and then leave.

There are clear peak times of day and year for shopping centres; whereas commercial plazas typically strive for a variety of uses that lend themselves to a balance of visits throughout the day/night and year (i.e. including office, retail, and restaurant uses). The stakeholder interviews noted the following peak times:

- Shopping centre use generally peaks between 11am-2pm on weekdays, with Mondays-Wednesdays generally quieter, and increasing attendance on Thursday and Friday; and then all day on weekends (9:30am-6pm on Saturday; 11am-5pm on Sunday)
- Shopping centre visits peaks in the year mid-November to January 1, with additional increased visits in August to mid-September, coincident with Christmas and back-to-school shopping
- In contrast, commercial plazas are far more use-dependent for peak times of day/week, in that an office will be visited during the day on weekdays, but a restaurant will be visited around noon and in the evening throughout the week, and a retail store will be visited during the day and weekends, for example.

Generally in a development with multiple tenancies specific parking spaces were not allocated to specific tenants; rather the entire parking area was available for all tenants/visitors.

5) Some thought is given to proximity to active and public transportation

With improved active and public transportation networks comes the opportunity to reduce parking requirements as these alternate modes are utilized; however, it was noted in the interviews that only certain tenants seek proximity and provision of public and active transportation routes and facilities. Notably, government tenants often have specific requirements for proximity.

6) Some parking should be located at the front (street-side)

In general it was felt that some parking on the street-facing side of the building should be provided, particularly for visitors. It was noted that limited parking at the front may create a perception that a business does not have enough parking for potential customers who may decide to go elsewhere, negatively impacting the viability of the business. On-street parking is typically not available for commercial plazas or shopping centres, as they are on arterial roads. There is the option to place parking at the rear of the building for employees, which has been employed at several sites in Sudbury. Such an approach will require a specific relationship between building size/format and parcel configuration.

There was some concern about the aesthetics and maintenance of building façades that are directly abutting busy arterial roads. If parking areas were exclusively located at the rear of the building, entrances would need to be accommodated on both sides (street and parking/rear) to create a pedestrian-friendly realm at the front. Provision of parking for customers needs to be focussed in order to meet operational requirements for most, if not all, retail businesses where control of the access is a basic requirement for product loss. However, even greater prescriptive development standards may be a disincentive to development in some areas.

7) Snow is often stored in required parking spaces

Across the board, respondents noted that snow was typically stored on site (sometimes in required parking spaces), until it is necessary to undertake snow removal for the parking

area to function practically. Onsite storage of snow was typically employed as a cost-saving measure (limiting exposure to the costs associated with hauling off-site).

Additional information from the stakeholder interviews is found in Appendix B.

5.0 Sudbury's Transportation and Transit Plans

The use of a private vehicle over transit, active modes of transportation, or car sharing directly influences parking demand. The City's approach has traditionally been to require private parking for commercial businesses. The City has now developed to a point where there is a fairly sophisticated transit system which is seeing its role more expanded and supported by both elected officials and the public. The development of an integrated bicycle network has also been recognized and is being expanded. The recognition of the need to support these alternative modes of transportation needs to be supported by the City in reviewing their own requirements for the provision of parking and subsequently bicycle and transit integration. Sudbury has prepared several recent plans which support shifting mode share to public transit and active transportation.

As noted in Section 2.0, Provincial and Municipal planning documents support the shift to more sustainable communities, and subsequently, more efficient development patterns and alternative transportation modes.

5.1 Transportation Master Plan

The Transportation Master Plan (2018) (TMP) proposes a sustainable transportation network for pedestrians, cyclists and vehicles that accommodates projected demands to the year 2031. There are three main principles guiding the development of the future transportation network:

- ***Healthy communities*** *with on- and off-road networks that facilitate active transportation, such as cycling and walking, and that consist of 'Complete Streets' that are designed, constructed and maintained to support all users and all modes of transportation;*
- ***Sustainability*** *based on integrated transportation and land use planning that minimizes the use of private automobiles and, in particular, the number of single-occupant vehicle trips; and*
- ***Economic vitality*** *associated with reduced congestion on roads so that people and freight can access destinations with limited delay.*

The TMP notes that: *"Automobile-dependent communities require more land for road rights-of-way and parking than those that are more sustainable. Reducing car dependence by providing infrastructure for alternative transportation modes, such as walking, cycling and public transit, results in more compact subdivisions that make more efficient use of available land."*

To that end, the TMP recommends the following related to modal share and shift:

- Supporting active transportation through education and promotion
- Adopt and implement the AT network implementation plan
- Develop a Transit Master Plan to leverage the road and active transportation plans recommended in the Transportation Study Report

- Prepare a Transportation Demand Management (TDM) Plan

The TMP notes that a TDM Plan focuses "*on moving people rather than vehicles, which in turn will lead to increases in mobility and accessibility for all members of the community. A complete program that offers a suite of options which is institutionalized in a formal TDM program will ensure that there will be long-term use of sustainable modes*." Outcomes of a successful TDM plan typically include a reduction in the mode share of single occupant vehicles, which would then support a reduction in required parking areas.

5.2 Transportation Demand Management (TDM) Plan

The Transportation Demand Management (TDM) Plan for Greater Sudbury (June 2018) was developed to assist the City in controlling and managing the demand for travel and transportation infrastructure. The TDM Plan outlines various techniques and includes a promotion and engagement tool kit to encourage residents to shift travel behaviour over the long-term. The TDM also recommends the implementation of a dynamic Action Plan to encourage sustainable travel modes. Three (3) implementation phases are presented in the TDM over the next 10 years, which are summarized as follows.

- **Phase 1 - Short Term / Quick Wins (Years 1 and 2):** increase the amount of sustainable infrastructure, initiating promotion of active transportation facilities, and initiate the hiring of a marketing and communications person who can promote both TDM programs and transit services.

- **Phase 2 - Medium Term (Years 3 to 5):** evaluate short-term projects to assess effectiveness and make improvements, update TIS Guidelines to include TDM-supportive infrastructure, work with community groups to encourage long term behaviour changes, create a TDM outreach program and recognition program for new and existing developments, and develop a workplace program.

- **Phase 3 - Long Term (Years 6 to 10):** continue to deliver but also evaluate and update the TDM strategies and programs, and review the Official Plan and Transportation Master Plan that support the TDM programs and measures.

It should be noted that revision to Phase 2 and 3 of the TDM may be necessary based on funding opportunities and the outcome and feedback received during the first phase of the TDM.

5.3 Transit Action Plan

The City's Transit Action Plan (2019) identifies providing improved route network to meet travel patterns, improved schedules to meet demand, and improved customer experience through infrastructure needs and other initiatives. As part of the public engagement process for the *Transit Action Plan,* respondents were asked to identify what should be the focus of that plan. Ranked number one was to reduce the amount of auto travel per person, in an effort to increase sustainability and community health.

The City's has just recently implemented the first phase of the Transit Plan (August 2019). As part of the changes, there are higher frequency routes on key arterial corridors with service standards

on various routes to match demand. Short and medium term (2020-2029) expansions are planned to increase frequency, increase hours and days of service and provide other improvements as demand increases. Longer term, the plan contemplates Bus Rapid Transit (higher-order) with potential for dedicated lane spaces, priority signals, and additional infrastructure.

5.4 Car Sharing / Park and Ride

Car sharing is not an obvious component of the market at this time. Changes to the automated vehicles may introduce a change to this mode in the future. Similarly, the provision of park and ride lots has not evolved in Sudbury at this point.

Through improvements to alternative modes of transportation, including public and active transportation, Sudbury's mode share can be supported to shift away from personal vehicles, allowing for greater consideration to reduction of commercial parking requirements.

6.0 Regulatory Options to Reduce Parking Requirements

As presented in Section 3 of this report, Sudbury's current commercial parking requirements are generally high when compared to peer municipalities. This, together with improvements to Sudbury's transit service times and routes and commitments to active transportation infrastructure, suggests that there is a technical validity in reducing commercial parking requirements and a desire to take the leadership role in developing policy and implementation that will contribute to this change in focus. With this in mind, the following section will present various regulatory options to reduce commercial parking requirements, including:

- Reduction based on proximity to transit
- Reduction for enclosed and/or underground parking
- Reduction based on location
- Establishing a maximum number of parking spaces
- Providing parking spaces on another lot
- Cash-in-lieu of parking
- Substitution for bus space or bicycle use
- Substitution for landscaping area
- Sharing of a parking area for multiple uses
- Complete elimination of minimum parking requirements

Sudbury's current reduction strategies and those employed by peer municipalities are presented in Table 2.

