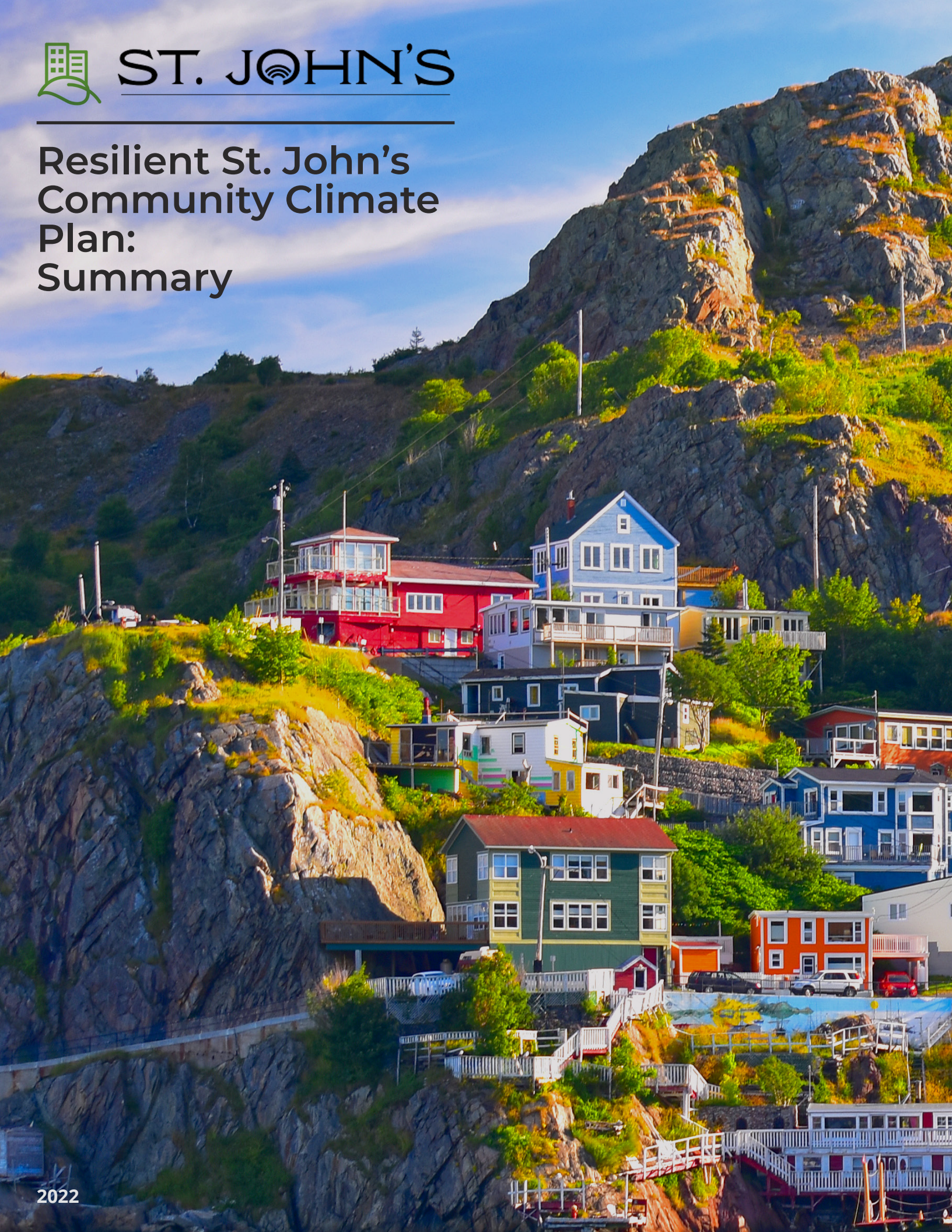
ST. JOHN'S

Resilient St. John's Community Climate Plan: Summary



2022

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Land Acknowledgements

We respectfully acknowledge the Province of Newfoundland and Labrador, of which the City of St. John's is the capital city, as the ancestral homelands of the Beothuk. Today, these lands are home to a diverse population of Indigenous and other peoples. We also acknowledge, with respect, the diverse histories and cultures of the Mi'kmaq, the Innu, the Inuit, and the Southern Inuit of this province.

Acknowledgments

Many residents and organizations contributed to the development of this plan throughout the various engagement stages, including the public, members of the Multi-Stakeholder Sustainability Team, St. John's Environmental and Sustainability Experts Panel, and St. John's Corporate Energy Team. We also thank all the residents and organizations who reached out to staff and council, completed online surveys, hosted do-it-yourself climate change workshops, and attended virtual sessions or council meetings.

