

### Energy Transition Strategy Corrective Actions

The Community Energy Transition is an opportunity to re-imagine Edmonton and the energy markets it will lead. The energy transition represents a once in a lifetime opportunity to create a new era of economic growth in the region. This will require transformational change at an unprecedented rate. The Energy Transition Strategy has four pathways requiring transformative action (Renewable and Resilient Energy, Emission Neutral Buildings, Low Emission City and Transportation, and Carbon Capture and Nature Based Solutions), all of which are grounded on a foundation where the City of Edmonton demonstrates Climate Solution Leadership in its decision making, actions and advocacy.

The Energy Transition Strategy and Action Plan requires an agile and smart implementation approach. This means knowing if, and what type of, an initiative is needed and knowing when government action is no longer required, or at least not required in the same way. The strategy identifies:

- Dynamic implementation is needed, including tracking “signals” to understand when a change in implementation is needed. The City's understanding of energy transition progress is not perfect, however there are some key signals that help understand how the transition is advancing.
- Five levers of change, which are tools, actions or approaches the City can use to enact change and achieve specific outcomes. These levers of change are: Partnership and Advocacy; Incentives, Pricing and Subsidies; Infrastructure Investment; Policy and Regulation; and Activation. Levers of change may need to be applied to varying degrees to achieve an Energy Transition outcome. In some cases, multiple levers will need to be used at the same time.

Implementation of the strategy and corrective actions requires a significant investment, estimating \$1.2 billion over the next four years. A targeted City funding share is one-third or \$100 million annually, shared with provincial and federal governments. Additionally, implementation will require additional resource capacity within the City of Edmonton. Administration is currently undergoing work to understand more specifically the financial and resource implications to implement specific climate actions.

With the first year of the updated strategy's implementation complete, significant work is still ahead. The start of accelerated and corrective actions in each of the strategy's four pathways and its foundation are presented below.

The field of climate change is evolving quickly, with new research, tools, initiatives and announcements emerging. Corrective actions will need to be continuously reviewed.

### Renewable and Resilient Energy

To be a thriving city powered by low carbon energy, Edmonton needs a supply of 100 per cent low carbon energy - both for electricity and heating. Edmonton also has a target to generate 10 per cent of electricity locally. This pathway is essential for reducing emissions, but also for developing the next generation of energy jobs, small business opportunities and products the global market is beginning to demand. Progress will be made through a combination of changes to Alberta's energy supply systems and through local energy generation (ie. district energy systems and microgeneration).

#### Energy Supply Current State

The average home in Edmonton uses electricity from the Alberta grid to power their homes and uses natural gas for heating. Alberta's electricity makeup is approximately 48 per cent coal generation and 41 per cent natural gas generation. Coal fired electricity in Alberta is expected to be phased out by 2023, and replaced by a combination of renewable energy sources and natural gas. This transition has resulted in the GHG intensity of Alberta's electricity grid dropping by 25 per cent since 2015. The number of distributed energy systems are increasing in Edmonton. Installed solar microgeneration capacity has increased by 1,700 per cent over the last seven years. However, less than 1 per cent of Edmonton's electricity is generated through solar microgeneration. As well, on the heating side, two low carbon district energy systems are in operation, with the Blatchford Renewable Energy Utility, and in construction, with the Downtown District Energy Initiative, with other feasibility studies advancing in other developments, such as River Crossing and Exhibition Lands.

#### Signals

Regulatory: The Government of Canada's 2030 Emissions Reduction Plan commits to support a net-zero electricity grid by 2035, through a Clean Electricity Standard.

Market: There are strong market signals for renewable energy and hydrogen. The International Energy Agency's 2020 World Energy Outlook report called solar power the "new king" of electricity and that solar projects now offer some of the

lowest cost electricity ever seen. There is 19,514 MW of capacity for wind, solar and battery projects at various stages of development in Alberta, with 6.433 MW targeted to be in service prior to the end of 2023.