Table 2: Parking Management Strategy by Municipality

Parking Management Strategy	Greater Sudbury	North Bay	Sault Ste. Marie	Thunder Bay	Newmarket	Ottawa	Burlington	Edmonton, AB	Surrey, BC	Victoria, BC
Reduction based on proximity to transit					✓	✓		✓		
Reduction for enclosed and/or underground parking	✓(1)					✓				
Reduction based on location	✓				✓	✓		✓	✓	✓
Establishing a maximum number of parking spaces					✓	✓(2)	✓			
Providing parking spaces on another lot	✓		✓		✓				✓	✓
Cash-in-lieu of parking	✓									
Reduction based on study								✓		
Substitution for bus space or bicycle use				✓		✓				
Substitution for landscaping area				✓						
Reduction in floor space for rate calculation		✓								
Sharing of a parking area for multiple uses			✓			✓(3)			✓	

Notes:
(1) Reduction in parking space dimensions from 2.75 m x 6 m to 2.6 x 5.5 m
(2) A maximum number applies when a retail store, retail food store, or shopping centre is with 600 m of a rapid transit station
(3) The cumulative total of parking spaces may be reduced based on largest cumulative total in any the identified time periods noted in the By-law (Table 104).

6.1 Reduction Based on Proximity to Transit

The concept of reducing required parking in proximity to transit is becoming a commonly-accepted practice. In fact, some municipalities require reductions in the amount of required parking spaces where a development site is located within a certain distance to transit facilities (routes and/or stops or hubs). With greater proximity to transit, it is assumed that more persons will access the site via public transportation, and therefore fewer parking spaces are required. This reduction strategy could also potentially drive modal choice, if the public perceives that a site has fewer parking spaces and has transit that is seen as being effective and available they may make that choice. If a site is seen to be easier to access via transit, they may choose to use transit instead of drive to a particular site.

A reduction based on proximity to a transit station is provided in three municipalities reviewed (Newmarket, Ottawa, and Edmonton, AB). The measurement for proximity to the rapid transit system and the way the reduction is applied varies. Newmarket applies a 30% reduction within 500 metres of a GO train station or bus terminal; whereas Ottawa provides a reduction by applying the parking requirements of the "Inner Urban" area (i.e., a lesser parking requirement) within 300 metres of a rapid transit station. Also, Ottawa has waived parking requirements altogether for areas identified as being near a major light rail station. Edmonton, AB, has reduced requirements within 200 m of an existing or future LRT station, Transit Centre, 150 m of a Transit Avenue, or on a "Main Street". In these areas, restaurants are permitted to provide either no parking, in the case of restaurants smaller than 60 sqm or the requirement is reduced by two-thirds for establishments larger than 60 sqm. For all other commercial uses proximate to transit, a flat parking requirement of 1 space per 100 sqm is established.

It should be noted, however, that in all of the above-mentioned cases these are considered higher-order transit that operates in its own dedicated right-of-way, outside of general traffic, with greater frequency of service times. Several other Ontario municipalities employ this strategy, notably those with Bus Rapid Transit or Light Rail Transit services.

This approach is consistent with the recent changes to the *Planning Act* where higher-order trasnit areas are included as areas where appeals to Council decisions supporting development within these areas are not subject to appeal.

6.2 Reduction for Enclosed and/or Underground Parking

A municipality may reduce the amount of required parking if it is provided in an enclosed or underground parking structure. Typically this type of parking is located in urban centres, as opposed to commercial plazas, and the reduction may be in recognition of available alternative parking locations (i.e. on street, or municipal lots, for example) and greater opportunity for active and public transportation use in a downtown setting. Nonetheless, this reduction still appears to be available to suburban or plaza commercial developments. However, the cost to construct and maintain enclosed or underground parking structures may present a significant barrier to smaller scale commercial developments versus a standard surface parking area.

Sudbury and the Ottawa provide for a reduction of parking for enclosed and/or underground parking lots; however, the strategy for the reduction differs. The former allows for a reduction in the parking space dimensions in enclosed or underground facilities (from 2.75 m x 6 m to 2.6 m x 5.5 m). The latter allows the number of required parking spaces in underground facilities to be reduced by the lesser of either 10% of the required parking spaces or 20 parking spaces. Ottawa's provision for a percentage of small spaces reflects the changing nature of the scale of vehicles that are being promoted. While Sudbury includes this provision as well, typically these facilities are located downtown and are not provided for commercial plazas. Additionally, further use of reductions in size may not be warranted in Sudbury at this time based upon the types of vehicles that are seen in parking lots.

6.3 Reduction Based on Location

Some municipalities have allocated parking space reductions or alternative standards based on various locations within the municipal boundaries. Typically the locational variation is also directly related to density (and thereby also transit availability and frequency).

Many municipalities, including Sudbury, apply a reduction for parking requirements in the downtown core. Two other larger, metropolitan cities reviewed herein (Ottawa and Victoria, BC) have applied a reduction based on area; however, in this case the reduction applies to multiple areas as opposed to strictly downtown. In each of these three municipalities, less restrictive parking requirements are applied to the core urban areas with, increasingly greater requirements as you move away from the core, and the rural or exurban areas then having the greatest requirements.

In Ottawa for example, parking requirements nearly consistently double going from the inner urban areas to outer urban/inner suburban areas for almost all uses. From there, parking requirements either remain constant, depending on the use, or go up by a factor of 1.5 to 2, depending on the use. Interestingly, the same rate typically applies to suburban areas versus rural areas. Refer to Figure 2 and Table 3 below.

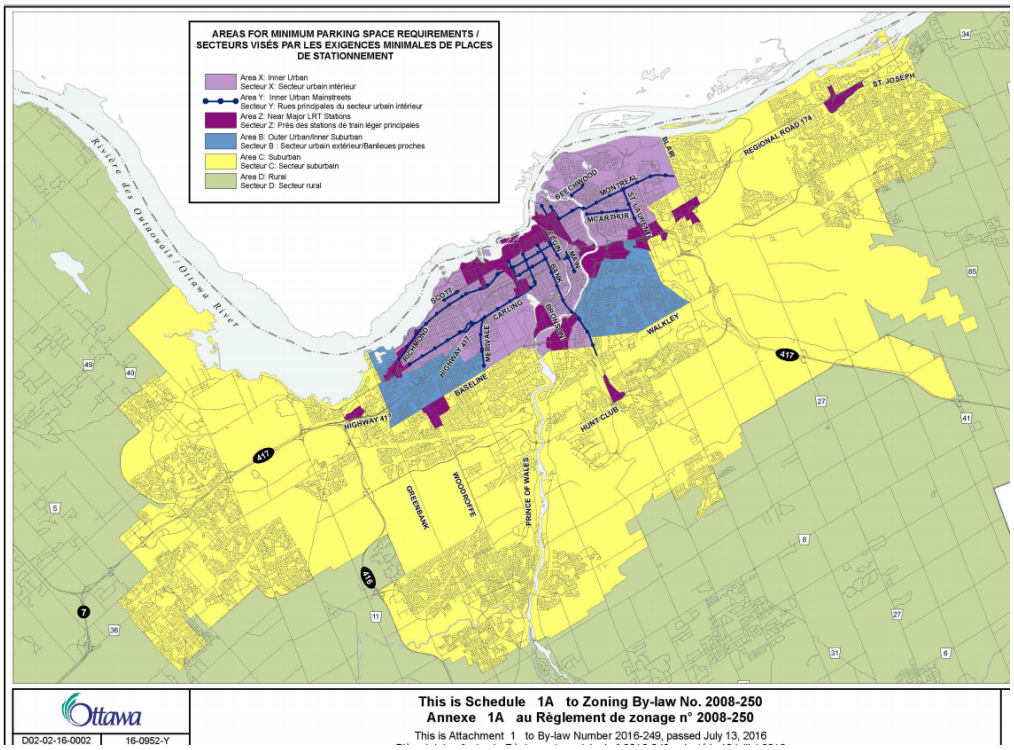

Figure 2: Schedule 1A to Ottawa's Zoning By-law 2008-250

Table 3: Excerpt from Table 101- Minimum parking space rates, City of Ottawa Zoning By-law 2008-250

Land Use	Area X and Y on Schedule 1A	Area B on Schedule 1A	Area C on Schedule 1A	Area D on Schedule 1A
Convenience Store	1.25 per 100 sqm of gross floor area	2.5 per 100 sqm of gross floor area	3.4 per 100 sqm of gross floor area	3.4 per 100 sqm of gross floor area
Office	1 per 100 sqm of gross floor area	2 per 100 sqm of gross floor area	2.4 per 100 sqm of gross floor area	2.4 per 100 sqm of gross floor area
Restaurant	5 per 100 sqm of gross floor area	3 for first 50 sqm of gross floor area plus	10 per 100 sqm of gross floor area	10 per 100 sqm of gross floor area

Land Use	Area X and Y on Schedule 1A	Area B on Schedule 1A	Area C on Schedule 1A	Area D on Schedule 1A
		10 per 100sqm of gross floor area over 50sqm of gross floor area		
Retail Store	1.25 per 100 sqm of gross floor area	2.5 per 100 sqm of gross floor area	3.4 per 100 sqm of gross floor area	3.4 per 100 sqm of gross floor area

6.4 Establishing a Maximum Number of Parking Spaces

In an effort to reduce excess surface parking, some municipalities have established maximum parking requirements, in addition to minimum parking requirements. That is, developments are capped at the amount of parking spaces that can be provided on a site. This has not been a common approach to zoning in Ontario. The ideas expressed in the theory of "The High Cost of Free Parking" by Donald Shoup, 2011, have attempted to show the environmental cost of provision of parking that is seen as free affects consumers approach to how they complete their activities.