Climate Change and St. John's

Climate change is an urgent worldwide crisis. Global temperatures are likely to rise by 1.5◦C between 2030 and 2052 if greenhouse gas (GHG) emissions are released at the current and projected rates. Allowing the temperature rise to exceed 1.5◦C will disrupt global social, economic, and ecological systems, with severe consequences for the most vulnerable populations.1

St. John's declared a climate emergency in 2019 and committed to a target of net-zero GHG emissions by 2050. Net- zero means reducing emissions as much GHGs as possible, then offsetting the little that remains. St. John's GHG emissions target aligns with targets of dozens of communities across the country, as well as the provincial and federal governments. All levels of government have a critical role to play in addressing the climate crisis.

Tackling climate change in St. John's involves two streams of work:

Mitigation: reducing the GHG emissions from energy consumption and other activities within the city; and

Adaptation: preparing for the physical, economic, and ecological changes already underway from climate change.

Resilient St. John's is the City of St. John's' combined plan to address climate mitigation and adaptation. Incorporating both streams in the plan will help the City avoid duplicated efforts and maladaptive decisions (Figure 1).

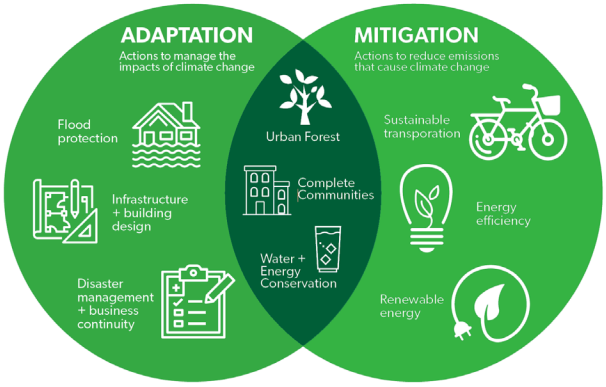

Figure 1. Shared considerations of the City's adaptation and mitigation efforts.

Resilient St. John's outlines the City's proposed energy transition, the climate risks the City must adapt to, as well as goals and actions developed through best practice reviews and local engagement. The plan shows that the next five to ten years are critical for St. John's efforts to address irreversible climate change.

[1] Intergovernmental Panel on Climate Change. (2018). Special report: Global warming of 1.5 ◦C. IPCC. https://www.ipcc.ch/sr15/

THE TOLL OF ENERGY POVERTY AND CLIMATE RISKS

Resilient St. John's is not just a climate plan. At its core, it is also an economic development strategy for the community. The plan identifies opportunities to expand existing industries in the community, new opportunities for businesses and employment, and meaningful ways to address energy poverty within the city.

Households experiencing energy poverty—or energy insecurity—face difficult choices such as "heat or eat".2 Energy insecurity disempowers low-income residents such as single parents, the elderly, and persons with disabilities.3 Energy insecurity leads to stresses such as food insecurity, utility-related debt, shutoffs, inefficient heating systems, antiquated appliances, and extreme home temperatures with significant health impacts.4 This stress is exacerbated when combined with the higher expense of vehicle ownership than that of active or public transportation. In an energy poverty context, children may experience nutritional deficiencies, high risk of burns from non-conventional heating sources, poor indoor air quality, high risk for cognitive and developmental behaviour deficiencies, and increased risk of carbon monoxide poisoning.5 Subsequent impacts include parents being unable to work in order to look after children, missed school days, and lost productivity.

Energy poverty, defined as when a household spends more than 6% of their total annual income on energy, is expected to increase from 2020 (Figure 2a) to 2050 (Figure 2b). The Energy Poverty Index gives an estimate of the average percent of the total annual income being spent on energy costs. The Net Zero Scenario greatly reduces the incidence of energy poverty in St. John's (Figure 2c).