A report from Alberta's Industrial Heartland Hydrogen Task Force outlined that Canadian hydrogen has a wholesale market potential of up to \$100 billion a year and identified the Edmonton region as the best launch point for a pan-Canadian hydrogen economy. A first-of-its-kind hydrogen blending project is being advanced in the region.

Ongoing implementation of this pathway is needed including using the following levers of change: Incentives, Pricing and Subsidies; Infrastructure Investment; Partnerships and Advocacy; Policy and Regulation; and Activation. This pathway has 20 actions identified to begin implementation before 2026. Further action is needed to support local renewable energy and storage systems, to promote the development of community renewable energy projects and the expansion of a renewable district energy network, and to advocate for and support the supply and purchasing of low carbon energy, including:

| Lever of Change                          | Corrective Actions                                                                                                                                                                                                 |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Incentives, Pricing and Subsidies</b> | Scale up renewable and distributed energy system incentives*                                                                                                                                                       |
| <b>Infrastructure Investment</b>         | Fund the first two District Energy nodes (Blatchford and Downtown)                                                                                                                                                 |
| <b>Partnerships and Advocacy</b>         | Implement the District Energy strategy to advance a district and major node district energy systems<br><br>Support and advocate for the supply of low carbon energy (eg. piloting a hydrogen heated neighbourhood) |
| <b>Policy and Regulation</b>             | Proposing changes in the Zoning Bylaw renewal including allowing height exemptions for renewable energy devices and opportunities to connect to low                                                                |

|                   |                                                                                       |
|-------------------|---------------------------------------------------------------------------------------|
|                   | carbon district energy systems<br>Plan for low carbon energy infrastructure           |
| <b>Activation</b> | Accelerate efforts to support the community's transition to low carbon energy sources |

\* Incentives will need to be reviewed in light of federal budget announcements

### Emission Neutral Buildings

Currently, the energy that buildings use is responsible for approximately 38 per cent of Edmonton's greenhouse gas emissions. Buildings are critically important to achieving carbon neutrality goals and will need to transition to become emission neutral. This will only be achieved if buildings use low carbon energy and become more energy efficient.

#### Buildings Current State

Based on The City Plan growth projections, half of the 840,000 homes that are needed for a City of two million currently exist. In Edmonton there are currently over 350,000 residential buildings, or 440,000 single-unit homes and over 11 million square feet of commercial space all with various levels of energy usage. There are over 19,000 permits a year issued for renovations in Edmonton, and around 7 per cent of those are for energy related renovation. Many new homes will be developed through the redevelopment of existing buildings. In Edmonton there are about 7,000 new homes and 300 large buildings constructed each year.

#### Signals

**Regulatory:** In March 2022, the Government of Canada released an update to the National Energy Code for Building 2020, which will come into effect March 28, 2023, as per Alberta legislation. This update includes tiered energy code requirements, with each tier becoming more stringent. This will help facilitate development of net zero energy ready buildings.

**Partnership:** The Federal Government's 2030 Emissions Reduction Plan identifies the development of Canada Green Building Strategy, which will identify new and additional tools to help catalyze massive retrofits of the existing building stock and construction to the highest zero carbon standards.

Ongoing implementation of this pathway is needed, including using the following levers of change: Incentives, Pricing and Subsidies; Infrastructure Investment; Partnerships and Advocacy; Policy and Regulation; and Activation. This pathway has 18 actions identified to begin implementation before 2026. Further action is needed to support the acceleration of emission neutral buildings, retrofits and energy efficiency improvements, to alleviate energy poverty and increase energy efficiency in affordable buildings, and to support low embodied carbon buildings and infrastructure, including:

| Lever of Change                          | Corrective Actions                                                                                                            |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Incentives, Pricing and Subsidies</b> | Expand and scale up retrofit incentives*<br>Provide development incentives to build better than Code                          |
| <b>Infrastructure Investment</b>         | Embodied carbon disclosure in City procurement processes for building materials and products                                  |
| <b>Partnerships and Advocacy</b>         | Support initiatives to alleviate home energy poverty and increase energy efficiency in affordable buildings                   |
| <b>Policy and Regulation</b>             | Proposing changes in the Zoning Bylaw renewal to reduce setbacks for energy efficiency                                        |
| <b>Activation</b>                        | Support emission neutral building capacity in the industry<br><br>Full implementation of the Clean Energy Improvement Program |