It is beneficial to a municipality and property owner to have taxable structures and rentable spaces instead of surface parking areas. The highest and best use of land is most often in a building or other productive use, not in surface parking, particularly where available land is limited and land values are high.

By reducing and capping the amount of available parking onsite, particularly where there are other options for modal choice such as active and/or public transportation, municipalities may drive modal decisions away from private vehicles. This is beneficial from an environmental perspective and increasing use of municipal services and infrastructure.

Three (3) municipalities reviewed apply a requirement for a maximum number of parking spaces. In all three cases however, the method by which they apply this parking strategy differs. Newmarket has applied both a minimum and maximum parking requirement for all uses within their urban centre (generally commercial plaza and shopping centre development). Generally speaking the maximums provided in Newmarket are double the minimum requirement. Notably absent, however, is a maximum provided for a regional shopping mall, i.e. the Upper Canada Mall constructed in 1974, operated by Oxford Properties, which exhibits 92,548 sqm of retail floor area and 9,892 parking stalls[1] (i.e. a parking ratio of 1 space per 9.4 sqm floor area, or far more than double what is required by the By-law). See Table 4.

Table 4: Excerpt from Section 5.3.3.2 Non-Residential Uses in the Urban Centres, City of Newmarket Zoning By-law 2010-40

Type or Nature of Use	Minimum Off-Street Parking Requirements	Maximum Off-Street Parking Requirements
Commercial Recreation Centre Community Centre Outdoor Recreation Facility Sports Arena	1.0 parking space per 28 sqm of gross floor area	2.0 parking spaces per 28 sqm of gross floor area
Convenience Store	1.0 parking space per 40 sqm of gross floor area	2.0 parking spaces per 40 sqm of gross floor area

[1] Upper Canada Mall, Property Overview, Oxford Properties Group, 2019
https://www.oxfordproperties.com/leasing/en/retail/property/upper-canada-mall/

Type or Nature of Use	Minimum Off-Street Parking Requirements	Maximum Off-Street Parking Requirements
Office Office, Conversion	1.0 parking space per 50 sqm of gross floor area	2.0 parking spaces per 50 sqm of gross floor area
Restaurant	1.0 parking space per 50 sqm of gross floor area, excluding any porch, veranda and/or patio dedicated as seasonal serving areas	4.0 parking spaces per 50 sqm of gross floor area, excluding any porch, veranda and/or patio dedicated as seasonal serving areas
Retail Store	1.0 parking space per 40 sqm of gross floor area	2.0 parking spaces per 40 sqm of gross floor area
Shopping Mall, Regional (Upper Canada Mall)	1.0 parking space per 21 sqm of gross leasable floor area	n/a

This was developed in a time where a true Regional Shopping Centre was a concept to be found in Ontario. Newmarket's Upper Canada, Toronto's Yorkdale, Kitchener's Fairview, Belleville's Quinte West, and London's White Oaks were all constructed in the early 1970's as draws for a large catchment area. Southridge Mall in Sudbury pre-dates most of these malls by more than two-decades, but it performed a similar function. These regional scale facilities may remain as unique situations due to their ability to service a larger geographic area. This function may, on the other side of the argument, be more susceptible to diminishing returns due to the increasing use of online shopping.

Burlington provides for maximum numbers based on zoning and does not apply a maximum for all zones. Specifically, for three of the four commercial zones Burlington has applied a maximum (Regional Commercial, Employment Commercial, and Community Commercial) where larger, and plaza-type commercial uses occur, with no maximum being applied to the Neighbourhood Commercial Zones. Ottawa has applied a maximum for choice uses (i.e. retail store, retail food store, or shopping centre) within 600 metres from a rapid transit station. In addition, the more central the area is to the urban core, the lower the maximum requirement.

Several other Ontario municipalities, typically in the Ottawa area and Greater Toronto Hamilton Area (GTHA) have employed maximum parking requirements.

However, it should be noted that in areas where land may be more readily available, and/or at lower land values, parking maximums may be regarded as an imposition, rather than a benefit to developers.

6.5 Providing Parking Spaces on another Lot

Parking requirements on site can be reduced if additional parking spaces can be provided on another lot. In the case of plaza commercial development this option could be used to provide customer (i.e. higher turnover) parking onsite, and employee (i.e. longer term) parking offsite, for example. This strategy could also be employed to allow for a lesser visual impact of parking areas creating a 'sea of parking' as these areas could be provided at the rear of buildings, particularly when fronting a major arterial.

Four municipalities, including Sudbury, have a provision where the required parking spaces can be provided on another separate lot. Ottawa and Thunder Bay have a similar provision; however, in those cases spaces provided on another lot do not contribute towards the parking space requirements. For the municipalities that do allow parking on a separate lot to count towards the

minimum number of spaces, the provisional requirements differ. Table 5 summarizes the requirements for each.

Table 5: Comparison of By-law Provisions to Provide Parking on Separate Lots

Provision	City of Greater Sudbury	Sault Ste. Marie	City of Newmarket	Victoria, BC
Within a certain distance to the subject lot	100 m	-	150 m	125 m
Zoning or Use Requirement	Same Zone as subject lot or main use is permitted on both	-	Provision applies for specific areas and the commercial zones	-
Ownership	Same ownership required	Same ownership or lease in excess of 10 years	-	-
Maintaining parking spaces on separate lot for duration of use	Agreement with the City and registered on title to maintain parking spaces for the duration of the building or use which the spaces are required	Maintain parking spaces for the duration of the use. No mention of agreement in provision.	-	Easement registered on title to restrict the use to parking purpose for as long as the use exists

'-' = not identified in By-law

Where a maximum distance to the subject lot is provided, Sudbury provides the shortest distance, however the variance to the others municipalities is relatively small (i.e. 100 m compared to 125 m and 150 m.). Overall Sudbury provides the most additional requirements to providing off site parking. The requirement to maintain the parking spaces for the duration of the use is identified for three of the four municipalities. Only Sudbury and Victoria however require either an agreement or easement. This requirement is important as it ensures the maintenance of those spaces for as long as the use on the servient lot requires those spaces.

It should also be noted that while this permits a reduction of the requirements at a particular location, if the required spaces are being provided elsewhere, then there is not an overall reduction in the number of spaces provided/required. This approach also limits the development capacity for these other lots in the long-term. Such an approach is likely not in the City's best interests where intensified growth within a defined area is becoming the approach to City development – intensification and infill as the priority over expansion to urban areas.

6.6 Cash-in-Lieu of Parking

Section 40 of the *Planning Act* enables a municipality to accept cash-in-lieu of required parking spaces for a development. The Act identifies that a municipality may enter into an agreement with a landowner exempting them from providing or maintaining parking and that the agreement shall provide for payment in consideration of the exemption and shall set out how the payment is calculated. The calculation is typically related to the construction costs and land values to provide parking. All monies are then used to put into a reserve fund or invested in securities permitted under the *Municipal Act.* The funds are then typically used to develop a municipal parking facility or other related infrastructure. This strategy may be used when it is difficult to provide the number of spaces, often in dense urban areas.

Sudbury has a provision for cash-in-lieu of parking spaces, provided Council has entered into an agreement with the landowner. No areas of the City are specified in this section of the By-law, and as such they may conceivably be applied to commercial plazas or areas outside of downtown. North Bay accepts cash-in-lieu of parking, however this only applies to residential uses. Newmarket references cash-in-lieu of parking in the downtown area. Ottawa has a policy on cash-in-lieu of parking that only applies to the former City of Ottawa and City of Vanier, and does not explicitly mention cash-in-lieu of parking as an option to reduce required parking in its Zoning By-law.

6.7 Substitution for Bus Spaces or Bicycle Use

Some municipalities may permit developments to swap the provision of traditional vehicular parking spaces for space allocated to public transit or active transportation use. The reductions would not only permit a smaller land area to be dedicated to surface parking, but could also serve to encourage modal switch by increasing available public and active transportation facilities.