[2] Cook, J. T., Frank, D. A., Casey, P. H., Rose-Jacobs, R., Black, M. M., Chilton, M., … Cutts, D. B. (2008). A brief indicator of household energy security: Associations with food security, child health, and child development in US infants and toddlers. Pediatrics, 122(4), e867–e875. https://doi.org/10.1542/peds.2008-0286

[3] Hernández, D. (2013). Energy insecurity: A framework for understanding energy, the built environment, and health among vulnerable populations in the context of climate change. American Journal of Public Health, 103(4), e32–e34. https://doi.org/10.2105/AJPH.2012.301179

[4] Hernández, D., & Bird, S. (2010). Energy burden and the need for integrated low-income housing and energy policy. Poverty & Public Policy, 2(4), 5–25. https://doi.org/10.2202/1944-2858.1095

[5] Hernández, D., & Bird, S. (2010). Energy burden and the need for integrated low-income housing and energy policy. Poverty & Public Policy, 2(4), 5–25. https://doi.org/10.2202/1944-2858.1095

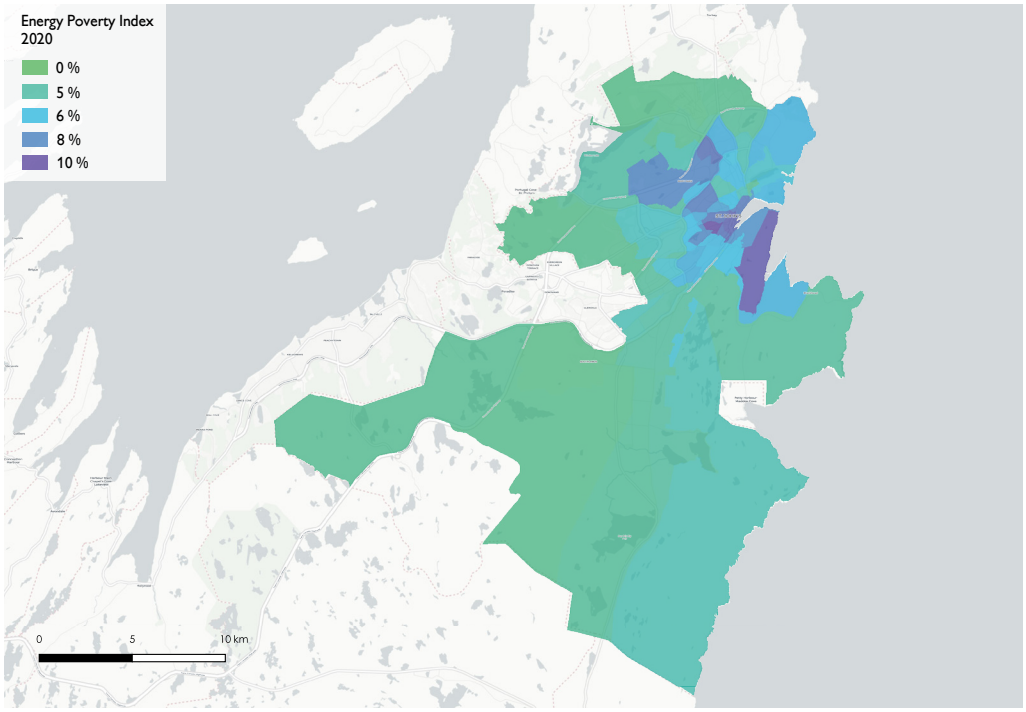

Figure 2a. Energy Poverty Index (average total energy costs per household as a proportion of the average household income in a given traffic zone) for St. John's in 2020.