\* Incentives will need to be reviewed in light of federal budget announcements

### Low Carbon City and Transportation

Currently, transportation accounts for approximately 30 per cent of Edmonton's community greenhouse gas emissions. The way a city is designed and built has a direct impact on how people get around, connect and experience the city. Decisions made today about how to design and build the city, transportation systems, infrastructure and energy will set the course for future climate resilience. Cities are at the forefront of the global climate emergency. The World Bank estimates that, although cities occupy only two per cent of land area, they account for over 70 per cent of global greenhouse gas emissions. Cities can be developed and planned to catalyze low carbon communities. Urban built form that fosters increased density, complete communities, and active or public transportation options, can be instrumental in greenhouse gas emission reductions. In Edmonton, these also contribute to multiple city building goals in The City Plan. Further to urban form and an increase in active and public transportation trips, switching vehicles to zero emissions is another transformative shift to reduce greenhouse gas emissions.

#### Land Use and Transportation Current State

Transportation accounts for approximately 30 per cent of Edmonton's community greenhouse gas emissions. Approximately 22 per cent of daily trips in Edmonton use transit and active transportation, with a goal to increase this mode share to 50 per cent. To help achieve this mode shift, Edmonton has goals in The City Plan related to infill development, complete and compact communities, and growing the city based on a nodes and corridors approach.

#### Signals

**Regulatory:** The Federal Government of Canada has made a commitment in the new 2030 Emissions Reduction Plan that all new truck and bus sales will be zero emissions by 2040, and all new car and van sales will be zero emissions by 2035. Edmonton needs to accelerate its EV-readiness, so that Edmontonians will not be left behind in this transition.

**Market:** Urban planning practices are changing, and Edmonton has already shown bold transformative leadership in developments such as Blatchford, which is planned to be a carbon-neutral community for 30,000 residents that uses 100 per cent renewable energy. Edmonton is already experiencing progress and a market shift for infill development. The five-year average of net dwelling units in Edmonton's redeveloping area is 29 per cent, demonstrating that the

development shift towards the City Plan target of 35 per cent by 1.25 million is well underway.

Ongoing implementation of this pathway is needed including using the following levers of change: Incentives, Pricing and Subsidies, Infrastructure Investment; Partnerships and Advocacy; Policy and Regulation; and Activation. This pathway has 30 actions identified to begin implementation before 2026. Activating climate resilient urban development is needed to set the course for Edmonton's future climate resilience as a city. Further action is needed to enable low carbon and resilient community development and zero emission mobility, including:

| Lever of Change                          | Corrective Actions                                                                                                                                                                                                                                                                                                           |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Incentives, Pricing and Subsidies</b> | Financing tools and incentives to advance priority growth areas                                                                                                                                                                                                                                                              |
| <b>Infrastructure Investment</b>         | Complete build out of a city-wide active transportation network<br>Expansion of public and mass transit network                                                                                                                                                                                                              |
| <b>Partnerships and Advocacy</b>         | Regional coordinated approach to climate resilient community development<br>Advance a city-wide zero emissions charging network                                                                                                                                                                                              |
| <b>Policy and Regulation</b>             | Climate resilient urban planning, starting with District Planning<br>Proposing changes in the Zoning Bylaw renewal such as the introduction of standard mixed-use zones, allowing more business opportunities in residential neighborhoods and increasing housing options and densities<br>Pilot low emissions zone/corridor |

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|-------------------|----------------------------------------------------------------------------------------|
| <b>Activation</b> | Accelerate efforts to support neighbourhoods and communities to advance climate action |
|-------------------|----------------------------------------------------------------------------------------|

### Carbon Capture and Nature Based Solutions

Even with decisive and bold climate action, up to 17 per cent, or approximately eight to nine megatonnes (Mt) between 2020-2030, of the reductions needed in Edmonton will have to be achieved by removing carbon from the atmosphere and offsetting emissions. This can be done using innovative technology and nature based solutions. Nature based solutions help support attractive and healthy urban places, while carbon capture technology can help to grow prosperity in our region.