Both Ottawa and Thunder Bay provide a reduction in parking spaces for a dedicated bus loading area on a lot. Ottawa allows for a reduction for bus loading areas only for a shopping centre use and does not provide a maximum substitution number but does stipulate 25 spaces for every bus loading area. Thunder Bay allows a reduction of 20 parking spaces for every bus stop area with a maximum of 40 spaces. The reduction needs to be coordinated and approved by Thunder Bay's Transit Division.

Both Ottawa and Thunder Bay provide a reduction in parking spaces in an effort to promote bicycle use. Their application of the substitution differs. Ottawa's Zoning By-law requires bicycle parking for certain uses, and in certain areas, including in the suburban area. Ottawa also provides a reduction for required vehicular parking of 1 space per 13 sqm gross floor area within a building that is intended for use by bicyclists (shower room, change/locker room, etc.) in conjunction with the required or provided bicycle parking. Ottawa does not set a maximum number of parking spaces that may be substituted. Thunder Bay provides for a substitution of parking spaces based on a set number of bicycle spaces (1 parking space for 5 bicycle spaces to a maximum of 20% or 5 parking spaces). Thunder Bay's Zoning By-law does not otherwise appear to require bicycle parking spaces.

Notably, Sudbury's Zoning By-law does require the provision of bicycle spaces, but does not provide any additional incentive for bicycle parking such as a reduction in private vehicle spaces with the provision of additional spaces or amenities.

6.8 Substitution for Landscaping Area

Thunder Bay is the only municipality reviewed that has a clause permitting a substitution of required parking spaces for landscaping, which is provided in addition to the other landscape requirements of the by-law. A maximum of 25% of the on site parking spaces can be substituted. Further, should the owner require parking spaces in the future, the landscaping may be removed and replaced with the parking spaces at the owner's sole option. This substitution requires prior approval of the municipality, presumably through a Site Plan review and approval.

6.9 Reduction through Study

Municipalities may enable development proponents to study and justify the amount of parking proposed onsite, to vary from the parking requirement, without needing to undertake additional planning act approvals / process. This could form part of a development or Site Plan review process. Should a use change to another permitted use, however, parking requirements may need to be re-evaluated.

Edmonton, AB permits the reduction (or increasing beyond the maximum) of parking spaces where a parking impact assessment has demonstrated that the parking requirement for the proposed development is less or more than the By-law's requirements. In addition, for mixed use developments of at least 28,000 sqm, with greater than 20% of the space dedicated to restaurant, entertainment or cinema space, a parking impact assessment is required to determine the actual amount of parking required.

6.10 Sharing of a Parking Area for Multiple Uses

Certain types of commercial plazas or shopping centres may contain multiple tenants that are visited on one trip. For example, a visitor to a shopping mall may enter multiple retail stores, use a personal service shop, and eat at a restaurant in the food court. If each individual tenant has a parking requirement allocated to it, this ignores the above scenario of a visitor using several of the occupied spaces. A strategy to reduce required parking spaces is to acknowledge the overlapping visits.

The application of an overall rate to commercial plazas and shopping centres could account for overlapping use of a facility, if the resultant parking rate is lower than the cumulative rate of each individual use. Of the municipalities reviewed, only Ottawa has a parking rate for shopping centre at lower than the average restaurant rate, and in most cases, the shopping centre rate is actually equal to or higher than the rate for retail store. Sault Ste. Marie applies this provision for power centres (box stores) or shopping centres only. In this case an overall rate of 4.5 spaces per sqm is applied to the shopping centre use regardless of individual tenancies. Given that restaurant and retail store have the same parking rate, the general shopping centre rate is not actually a reduction in this case either.

A specific shared parking provision for Burlington, Ottawa, and Surrey, BC, are applied to mixed use developments, with consideration given to peak time usage. Surrey provides for sharing a maximum of 25% of the required parking spaces; however, this is only permitted where the establishments have different temporal distributions, and where the parking spaces are protected by an easement and restrictive covenant to ensure the spaces are reserved for the use which requires them. Burlington determines the parking requirement for the specific mixed-use development based on the greatest peak period occupancy of any given use. Ottawa also provides a reduction for shared parking, which here too is based on temporal parking demand per use. The reduced ratio is such that it determines the minimum space requirement based on the largest cumulative total in any given time period across all proposed uses. For example, a retail store will have higher occupancy rate during a weekend day compared to a business office which is typically occupied during a weekday. See Table 6 below from Ottawa's By-law.

Table 6: Excerpt from Table 104, Percentage of Parking Permitted to be Shared, City of Ottawa Zoning By-law 2008-250

Land Use	II Weekday - Morning	III Weekday - Noon	IV Weekday - Afternoon	V Weekday - Evening	VI Saturday[1]- Morning	VII Saturday[1]- Noon	VIII Saturday[1]- Afternoon	IX Saturday[1]- Evening
(a) office; medical facility; research and development centre	100%	90%	100%	15%	20%	20%	10%	5%
(b) bank	80%	100%	100%	10%	80%	100%	60%	10%
(c) retail store; retail food store; personal service business; convenience store	75%	80%	85%	75%	60%	90%	100%	50%
(d) restaurant; bar	30%	90%	60%	100%	30%	80%	50%	100%
(e) cinema; theatre; amusement centre	40%	40%	60%	85%	40%	70%	80%	100%
(f) visitor parking required for residential uses in Section 102	50%	50%	75%	100%	100%	100%	100%	100%

In addition, by-laws may contain provisions applicable to specific combinations of uses. Ottawa provides a special reduction for drive-through restaurants wherein a reduction of 20% or 10% can be provided where a drive-through operates in combination with either a restaurant or other use, respectively.

6.11 Total Elimination of Minimum Parking Requirements

Some jurisdictions in Canada and the United States have contemplated or implemented the complete elimination of minimum parking requirements. The Fraser Institute recently recommended that Canadian cities should eliminate minimum parking requirements altogether as: 1) property owners should dictate the “highest and best use” of their property; and 2) the high direct and indirect costs to provide parking, further contributing to making development in some areas unaffordable.[2] Edmonton’s City Council endorsed a plan to eliminate minimum parking requirements that could be implemented in 2020, after taking a piecemeal approach to various parking reductions over the past number of years for specific areas and uses. Proponents of the elimination note that the market is able to determine the actual parking needs for a development.[3]

[2]The Fraser Institute; September 26, 2018; It’s time for Canadian cities to eliminate minimum parking requirements. https://www.fraserinstitute.org/blogs/it-s-time-for-canadian-cities-to-eliminate-minimum-parking-requirements

[3] Committee endorses plan to eliminate Edmonton's minimum parking requirements JONNY WAKEFIELD Edmonton Journal Updated: May 7, 2019 https://edmontonjournal.com/news/local-news/committee-endorses-plan-to-eliminate-edmontons-minimum-parking-requirements

In the United States, Buffalo, New York, was one of the first cities to implement the elimination of minimum parking requirements in 2016, and Cincinnati, Ohio, and Hartford, Connecticut (2017), and San Francisco, California (January 2019) have also enacted similar by-laws.

6.12 Other Factors Reducing Parking Needs

Provision of municipal on-street parking and/or municipal parking garages adjacent or near commercial properties may reduce the need for onsite parking requirements. These parking features are typically found in a downtown, or urban environment. At this time none of the municipalities reviewed had a reduction related specifically to a municipal garage nearby.

The increasing use of online shopping home delivery and related activities such as shopping online and picking up at the store are altering the retail environment. Other technological advances such as ride-sharing services and automated vehicles will also play into this discussion as we move forward. Both of these major changes have already been and will continue to impact municipal commercial parking needs and contribute toward a further reduction in parking requirements.

6.13 Summary

Based on the above there appears to be parking management strategies that are exclusive to larger, more metropolitan municipalities. These include:

- Reduction based on proximity to transit;
- Reduction for enclosed or underground parking;
- Reduction based on location; and
- Establishing a maximum number of parking spaces.

Where developable land is at a premium, and where a transit system is well-established, such as is the case for downtowns and large urban areas, the foregoing strategies could provide for more flexibility for developers. Setting a maximum parking requirement avoids the oversupply of parking spaces and assist in creating more compact developments. However, developers are cognisant of their parking needs and applying a maximum might compromise the viability of a proposed development.

The following are the remaining identified strategies not currently in place in Sudbury:

- Substitution for bus space or bicycle space
- Substitution for landscaping space
- Reduction through study
- Sharing of a parking area for multiple uses
- Elimination of minimum parking requirements

Encouraging active or alternative transportation modes can be assisted through site development. A substitution of parking spaces for bus space and bicycle space, such as is provided for in Thunder Bay, could facilitate a move away from an auto-oriented form of transportation.

The substitution of landscaping area for a reduction in parking would be beneficial should a municipality want to encourage greater naturalization than what is currently provided in minimum landscaping requirements.