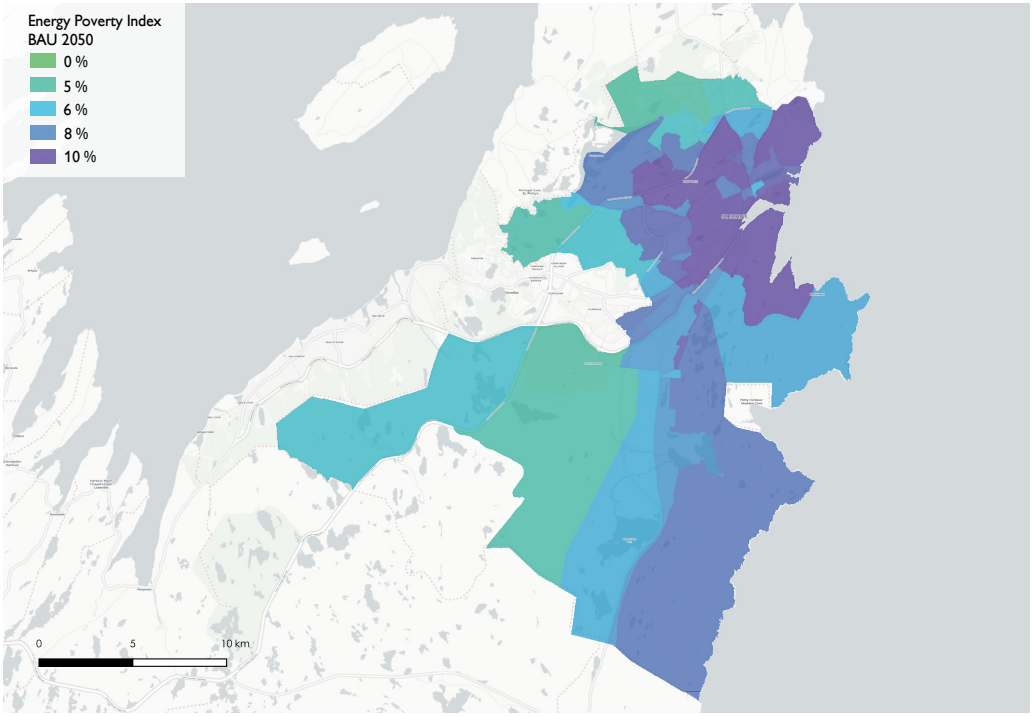

Figure 2b. Energy Poverty Index (average total energy costs per household as a proportion of the average household income in a given traffic zone) for St. John's in 2050 BAU scenario.

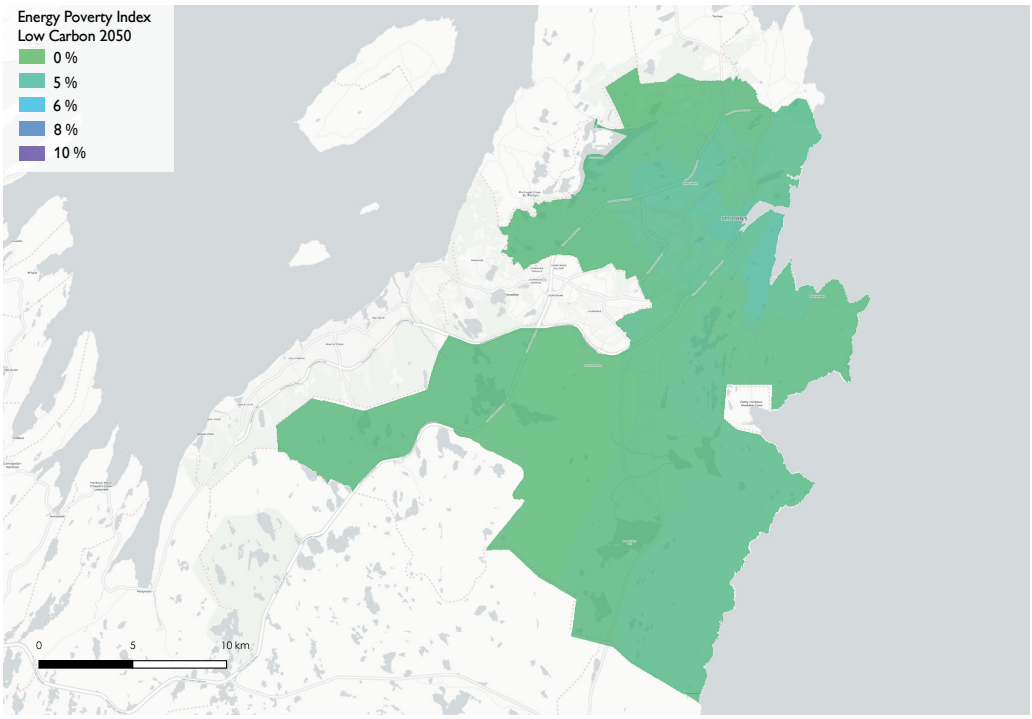

Figure 2c. Energy Poverty Index (average total energy costs per household as a proportion of the average household income in a given traffic zone) for St. John's in 2050 Net Zero Scenario.

Financial analysis shows the City's planned energy transition is cost-effective and, overall, a good economic policy for St. John's, with an average $167 in savings per GHG tonne reduced. Over 28 years, that's an overall return of nearly $1.8 billion dollars, or a 33% return on a $5.5 billion dollar investment. Most of the financial benefit is due to $7 billion in energy and carbon cost savings, as well as maintenance savings associated with the energy efficiency improvements and fuel switching included in the plan. The plan also would generate 1,400 full-time jobs and save households about 50% on their energy costs.

The City's energy transition will be funded by many sources, including the City, other levels of government, the private sector, and individual residents. Where necessary, these investments will be enabled through innovative financing solutions and incentives. An equitable program design will ensure all residents and businesses have access to the incentives.

Analysis by the Government of Canada, the Government of Newfoundland and Labrador, and the *City of St. John's* indicates that communities in Canada will experience significant changes in climate. We have already observed a temperature increase of 0.8°C since 1942, warming sea surface temperatures, an increase of intensity and duration of some storm types, and rising sea levels of about 1.9 mm/year since the 1940s.