#### Carbon Capture and Nature Based Solutions Current State

The region is home to the world's largest CO<sub>2</sub> pipeline and a significant carbon capture and storage facility. Over the last few years, leading companies in the region have invested in innovative projects that have created a global competitive advantage. Edmonton's 11,000 hectare Green Network forms a valuable part of the City's landscape and is arguably one of Edmonton's most valuable community assets. It is made up of over 6,000 ha of natural assets (forests, rivers/streams, wetlands) that provide important ecosystem benefits.

#### Signals

**Partnership:** The Federal Government is providing funding for additional tree planting through the 2 Billion Trees initiative. Additionally, they recently announced additional funds for the Nature Smart Climate Solutions Fund, and are continuing to develop protocols under the Federal Greenhouse Gas Offset System, including for projects focused on nature based solutions.

**Policy:** Nature based solutions were prominent at COP26 in November 2021, where it was estimated that they have the potential to provide up to 30 per cent of the climate change mitigation needed to limit global warming to 1.5 degrees Celsius, and that they could generate trillions of dollars in benefits. A United Nations report in January 2022 found that G20 countries need to scale-up annual nature based solutions spending to USD \$285 billion (USD) by 2050 to tackle the interrelated nature, climate and land degradation crises. The report identifies policy options available to stimulate private finance.



Market: In March 2022, the Government of Alberta shared they are allowing the development and planning of six new carbon dioxide storage project hubs in the Edmonton region. Within the City of Edmonton, the Lehigh Cement Edmonton Plant has announced plans to integrate carbon capture, utilization and storage into their operations by 2026, targeting capture of 90-95 per cent of the carbon dioxide generated.

Ongoing implementation of this pathway is needed including using the following levers of change: Incentives, Pricing and Subsidies; Infrastructure Investment; Partnerships and Advocacy; Policy and Regulation; and Activation. This pathway has 13 actions identified to begin implementation before 2026. The climate and biodiversity crises are inextricably linked. The recent 2022 IPCC report indicates that global warming would cause unavoidable increases in multiple climate hazards and present multiple risks to ecosystems as well as humans. This same report indicates that biodiversity loss, degradation, damage, and transformation of ecosystems are already key risks for every region due to past global warming, and will continue to escalate with continued warning. Nature based solutions work by increasing carbon storage (such as ecosystem restoration), or by avoiding greenhouse gas emissions (such as limiting deforestation). Nature based solutions also offer several other important benefits including water regulation, stormwater management, urban heat island mitigation, habitat and access to nature for urban residents. Further action is needed to promote investment in natural carbon storage and sinks, promote the acceleration of nature based solutions such as tree planting, ecosystem conservation and restoration, and the acceleration of carbon capture storage technology and utilization in the Region, including:

| Lever of Change                          | Corrective Actions                                                                                            |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Incentives, Pricing and Subsidies</b> | Accelerate community investment in natural carbon storage, including conservation offsets                     |
| <b>Infrastructure Investment</b>         | Accelerate nature based climate solutions efforts (restoration, conservation, naturalization and daylighting) |

| Lever of Change                  | Corrective Actions                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  | Accelerate tree planting, including applying to the Federal Government's 2 Billion Tree Fund                                                                                                                                                                                                                                                                                                                                  |
| <b>Partnerships and Advocacy</b> | <p>Support the acceleration of regional carbon capture storage and utilization technologies</p> <p>Support activities to conserve and restore nature based solutions on private property, such as private tree protection</p>                                                                                                                                                                                                 |
| <b>Policy and Regulation</b>     | <p>Develop and implement a nature based solutions and urban restoration plan so every community's connection to nature is strengthened</p> <p>Proposing changes in the Zoning Bylaw renewal including to allow more urban agriculture without the need for permits, to continue preservation of natural areas, and that on-site landscaping will include diverse plant material and incentivize the preservation of trees</p> |
| <b>Activation</b>                | Mobilize and track the voluntary carbon offsets purchased in the community                                                                                                                                                                                                                                                                                                                                                    |