A provision to allow for parking requirements to be studied and justified, through the Site Plan process would provide for provision of “actual” parking needs, rather than based on a minimum requirement. Typically commercial developments require Site Plan approval, and allowing parking to be varied through a study and Site Plan would eliminate the need for an additional planning approval (minor variance or ZBA) to vary parking. This strategy would also serve to build some flexibility into the by-law that stakeholders would like to see.

As discussed in Section 6.10, contemplating changes to account for shared parking, reflective of time of use may be beneficial to mixed-use developments.

Total elimination of minimum parking requirements is still relatively new, and may be worth re-visiting once those municipalities that have implemented the strategy have had experience reviewing and approving development. This strategy should be monitored as it does appear to have merit for consideration. As previously noted, and echoing the stakeholder comments, the market and demand should dictate the amount of parking to place on a property. A developer will not build a site that cannot be leased or sold because it does not have an ‘adequate’ amount of parking. The question is: what is an ‘adequate’ amount, and should a municipality or market be dictating the answer?

7.0 Conclusions and Recommendations

There appears to be a technical validity in considering the reduction in the number of parking spaces required for various commercial uses. This conclusion was based on the following observations:

- Overall Sudbury’s commercial parking requirements are higher than peer municipalities amongst a variety of uses.
- Provision of required parking has been a limiting factor in development opportunities in Sudbury.
- The Transportation Master Plan and Transit Action Plan are committed to expand and improve the City’s transit system and support and implement active transportation projects.
- There are many regulatory options that could be used to reduce parking requirements.

Having reviewed various municipal parking standards and parking management strategies, the following are recommended management strategies for consideration by Sudbury:

- Consider reducing the overall parking requirement for commercial uses to be:
    - More consistent with requirements in peer jurisdictions;
    - More appropriately capture the parking needs of various uses; and
    - Support a more compact development form.

- Rates should reflect parking demand per use. Collecting empirical data of observed onsite parking demands would assist in determining Sudbury’s current demand per use.

- In the absence of such data, parking rates per use may be adjusted to be more consistent with requirements identified for peer municipalities and to reflect the stakeholder interviews that were conducted, as noted below:

Use	Current CGS Standard (per 100 sqm)	Considered Reduction (per 100 sqm)
Convenience store	5 (or 1/20 sqm)	3 (or 1/33 sqm)
Personal service shop	5 (or 1/20 sqm)	3 (or 1/33 sqm)
Restaurant	10 (or 1/10 sqm)	8 (or 1/12.5 sqm)
Retail store	5 (or 1/20 sqm)	3 (or 1/33 sqm)
Shopping centre	5 (or 1/20 sqm)	4 (or 1/25 sqm)

- Maintain those strategies currently employed by the City including:

    - Reduction for underground parking spaces;
    - Provision of parking spaces on another lot; and
    - Cash-in-lieu of parking.

    These strategies provide for site development flexibility and encourages compact development.

- In an effort to promote both active transportation and transit use the City should consider including a provision whereby a bus parking area and/or bicycle space(s) provided on-site could allow for a reduction in the minimum number of parking spaces required, such as:

    - 1 space reduction per 5 bicycle; and
    - 10 spaces per bus layby.

- A provision in the Zoning By-law, to allow for parking requirements to be studied and justified, through the Site Plan process that would provide for provision of “actual” parking needs, rather than based on a minimum requirement. This strategy would also serve to build some flexibility into the by-law.

- To encourage a more efficient use of a parking lot for a mixed-use development, a shared parking provision which takes into consideration the differential parking occupancy rates for a use can be included. Both Ottawa and Burlington are good examples of how this provision should be applied.

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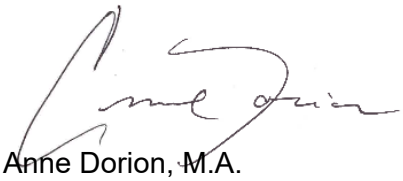

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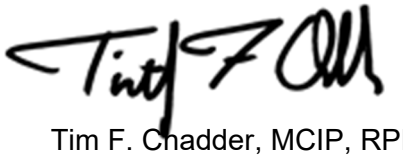

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Appendix A

Detailed Parking Standards Chart

JLR No. 28709
Detailed Parking Standards Chart

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Standard Regulation	Sudbury (By-law No. 2010-100Z, updated July 12, 2019)	North Bay (By-law 2015-30)	Sault Ste. Marie (By-law No. 2005-150)	Thunder Bay (By-law No. 100-2010)	Newmarket (By-law No. 2010-40, Consolidated Nov 2018)*	City of Ottawa 2008-250 Consolidation	Waterloo (By-law 2018-050)	City of Ottawa 2008-250 Consolidation	City of Burlington (By-law 2020)	Edmonton, AB (By-law 12800)	Surrey, B.C. (Zoning By-law No. 12000)	Victoria, BC (By-law No. 80-159)
Automotive Service Shop	1/30 m2 net floor area	1 parking space per 30m2 total floor area.	3.5 spaces/100m2 for the 1st 1000m2 + 1/200m2 thereafte	one PARKING SPACE for every 40.0 m² of GFA devoted to storage, offices and display area plus 3 PARKING SPACES for every service bay devoted to repair facilities	1 parking space per 13 m2 of gross floor area excluding the service bays	Greater of 1 per 100 m2 of gross floor area or 2 per service bay		Greater of 1 per 100 m2 of gross floor area or 2 per service bay	4 spaces per 100 m2 gross floor area	less than 4 500 m2, 1 parking space per 40.0 m2 of Floor Area; 4 500m2 - 9 000m2, 1 parking space per 33.3 m2 of Floor Area; 9 000 m2 28 000 m2, 1 parking space per 28.5 m2 of Floor Area; greater than 28 000 m2, 1 parking space per 25.0 m2 of Floor Area	2 parking spaces per vehicle servicing bay; plus 1 parking space per car wash bay	1 space per 40m2 floor area
Business Office	1/30 m2 net floor area	1 parking space per 30 m2 of commercial floor area	4.5 spaces/100m2	one PARKING SPACE for every 30.0m² of GFA	1 parking space per 27 m2 of net floor area	2 per 100m2 of gross floor area		2.4 per 100 m2 of gross floor area	3.5 spaces per 100 m2 gross floor area	1 parking space per 29.4 m2 of Floor Area	2.5 parking spaces per 100 m2 [1,075 ft2] of gross floor area for a building outside of City Centre	1 space per 55m2 floor area
Convenience Store	1/20m2 net floor area		3.5 spaces/100m2 for the 1st 1000m2 + 1/200m2 thereafter	one PARKING SPACE for every 37.0m² of GFA	Retail Store, personal service shop, convenience store: min --> 1.0 parking space per 40m2 of gross floor area; max -->2.0 parking spaces per 40m2 of gross floor area	2.5 per 100 m2 of gross floor area		3.4 per 100 m2 of gross floor area		less than 4 500 m2, 1 parking space per 40.0 m2 of Floor Area; 4 500m2 - 9 000m2, 1 parking space per 33.3 m2 of Floor Area; 9 000 m2 28 000 m2, 1 parking space per 28.5 m2 of Floor Area; greater than 28 000 m2, 1 parking space per 25.0 m2 of Floor Area	2.75 parking spaces per 100 m2 [1,075 ft2] of gross floor area where the gross floor area is less than 372 m2 [4,000 ft2]; or 3 parking spaces per 100 m2 [1,075 ft2] of gross floor area where the gross floor area is greater than or equal to 372 m2 [4,000 ft2] but less than 4,645 m2 [50,000 ft2]; or 2.5 parking spaces per 100 m2 [1,075 ft2] of gross floor area where the gross floor area is greater than or equal to 4,645 m2 [50,000 ft2].	
Commercial Use		1 parking space for every 30m2 of commercial floor area. 1 parking space for every 75m2 for any C1 (general commercil inner core) or C2 zone (general commercial outer core)					MIXED-USE COMMUNITY COMMERCIAL (C1) = 2.00, 2.40, 2.80, 3.20, 3.20, 3.60, or 4.00, per 100 m2 ; MIXED-USE NEIGHBOURHOOD COMMERCIAL (C2)= 2.80 ,3.20, 3.20, 3.60, or 4.00 per 100m2; CONVENIENCE COMMERCIAL (C3) =2.80 ,3.20, 3.20, 3.60, or 4.00 per 100m2 etc.			less than 4 500 m2, 1 parking space per 40.0 m2 of Floor Area; 4 500m2 - 9 000m2, 1 parking space per 33.3 m2 of Floor Area; 9 000 m2 28 000 m2, 1 parking space per 28.5 m2 of Floor Area; greater than 28 000 m2, 1 parking space per 25.0 m2 of Floor Area		