Without action, temperatures are predicted to increase by 2.7°C by the 2050s, leading to other significant changes in precipitation, winter conditions, and sea-level rise. These environmental impacts would make existing risks greater for vulnerable residents, disrupt infrastructure systems, and lead to economic impacts. While the global goal is to achieve net-zero GHG emissions by the middle of this century to avoid many of the worst climate impacts, it is well understood that a certain amount of climate change is now inevitable.

Plan Development Process

Resilient St. John's was developed in several stages, with an early public consultation, stakeholder engagement workshops, technical modeling for energy and GHG emissions, and scenario-based climate adaptation and resilience analysis (Figure 3).

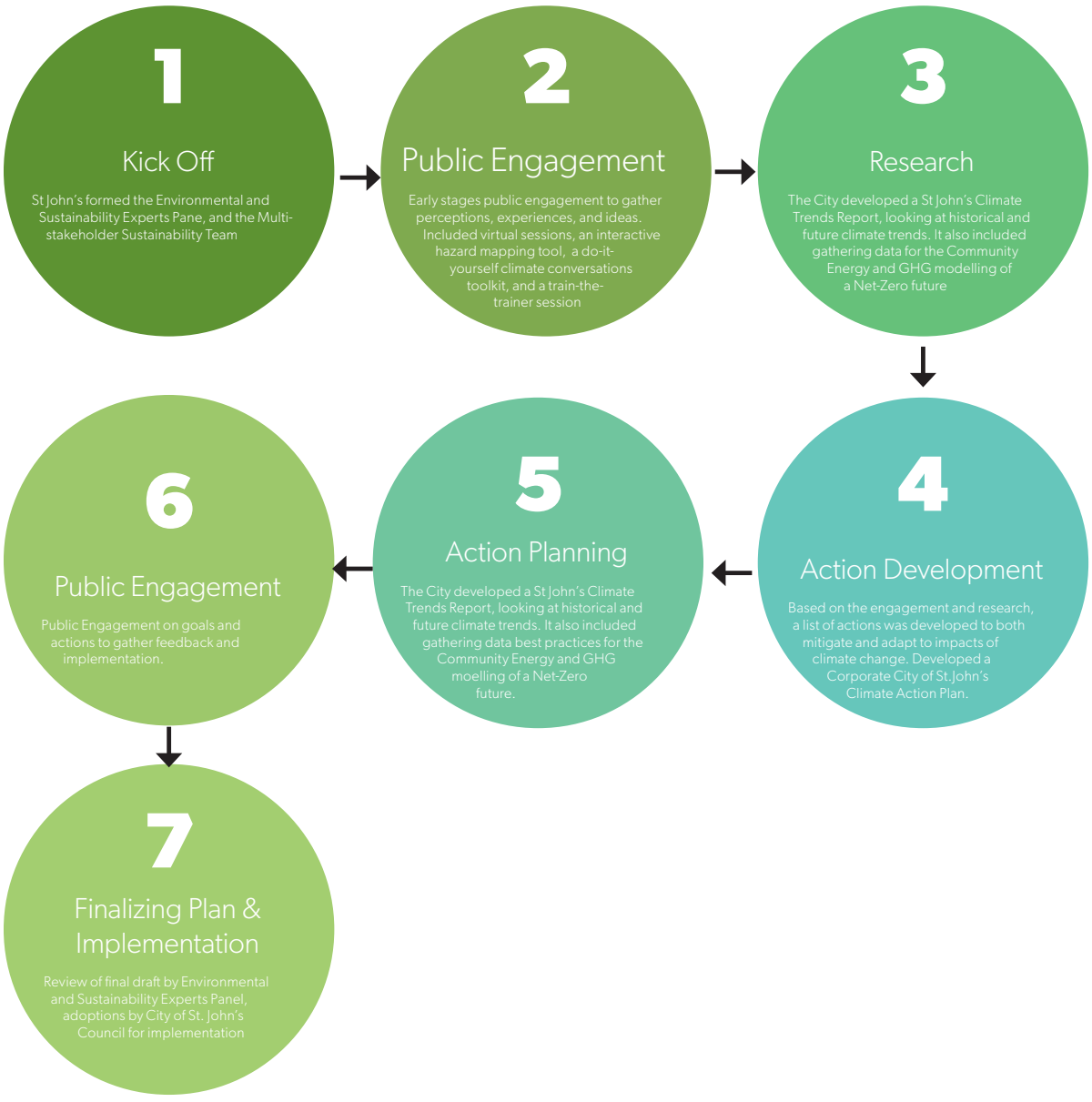

Figure 3. Overview of the development of St. John's climate plan.