### Climate Solutions Leadership

Energy transition is a complex community effort that requires strong leadership. The City of Edmonton is in a position to demonstrate climate solutions leadership through decision making, actions and advocacy, and to create a foundation of climate change actions. The City of Edmonton is also in a position to demonstrate leadership towards net zero and climate resilient municipal operations. The City of Edmonton is currently working on the change management approach to become a Carbon Neutral Corporation by 2040.

#### Climate Solutions Leadership Current State

The City of Edmonton corporate greenhouse gas emissions are approximately 2 per cent of overall community emissions. In 2020, net corporate emissions were about 33 per cent below Edmonton's 2005 baseline year. The reductions have been primarily driven by the purchase of renewable energy certificates (see Attachment 3). Beginning in 1992, landfill gas was harvested from the Clover Bar Landfill to produce electricity; at times enough to power over 4,600 homes annually. In 2020, the City received a grant from Emissions Reductions Alberta to work with Capital Power to upgrade and convert the landfill gas to renewable natural gas. The City of Edmonton declared a Climate Emergency in 2019. The City of Edmonton has committed to taking urgent and immediate climate action, as outlined in Council Policy C627 Climate Resilience.

### Signals

Partnership: The Edmonton Declaration is a bold call-to-action for mayors to take the mantle of leadership on climate change. Over 3,400 municipalities from around North America have endorsed the Edmonton Declaration. The Edmonton Metropolitan Region Board is collaborating on a motion to explore the concepts of a regional carbon budget, climate vulnerability assessment and to identify the steps needed to harmonize regional standards for climate resilient community development and building energy efficiency. The City's Corporate Climate Leaders Program is a call to action for Edmonton corporations to take climate action. The program launched in 2018 with 17 founding members and has grown to now include over 64 organizations, from large oil and gas companies to small, home-grown Edmonton businesses, all working to understand their emissions and taking action to reduce their carbon footprint.

Ongoing implementation of the strategy's foundation of Climate Solution Leadership is needed including using the following levers of change: Incentives, Pricing and Subsidies; Infrastructure Investment; Partnerships and Advocacy; Policy and Regulation; and Activation. This foundation has 20 actions identified to begin implementation before 2026. Demonstrated leadership and an integrated approach for energy transition and adaptation in the corporation can help catalyze further action on climate change. A bolder, more strategic approach to Partnership and Advocacy is needed. Now is the time to build new partnerships, find new ways to deliver action, as well as to advocate for funding, regulatory changes and bolder

## Attachment 4

action. Further action is needed to increase the City of Edmonton's Climate Solution Leadership, including:

| Lever of Change                   | Corrective Actions                                                                                                                                                                                                                                                               |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Incentives, Pricing and Subsidies | Procuring low carbon energy<br>Procuring carbon offsets                                                                                                                                                                                                                          |
| Infrastructure Investment         | Scale up climate resilience retrofits for City facilities and energy efficiency improvements to assets<br>Scaling up solar photovoltaic on City infrastructure<br>Accelerate the City's transition to zero emission fleet and equipment, including fleet charging infrastructure |
| Partnerships and Advocacy         | Collaborative approaches such as a national climate strategy for Big Cities and a Big City CAO Climate Action Table<br>Accelerate efforts to embed a just and equitable approach into climate action                                                                             |
| Policy and Regulation             | New decision making processes and tools<br>Embedding climate resilience into City services and processes (ie. procurement, financial investments and others)                                                                                                                     |
| Activation                        | Internal Climate Action Leadership Task Force                                                                                                                                                                                                                                    |