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Hotel	1/guest room plus 1 per 10m2 of net floor area of any restaurant, dining room, lounge, tavern, banquet hall, meeting room, retail store or any other area, used to accommodate the public	1 parking space for each guest room plus 1 parking space for each 10m2 of floor area of the building devoted to public use.	1.25 spaces / guestroom	one PARKING SPACE for every suite plus the number determined by the ASSEMBLY RATE for the dining or banquet facilities, lounges, RESTAURANTS and meeting rooms	The aggregate of: • 1 space per guest room • 1 space per every 2 guest rooms over 20 • 1 space per 4.5 m2 of gross floor area dedicated to administrative, banquet and meeting facilities	1.4 per 100 m2 of gross floor area		1.4 per 100 m2 of gross floor area	1 space per guest room or suite	1 parking space per Sleeping Unit	1 parking space per sleeping unit; plus Parking requirements for accessory uses.	0.50 spaces per room
Medical Office	5 spaces OR 1/20 m2 net floor area, whichever is greater	Same as business office - no distinction made	4.5 spaces/100m2	one PARKING SPACE for every 23.0m² of GFA	1 parking space per 17 m2 of net floor are	4 per 100 m2 of gross floor area		4 per 100 m2 of gross floor area	6 spaces per 100 m2 gross floor area	1 parking space per 22.2 m2 of Floor Area	3.5 parking spaces per 100 m2 [1,075 ft2] of gross floor area.	1 space per 40m2 floor area
Personal Service Shop	1/20 m2 net floor area	No parking shall be required in the C1 zone. 1 parking space for every 75 m2 of floor area in the C2 Zone.	4.5 spaces/100m2	one PARKING SPACE for every 20.0m² of GFA	Retail Store, personal service shop, convenience store: min --> 1.0 parking space per 40m2 of gross floor area; max -->2.0 parking spaces per 40m2 of gross floor area	2.5 per 100m2 of gross floor area		3.4 per 100 m2 of gross floor area	4 spaces per 100 m2 gross floor area		3 parking spaces per 100 m2 [1,075 ft2] of gross floor area.	1 space per 40m2 floor area
Recreational/Fitness Centre	1/6 persons capacity, plus 1/20m2 net floor area of any accessory use for a commerical recreation centre only	1 parking space per 30 m2 of total floor area	1/5 persons Max. Building Capacity	varies based on use. Fitness = 1 for every 25 m2 of GFA; arena auditorium, dance hall, public hall, music hall or similar use = determined by assembly rate	min. 1.0 parking space per 28m2 of gross floor area. Max --> 2.0 parking spaces per 28m2 of gross floor area	4 per alley, court, ice sheet, game table or other game surface plus 10 per 100 m2 of gross floor area used for dining, assembly or common area		4 per alley, court, ice sheet, game table or other game surface plus 10 per 100 m2 of gross floor area used for dining, assembly or common area	1 space per 6 persons capacity	c. Health and Fitness Clubs: 1 parking space per 10 m2 of Floor Area used by patrons	3.6 parking spaces per 100 m2 [1,075 ft2] of floor area; plus Parking requirements for all accessory uses	1 space per 20m2 floor area

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Restaurant	1/10m2 net floor area OR 1/3 persons seating capacity, which ever is greater. Take-out = 3 spaces plus 1/10m2 net floor area	No parking in the C1 zone. 1 parking space for every 75 m2 of floor area in the C2 Zone. All other zones 1 parking space per 15m2 total floor area	Food service 1/5 persons Max. Building Capacity. Take out facilities 4.5 spaces/100m2	without take-out = one PARKING SPACE for every 20.0m² of GFA, without a DRIVE SERVCE UNIT = one PARKING SPACE for every 6.0m² of GFA, with a DRIVE SERVCE UNIT = one PARKING SPACE for every 10.0m² of GFA	Restaurant: min-->1.0 parking space per 50m2 of gross floor area, excluding any porch, veranda and/or patio dedicated as seasonal serving areas; max --> 4.0 parking spaces per 50m2 of gross floor area, excluding any porch, veranda and/or patio dedicated as seasonal serving areas	Full service or Fast food = 3 for first 50m2 of gross floor area plus 10 per 100 m2 of gross floor over 50 m2 of gross floor area; Take out = 1.5 for first 50m2 of gross floor area plus 5 per 100 m2 of gross floor area over 50 m2 of gross floor area.		10 per 100 m2 of gross floor area	Fast Food :1 space per 4 persons capacity or 25 spaces per 100 m2 GFA, whichever is greater; standard or patio: 1 space per 4 persons capacity	1 parking space per 9.6 m2 of Public Space	3 parking spaces where the sum of the gross floor area, balconies, terraces and decks is less than 150 m2 [1,615 ft2]; or 10 parking spaces per 100 m2 [1,075 ft2] of gross floor area, balconies, terraces and decks, where this total area is greater than or equal to 150 m2 [1,615 ft2.] but less than 950 m2 [10,225 ft2.]; or 14 parking spaces per 100 m2 [1,075 ft2.] of gross floor area, balconies, terraces and decks,where this total area is greater than or equal to 950 m2 [10,225 ft2].	1 space per 25m2 floor area
Retail Store	1/20 m2 net floor area	No parking shall be required in the C1 zone. 1 parking space for every 75 m2 of floor area in the C2 Zone.	4.5 spaces/100m2	FOOD STORE with a GFA less than or equal to 275.0m² = one PARKING SPACE for every 30.0m² of GFA, FOOD STORE with a GFA greater than 275.0m² = one PARKING SPACE for every 25.0m² of GFA	Retail Store, personal service shop, convenience store: min --> 1.0 parking space per 40m2 of gross floor area; max -->2.0 parking spaces per 40m2 of gross floor area	2.5 spaces per 100 m2 gross floor area		3.4 per 100 m2 of gross floor area	4 spaces per 100 m2 gross floor area	less than 4 500 m2, 1 parking space per 40.0 m2 of Floor Area; 4 500m2 - 9 000m2, 1 parking space per 33.3 m2 of Floor Area; 9 000 m2 28 000 m2, 1 parking space per 28.5 m2 of Floor Area; greater than 28 000 m2, 1 parking space per 25.0 m2 of Floor Area	2.75 parking spaces per 100 m2 [1,075 ft2] of gross floor area where the gross floor area is less than 372 m2 [4,000 ft2]; or 3 parking spaces per 100 m2 [1,075 ft2] of gross floor area where the gross floor area is greater than or equal to 372 m2 [4,000 ft2] but less than 4,645 m2 [50,000 ft2]; or 2.5 parking spaces per 100 m2 [1,075 ft2] of gross floor area where the gross floor area is greater than or equal to 4,645 m2 [50,000 ft2].	1 space per 50m2 floor area

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Standard Regulation	Sudbury (By-law No. 2010-100Z, updated July 12, 2019)	North Bay (By-law 2015-30)	Sault Ste. Marie (By-law No. 2005-150)	Thunder Bay (By-law No. 100-2010)	Newmarket (By-law No. 2010-40, Consolidated Nov 2018)*	City of Ottawa 2008-250 Consolidation	Waterloo (By-law 2018-050)	City of Ottawa 2008-250 Consolidation	City of Burlington (By-law 2020)	Edmonton, AB (By-law 12800)	Surrey, B.C. (Zoning By-law No. 12000)	Victoria, BC (By-law No. 80-159)
Shopping Mall	With a min. gross floor area of 4,650 m2 = 1/20m2 net floor area		Power Centres and shopping centres = 4.5 spaces/100m2	one PARKING SPACE for every 25.0m² of GFA	min. 1.0 parking space per 21m2 of gross leasable floor area; no max	3.4 per 100m2 of gross floor area		3.6 per 100 m2 of gross leasable floor area	5.25 spaces per 100 m2 gross floor area	less than 4 500 m2, 1 parking space per 40.0 m2 of Floor Area; 4 500m2 - 9 000m2, 1 parking space per 33.3 m2 of Floor Area; 9 000 m2 28 000 m2, 1 parking space per 28.5 m2 of Floor Area; greater than 28 000 m2, 1 parking space per 25.0 m2 of Floor Area	2.75 parking spaces per 100 m2 [1,075 ft2] of gross floor area where the gross floor area is less than 372 m2 [4,000 ft2]; or 3 parking spaces per 100 m2 [1,075 ft2] of gross floor area where the gross floor area is greater than or equal to 372 m2 [4,000 ft2] but less than 4,645 m2 [50,000 ft2]; or 2.5 parking spaces per 100 m2 [1,075 ft2] of gross floor area where the gross floor area is greater than or equal to 4,645 m2 [50,000 ft2].	
Supermarket				RETAIL STORE (other than a FOOD STORE) with a GFA of less than or equal to 930.0m² = one PARKING SPACE for every 40.0m² of GFA whichever is the greater, RETAIL STORE (other than a FOOD STORE) with a GFA greater than 930.0m²= one PARKING SPACE for every 55.0m² of GFA,		2.5 per 100m2 of gross floor area		3.4 per 100 m2 of gross floor area	4 spaces per 100 m2 gross floor area			800 m2 or less 1 space per 50m2 floor area; >800m2 1 space per 40m2 floor area
Snow					An outdoor parking lot designed to accommodate 5 or more parking spaces, shall provide an area equivalent to 5% of the number of required spaces for the purpose of snow storage.							