Energy and Emissions in St. John's

Residents, businesses, industries, and the City use energy in St. John's to heat homes and buildings, to run appliances and machinery, and to operate vehicles. This consumption includes many forms of energy, such as electricity, natural gas, propane, gasoline, and diesel. The consumption of these fuels releases GHG emissions into the atmosphere.

In 2020, St. John's total energy consumption was 15.3 million gigajoules (GJ). This energy consumption, combined with emissions from the decay of organic materials in landfills, resulted in 748 kilotonnes of carbon dioxide equivalent (ktCO2e) being released into the atmosphere. That is an average of 5.8 t CO2e per person, or the equivalent of each person in St. John's driving a car for 23,500 km.6

To determine an evidence-based and community-informed pathway for its energy transition, the City populated the CityInSight spatial energy and emissions model with a series of actions informed by best practices, available technologies, and community insight. The model shows that St. John's **GHG emissions can be reduced by 93% in 2050** as compared with business-as-usual emissions in 2050. Most of the remaining 7% of emissions are predicted to be from organic waste decomposing in the landfill. This remaining carbon gap would need to be addressed in the future via the purchase of offsets. Future revisions of the City's energy transition will incorporate further policy and technological innovations.

In order to reach the emissions target of net-zero by 2050, the City must implement a comprehensive series of strategic actions across all sectors. Each action is critical to achieving net-zero emissions, even if it only represents a fraction of overall GHG reductions. In some cases, an action facilitates another action (e.g. increased densification allows for more affordable transit and active transportation infrastructure, which in turn reduces the need to use personal vehicles for shorter trips). Actions also provide unique sets of co-benefits beyond GHG reductions, such as improved resiliency to climate extremes (e.g. tree planting and naturalization) or improved air quality and noise pollution (e.g. active transportation, as well as electrification of transit, cars, and trucks).

6 US Environmental Protection Agency. Equivalency from the US EPA Greenhouse Gas Equivalencies Calculator. https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

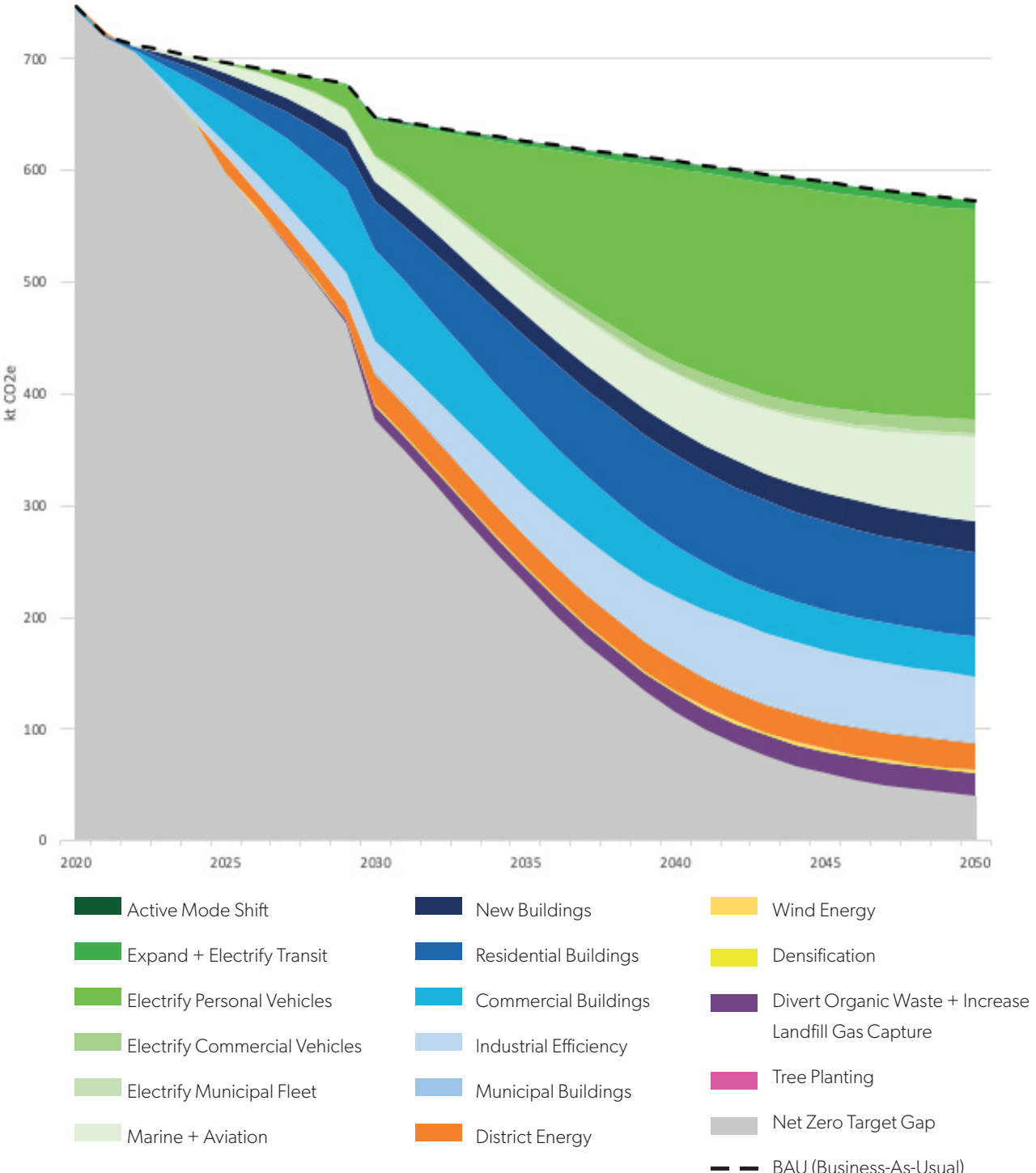

Figure 4. Wedge diagram showing the relative GHG emissions savings from each action within the Net Zero Scenario from 2020 to 2050.

A financial analysis of the costs and savings from these actions shows that the transition requires an annual investment of about $205 million per year between now and 2050. However, the savings on energy costs, carbon costs, maintenance, and repair costs add up quickly over the next 28 years to an overall return of nearly $1.8 billion dollars. In addition to the financial return on investment, the energy transition will produce 38,600-person years of employment (1,400 full-time jobs) in St. John's. It will also save households about 50% on their energy costs, making things like quality food, education, and recreation more accessible to St. John's residents.

Climate Risk and Vulnerabilities

To understand how climate and weather may affect communities requires a systematic, evidence-based, and engagement-focused approach. As a first step, the City undertook a strategic risk assessment to identify how these impacts affect areas of the city and populations disproportionately as well as ways to mitigate the impacts.

The risk assessment identified over 50 impacts across the community's infrastructure, socioeconomic, and ecological systems. The City set priorities based on the likelihood of the impact taking place, as well as the consequences it would have on health, infrastructure, the local economy, natural resources, culture, social cohesion, and public administration (Figure 5).

Figure 5. Risk assessment process.

THE CITY IDENTIFIED THE FOLLOWING CLIMATE CHANGE IMPACTS AS HIGH-RISK FOR ST. JOHN'S.

Infrastructure systems: In the coming years, sea-level rise is anticipated to increase erosion and the likelihood of storm surges flooding coastal infrastructure. Precipitation changes are expected to increase stress and maintenance requirements on stormwater infrastructure and buildings (e.g. mold, leaks), while water crossings may experience increased vulnerability and potential for failure. Similarly, sport fields may see an increase in required maintenance due to flooding. Warmer summers will increase energy use for cooling, and demand for cooled venues for youth and vulnerable populations, as well as opportunities for gardening. Meanwhile, the increase in winter freeze-thaw cycles may increase maintenance requirements on roads. Increased extreme weather may lead to more frequent outages in communications and power.

Socioeconomic systems: Climate change will have direct impacts on St. John's socioeconomic system. Impacts to transportation systems (roads, public and active transportation) can affect the local economy by causing delays and disruptions to business operations. Similarly, impacts to marine ecosystems, agriculture, and energy use can change food security. Increased infrastructure maintenance and repairs due to flooding and other climate events can increase servicing costs.

Health systems: Health impacts from climate change include less opportunities for winter activities due to changing weather patterns, increased incidence of vector-borne diseases, injury from extreme weather events, exacerbations to weather-dependent health conditions (e.g., respiratory and cardiovascular conditions), and psychological distress.

Ecological systems: Warmer temperatures are expected to impact freshwater and sea temperatures leading to changes in both ecosystems, as well as terrestrial ecosystems, including invasive species. These changes may also impact migratory birds and fish, which can impact on recreation and fishing activities. Temperature and precipitation changes are expected to extend the forest fire season. A longer growing season is also expected, which will increase pest management demand, but also provide an opportunity for gardening and food production. The impact of wind is uncertain, but if winds do increase (along with storm intensity), more tree blowdowns may take place (contributing to fire risk), and that wind would also impact the number of viable fishing days.