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Notes			separate definition for box stores and shopping centres: {2012-158} POWER CENTRE More then one commercial function housed in more then one building, where the overall site has been designed to function as an integrated unit and parking areas are shared among separate commercial buildings. SHOPPING CENTRE Several mixed commercial functions housed in one or more buildings designed as an integrated unit. Shopping centers shall have a minimum gross floor area of 10 000m2		parking standards for the lands located within the Urban Centres noted here. Maximum spaces only apply to the Urban Centre	Different parking standards apply to the inner urban, inner urban mainstream, Outer Urban/inner suburban, suburban, rural. Outer Urban/inner suburban used here (Area B)	Waterloo parking is primarily based on the zone and within that zone it is further subdivided into areas. In certain instances a specific use will have its own parking requirment and identified in the Parking section of the By-law	Suburban (Area C) used here				Victoria has separate by-law for downtown. Outside downtown parking required vary dependent on area: Core Area, Village / Centre, Other Area. Less retrictive being Core Are and greater parking for other areas. Village/Centre values only noted here.

Appendix B

Stakeholder Interviews

Commercial Parking Requirements
Appendix B: Stakeholder Interviews

Preface: The purpose of the study is to develop a background report for the City of Greater Sudbury (City) that outlines current best practices regarding zoning approaches to parking standards for commercial lands. As part of the analysis, we are conducting stakeholder interviews to establish opinions regarding current parking standards, and their economic impact including development, leasing, and expansion opportunities.

Telephone interviews were conducted between August 2, 2019 and September 13, 2019 and included participation from the following individuals:

- Chris Tammi, Real Estate Broker, Mallette-Goring Inc., Brokerage
- Genny Beckerton, General Manager Morguard Real Estate Agency (New Sudbury Centre)
- Joe Rocca, Traffic and Asset Management Supervisor, City of Greater Sudbury
- John Arnold, Dalron Commercial
- Paul Zulich, Zulich Enterprises Limited

QUESTIONNAIRE

1. **To establish what commercial lands the interviewee has interest in**

- Please identify where your commercial land holdings are (locations, square footage, number and types of tenancies, number of parking spaces)

- *Throughout Sudbury, with office, industrial, retail uses*
- *Brady Square, Notre Dame Square, LaSalle Mall, Times Square, 1865 Paris Street, Paris/Regent Street; strip plazas with a balance of professional office, retail and restaurant uses*
- *Throughout Sudbury*
- *Mix of tenancies – 2040 Algonquin retail/food, 863 Barrydowne, 850 Barrydowne, 1010 Lorne St, 1361 Paris Street, 410 Falconbridge*
- *New Sudbury Centre – 110 tenants – GLA is 568,000 square feet (including food court and 23,000 square feet office)*

2. **To establish operational/tenant/consumer parking 'requirements'**

- Please identify the following days/times:
  - Low/High peak shopping/use day/hour
  - High/holiday shopping/use season(s)

- *The whole month of August, first couple of weeks of September are busy. Mid-November through New Year's is busy.*
- *There is a balance between the uses: restaurants will use in the afternoon/evening (dining hours, and office will be occupied during the daytime on weekdays. Retail is daytime weekdays and weekends. We take this into consideration.*
- *Low days are Mon-Wed; Thurs-Fri are busy 11-2; and all day Saturday and Sunday are peak*

- Do the City's parking requirements cause you to avoid certain tenant types?

- *Absolutely. This is one of the most common challenges.*
- *No. retail and office only.*
- *Definitely. Needed to turn away a restaurant in a space that already had another restaurant. Restaurant parking requirements are much higher than retail.*

- Have you had prospective tenants require more parking than what was available?

- *Yes*
- *Everyone wants more parking.*
- *No.*

- Do your tenants ask about bicycle parking / transit services to the site / on-street parking?

- *Typically not bicycle parking. Certain tenants ask/require transit (CNIB, for example).*
- *Bicycle parking is not normally asked about. Public services will ask about transit. It depends on the use.*
- *Yes. Federal and provincial government departments will ask about bicycle parking and transit. Transit is a Federal government requirement.*
- *Ownership is concerned with these factors and sustainability. Would like to see more bike storage and supportive of transit.*

- Overall, how does the number of parking spaces you provide at your property(ies) compare with the number of parking spaces you /your tenants/customers want/need?

- *Everyone wants more parking. You are trying to maximize the ratio of land to building while ensuring there is enough parking.*
- *Cambrian Heights Drive meets the City's parking requirement, but tenants want more for office and light industrial/service commercial uses.*
- *Depends, for certain uses, parking standards are justified (i.e. medical uses). Retail, office restaurant requirements are too high. An 8,000 sqft retail store requires 30 spaces, for example.*
- *Depends where and who. Sometimes there are also accessibility and delivery considerations.*

- Do you agree or disagree with the following statements:
    - Your establishment needs more parking spaces to meet the needs of consumers during low and high peak shopping hours

- *The market should dictate the number of spaces.*
- *Tenants are sensitive to uses that may conflict with respect to peak times. For example, a restaurant on Paris Street is looking for an office use to compliment peak times. The tenant/owner brings an understanding of requirements.*
- *Strongly disagree at low and high peak shopping hours. There is more than enough parking.*
- *We meet the needs.*

    - Your establishment needs more parking spaces to meet the needs of consumers during high/holiday shopping season(s).

- *We have seen problems at Christmas time where the parking lot is packed but not as much in past couple of years.*
- *If we need more parking spaces, we will start hauling snow offsite.*

- Have any existing or past tenants indicated that there is an insufficient number of parking spaces to meet their customers' needs: YES or NO. Please explain.

- *Yes.*
- *Yes, in Downtown Sudbury.*
- *No.*

- In the last year how often have you heard that customers did not want to visit your establishment or tenants did not want to locate in your property because they thought parking would be a problem?

- *Never.*

- Outside the City's Zoning by-law, is there a metric or factor that you or your tenants use to determine your/their parking requirements?

- *Offices may use head counts. Other factors rarely come up for parking. Tenants are looking for specific locations, visibility, etc.*

- *No, we typically use the municipal Zoning By-law.*
- *No, we are in line with the Zoning By-law.*
- *Square footage and employee numbers. If an office is open concept, can fit more employees in, thereby increasing parking requirement.*

- Is there a minimum number of spaces that you would consider having on a site and how would you calculate this minimum?

- *No responses to this question.*

- How do you factor providing parking spaces for tenants into the cost of space in your facility(ies)?

- *Parking lot maintenance is part of lease costs, and are a function of GFA.*
- *Included in the base lease rate. Operating costs are additional.*
- *Have not seen charging for parking other than downtown or at the hospital.*
- *It is distributed overall based on the percentage of the building that is occupied*

- Do you allocate/assign/designate certain spaces to particular uses/tenants? YES or NO. Please explain.

- *Some areas do allocate spaces, but it would not be a large percentage of spaces. 868 Falconbridge, for example*
- *There is not a formal allocation. In some cases tenant employees are required to parking in certain areas.*
- *On occasion, not often though.*
- *Not typically. This is confusing. Parking is provided in common.*

3. To determine the frequency of overlapping uses

- How often would you say that a customer visits more than one type of tenant/use during a single trip to your property (such as retail, office, food and coffee, personal service, etc.)?

- *Where there are complementary uses, this may happen*
- *Where restaurants are permitted and there are offices close by, office visitors can pop in*
- *Visitors typically do not multi-task, the retail plaza trend is a destination, where visitors come for a specific tenant only*
- *Frequently.*
- *Sometimes, not usually though. These are destination locations, which might have 1 or 2 visitors at a time, other than employees.*

4. To assess the City of Greater Sudbury's Zoning By-law parking requirements

- Fill in the blank: New construction projects or redevelopment should require_____ parking than currently required

- *Less requirement for commercial zoned properties. The market should dictate how much parking is needed.*
- *Could consider a maximum number of spaces, for certain uses or size of sites*
- *Institutional uses often do not have enough spaces, not considering the basic needs of their staff.*
- *Don't think that the rate is bad for smaller developments. Larger developments the rate is over the top. Look at the spaces, and you can see it is not needed.*
- *The same requirements are fine. The rates work well right now.*
- *Less requirements, so that we can add more GLA.*
- *Parking lots are massive black asphalt areas. It would be nice to reduce the requirements to improve the look and add landscaping.*

- *Depends on the use.*
- *Looking for flexibility, not a black-and-white by-law.*
- *Office requirement is overkill. Our office does not meet by-law requirements, but the parking lot is always empty.*
- *Standards should be maintained to keep a level playing field for existing / future development. It is unfair if the development next door doesn't require as many spaces.*
- *Parking requirements seem to make sense and meet provincial standards.*
- *Office is not as busy as retail.*
- *In general all for less government regulations; let the private sector determine how to spend their money to develop their properties. Address the low-hanging fruit to reduce hurdles to development.*

- Have parking requirements influenced your decision as to whether to purchase property and/or proceed with a development proposal? YES or NO. Please explain.

- *Yes.*
- *Parking is always the deciding factor. It affects leasibility, which then affects profits.*
- *Yes. They are a hindrance.*
- *For a multiple-residential development on Paris parking needed to be exchanged with the commercial building.*
- *Yes.*

- Have you submitted any applications for minor variance or rezoning to ask for a reduction in parking requirements? YES or NO. Please explain.

- *A minor variance was required for parking for Freshii on LaSalle. Location of the business was of primary importance.*
- *Cedarpoint for Frubar*
- *Starbucks in South End*
- *Autumnwood – at McKenzie and Ste Anne Streets (residential)*
- *Hotels – Marriott at Kingsway/Falconbridge*
- *Maybe – if it is the right opportunity.*
- *Yes, for food services.*
- *Not since 2014, not sure prior to that.*
- *The process/requirements for minor variance can often deter development.*

- Do you have any thoughts on the cumulative standard for determining parking requirements, i.e. related to the potential for overlapping uses?

- *You do not need a parking space for each use.*
- *No.*
- *Not sure.*

- Do you agree or disagree with the following statements:
    - As a result of the minimum number of required spaces, costs associated with the development of the parking lot were substantial.
    - The minimum requirements have limited the full commercial development potential of the property.

- *Disagree.*
- *This has a major impact. The cost of parking directly relates to the potential development, when trying to maximize development area and potential tenants.*
- *Yes, we have experienced this.*
- *We were looking at developing additional pad sites which would have required additional parking or variances (prior to Sears closure). Now focused on filling Sears before additional development.*

- How often would you say that parking spaces determine GFA of a building?

- *The value of commercial property is directly related net rentable area. Office is different from the rest. Sometimes it makes more sense for a 3,000 sqft restaurant than a 10,000 sqft office, as the highest rent is for food / take out.*
- *Yes, I have seen this. A more recent trend is to ask for relief (i.e., through a variance).*

5. To discuss parking layout and urban design factors related to parking requirements

- How is snow accumulation dealt with? Is it removed or stored on the property?

- *The need for those parking spaces and cost to have it hauled to the snow dump by a private contractor influences how often removal is done.*
- *Some sites require hauling snow out with more frequency*
- *Store it on the property until it cannot be stored anymore.*
- *Smaller sites tend to remove; larger sites have more room and extra spaces for storage*
- *Pile all of the snow in the back until it is too big/too large.*
- *It takes up required parking spaces (per By-law calculation).*

- Have minimum zoning requirements for parking resulted in altering the site layout and/or functionality of the property? Please explain.

- *Sometimes it stops projects – how do you fit it in?*
- *Definitely. Parking requirements have altered or reduced buildable area of the property.*
- *For sure; we have altered the size of buildings, reduced building size. The entire development is based on parking, and maximizing land costs.*
- *No change.*

- How would you prefer to see parking oriented relative to the building?

- *The City is always talking about pushing buildings to the street. However, the perception is that there is not enough parking for patrons because you cannot see it.*
- *Wouldn't typically push those comments forward as it does not impact the corridor function; ok with access at the front.*
- *Most normally at the front, with employee parking at the back.*
- *Times Square – 24,000 sqft office – parking at back; 1865 Paris St – employee parking at back*
- *1565 Lasalle - no parking at the back.*
- *Depends on what the building looks like.*
- *Our parking layout is well thought out for us.*

- What do you think of the potential to require street-oriented buildings with parking at the rear through urban design standards?

- *There is a resistance to curb diamond from an operating perspective; more emphasis is placed on definition of the drive aisle.*
- *Not in favour of forced / one-size-fits-all requirements*
- *RioCan Centre is OK, as it is above street level.*
- *Depends. Buildings closer to the street might get dirty, especially on busy arterial streets. This might not be well-maintained.*
- *There is a concern about the number of entrances and parking location.*

- What do you think about maximum parking requirements?

- *Tie it into the Transit Action plan*
- *Might make sense in Southern Ontario, but it is not relevant here. There is nothing wrong with having more than what is required.*
- *That is ridiculous.*

- *Would not matter in our case.*
- *It is unnecessary. Landscaping should be required.*

6. To determine tenant/customer travel mode behavior

- Are there transit and active transportation stops/networks/connections to your property(ies)/ the sites reviewed?

- *The bus goes through our property and there are sidewalks.*
- *Bicycle parking, supportive infrastructure, lockers and change facilities*
- *The Extendicare on Algonquin is located near a transit stop*
- *Yes there are both.*

- In the last year how likely were your existing tenants/customers to use the following modes of transportation to access your property: personal vehicle; public transportation; bike; walk?

- *Unknown.*
- *Majority use a personal vehicle. Some use public transit. Not many bike or walk.*

- Based on your understanding of transportation trends, how likely do you think your tenants/customers are to use the following modes of transportation in the next five (5) years to access your property: personal vehicle; public transportation; bike; walk?

- *We undertook a tenant survey, and Sunday transit service for employees was needed. This would improve usage.*
- *It is a big uphill battle to get people using transit – not just the design of the system, but also a mindset*

- Are there certain types of uses that you would see as being transit or alternative transportation supportive?

- *Tim Horton's morning crowd is mostly seniors.*
- *Would be interesting to integrate Transportation Demand Management measures to help reduce parking requirements*
- *Can't think of anything specific. As the City builds it, more people will use it.*
- *Uses that cater to students.*
- *Question is always how to encourage alternate modes of transportation thereby reducing need for parking/vehicles.*

By-law 2020-XXXZ

A By-law of the City of Greater Sudbury
to Amend By-law 2010-100Z being the
Comprehensive Zoning By-law for the City of Greater Sudbury

Whereas the Council of the City of Greater Sudbury deems it desirable to amend By-law 2010-100Z being the Zoning By-law for the City of Greater Sudbury;

Now therefore the Council of the City of Greater Sudbury hereby enacts as follows:

1. That By-law 2010-100Z being the Zoning By-law for the City of Greater Sudbury be and the same is hereby amended by:

(1) In Part 5, PARKING AND LOADING PROVISIONS, Section 5.2.2, CALCULATION OF PARKING REQUIREMENTS, by adding a new Sections as follows:

"5.2.2.5 – CORRIDOR PARKING REDUCTION

Where a *lot* has *frontage* onto GOVA Routes 1 and 2 (the Main Line and Barry Downe / Cambrian, respectively), the number of *parking spaces required* shall be reduced by 10%.

5.2.2.6 – BICYCLE PARKING REDUCTION

Where bicycle parking is provided, the City may reduce the number of *parking spaces required* by 5 spaces.

5.2.2.7 – BUS LAY-BY REDUCTION

Where a bus lay-by is provided, the City may reduce the number of *parking spaces required* by 10 spaces.

5.2.2.8 – REDUCTIONS BASED ON PARKING STUDY

The City may accept the number of *parking spaces required* as determined by a site-specific study prepared to the satisfaction of the City of Greater Sudbury."

(2) In Part 5, PARKING AND LOADING PROVISIONS, Section 5.3, NON-RESEIDENTIAL PARKING REQUIREMENTS, TABLE 5.4, by:

a. Deleting and replacing "*Retail Store* - 1/20m^2 *net floor area*" with "*Retail Store* - 1/33 m^2 *net floor area*"

b. Deleting and replacing "*Restaurant* - 1/10m^2 *net floor area*" with "*Restaurant* - 1/12.5 m^2 *net floor area*"

c. Deleting and replacing "*Convenience Store* - 1/20m^2 *net floor area*" with "*Convenience Store* - 1/33 m^2 *net floor area*"

d. Deleting and replacing "*Personal Service Shop* - 1/20m^2 *net floor area*" with "*Personal Service Shop* - 1/33 m^2 *net floor area*"

e. Deleting and replacing "*Shopping Centre* - 1/20m^2 *net floor area*" with "*Shopping Centre* - 1/25 m^2 *net floor area*"

(3) [MAP SHOWING GOVA ROUTES 1 and 2 TO BE ATTACHED]