Public Engagement

To kick off the plan development, the City engaged various groups including residents, staff, community organizations, businesses, association, and academics for various levels of technical and non-technical discussions. Due to the impacts of COVID-19, the City facilitated most of the engagement virtually throughout 2020 and 2021.

To support community leaders hosting conversations about climate change and to provide early feedback, the City developed a DIY toolkit and held two "train-the-trainer" style public sessions for anyone interested in using the toolkit in October 2020. Seven members of the community took part. The public provided feedback to the City via virtual community events using the toolkit.

The City used its online engagement platform, City Guide, City Website News, an e-newsletter, social media, and Council members' media interviews to raise awareness and elicit feedback on various stages of the planning process.

Prior to finalizing the plan, the City sought additional input from the public and various Citizen Committees of Council including: Accessibility and Inclusion Advisory Committee, Arts and Culture Advisory Committee, Bike St. John's, Built Heritage Experts Panel, Healthy City Strategy Steering Committee, Seniors Advisory Committee, as well as working groups. The City then brought Resilient St. John's to the Environmental & Sustainability Experts Panel for review prior to presenting it to the Council for consideration. The panels expressed support for the content of the report and its development process, and recommended the Council to adopt the plan, including the targets presented and collaborative framework.

What We Need to Do

St. John's proposed energy transition is a large undertaking for any single organization to lead. The plan outlines the City's unique role in administering and reporting on the transition, and as a climate leader. It also outlines the community's role in the transition, which includes becoming informed, and shaping and participating in programs. The plan presents significant opportunities for businesses, institutions, associations, and community groups to step up as program delivery partners or leaders.

The following is a list of strategic imperatives that the City identified in its climate action plan.

MUNICIPAL LEADERSHIP AND PLANNING

Smart Growth

1. Improve the resilience of new buildings, roads, and stormwater infrastructure to extreme weather.
2. Increase the City's resilience by informing municipal plans with the latest climate data and projections of future extreme weather events.
3. Protect and enhance coastal infrastructure from the impacts of sea-level rise and storm surge.

The City's Responsibilities

4. Integrate climate considerations into city-wide development policies and budget decisions.
5. Report to the community on progress and regularly update the plan.
6. Develop business and industry working groups.
7. Develop partnership with academic institutions and entrepreneurship incubators for pilot projects and training.

AFFORDABLE, EFFICIENT BUILDINGS FOR ALL

Resilient Natural and Built Infrastructure

8. Increase household-level climate risks protection.
9. Improve the resilience of existing buildings, roads, and stormwater infrastructure to extreme weather and temperatures.
10. Protect and enhance the resilience of parks and open spaces, including habitats, from the impacts of climate change.

New Development Standards

11. Develop new sustainable development guidelines so all new developments are net-zero by 2030.

Retrofit Existing Buildings

12. Retrofit existing homes and buildings on a mass scale, and then switch to electric heat pumps and water heaters to achieve net-zero or net-zero ready.
13. Convene a roundtable to address energy poverty.

TRANSPORTATION TRANSFORMATION

Personal-Use Vehicles

14. Electrify personal, municipal, and commercial vehicles.

Transit and Active Transportation

15. Expand and electrify transit.
16. Improve and expand walking and cycling infrastructure.

CLEAN ENERGY FOR RESILIENCE

Expanding our Options

17. Supplement the electricity grid with wind farms and ensure the electricity system is planned and managed to handle supply and demand.
18. Develop a partnership with Memorial University of Newfoundland to decarbonize the district energy system.
19. Expand landfill gas capture systems.

THRIVING NATURAL ENVIRONMENT AND AGRICULTURE

Protecting Green Spaces

20. Protect surface- and ground-water quality and quantity.

21. Enhance the resilience of ecological assets from climate change.

22. Improve local food security by supporting the food and agriculture sector.

23. Monitor and plan for the spread of invasive species and infectious disease.

A Low-Waste Future

24. Improve public education to reduce overall waste production and improve waste diversion.

25. Support the development of a circular economy.

DISASTER RESILIENCE AND EMERGENCY PREPAREDNESS

Preparing for the Storms

26. Improve resilience and preparedness of key services and businesses to extreme weather events.

27. Improve resilience and emergency preparedness of residents to extreme weather events.

Resilient St. John's Community Climate Plan
February 2022