

CAPITAL PROFILE REPORT

PROFILE NAME:	CLIMATE RESILIENT CITY FACILITY UPGRADES	FUNDED
PROFILE NUMBER:	CM-10-0001	PROFILE STAGE: Approved
DEPARTMENT:	Integrated Infrastructure Services	PROFILE TYPE: Composite
LEAD BRANCH:	Infrastructure Planning and Design	LEAD MANAGER: Pascale Ladouceur
PROGRAM NAME:		PARTNER MANAGER:
PARTNER:		ESTIMATED START: January, 2023
BUDGET CYCLE:	2023-2026	ESTIMATED COMPLETION: December, 2026

Service Category:	Building Renewal	Major Initiative:	
GROWTH	RENEWAL	PREVIOUSLY APPROVED:	43,830
100		BUDGET REQUEST:	-
		TOTAL PROFILE BUDGET:	43,830

PROFILE DESCRIPTION

This profile would provide funding to complete deep energy retrofits to enable emissions neutrality in City owned buildings funding may also be used to support facility specific adaptation renewal work. City buildings and other facilities are the largest source of COE corporate emissions, making up about 46 per cent of corporate GHG emissions. The scope of this profile would include work that is required for the buildings that are undergoing renewal as part of the 2023-2026 budget cycle to be upgraded for energy efficiency as required by C627 Existing Building Procedure. Approval of matching grant funding of up to \$21 million to support this work is currently outstanding.

PROFILE BACKGROUND

Climate change is changing everything. This is a critical decade requiring rapid and significant scaling up of climate action. Growing climate risks have clear implications for city resources, local economies and the financial well-being of municipal governments. Climate change could cause direct annual costs of approximately \$1.0 billion and GDP losses estimated at \$2.1 billion annually as early as the 2040s in Edmonton. Those costs increase to approximately \$4.2 billion annually for direct costs and \$6.0 billion for GDP losses as early as the 2070s. It is estimated that the City of Edmonton will own 8% of the impact costs. Investment is needed to reduce GHG emissions (which are causing climate change) and to prepare for the impacts of a changing climate. Buildings are critically important to achieving COE's 2040 carbon neutral goal and will need to transition to become emission neutral. Preliminary analysis has identified 59 City facilities that are more than likely to have flood hazard interactions, and that 29 could be impacted by major floods (an estimated \$5 billion in asset value that may be at risk of damage and service impacts).

PROFILE JUSTIFICATION

City Council approved Edmonton's Community Energy Transition Strategy, Climate Resilient Edmonton Adaptation Strategy, and Climate Resilience Policy (C627) which requires urgent accelerated and ambitious climate action. This Profile provides funding to accelerate COE's efforts to retrofit and upgrade City buildings and facilities to reduce GHG emissions and to improve their resilience to the impacts of a changing climate. This funding will allow asset managers to retrofit and upgrade buildings and facilities so the assets can serve into the low carbon and new climate future. City buildings and facilities were not historically designed to be carbon neutral or to be ready for the risks of a changing climate. Many building standards and systems were based on past climate observations, which are no longer expected in a changing climate. This profile will enable the continuation and required acceleration of deep retrofits and climate resilience upgrades for city buildings and facilities. This capital cost reflects the incremental cost of doing work on buildings that will be undergoing rehabilitation work. Alignment with building rehabilitation schedules limits the amount of disruption to service operations and customer impacts. The specific energy retrofits and climate resilient upgrades will vary depending on the need of the building. This funding will support additional analysis to identify the correct interventions. Investing in climate resilience upgrades helps protect COE buildings from the increasing frequency and intensity of extreme weather events and new temperature highs. Energy efficient improvements are needed to reduce energy usage, GHG emissions and operating costs.

STRATEGIC ALIGNMENT

City Council approved Edmonton's Community Energy Transition Strategy, Climate Resilient Edmonton Adaptation Strategy, and Climate Resilience Policy (C627) which requires urgent accelerated and ambitious climate action. This Profile provides funding to accelerate the City of Edmonton's efforts to retrofit and upgrade City buildings and facilities to reduce GHG emissions and to improve their resilience to the impacts of a changing climate.

ALTERNATIVES CONSIDERED

Administration is currently exploring financing options for completing deep retrofits of 30-50 buildings through participation in the Canada Infrastructure Bank's Public Building Retrofit Initiative. While the group of buildings selected for this CIB project are different than the ones intended to be impacted by this composite fund, this option would also support the emissions reduction targets for City owned buildings. However, choosing the CIB project as an alternative to this project would result in renewal work being completed on City owned buildings that would not include deep retrofits or climate resilience work. This could increase risk to infrastructure damage, increase insurance costs, and lock in carbon consuming equipment beyond the City's 2040 emissions neutral corporation target date in the facilities planned for renewal through Lifecycle management.

COST BENEFITS

Cost benefits associated with this profile include those related to energy savings for these projects. There will also be savings associated with maintenance improvement from older infrastructure. Adaptation measures will help reduce costs associated with damage caused by a changing climate including extreme weather events. This may also reduce insurance claims.

KEY RISKS & MITIGATING STRATEGY

Risks associated with increasing construction costs have been identified, and these costs will need to be monitored to update cost estimates as applicable.

Hazardous building material abatement and other unforeseen costs. Mitigation includes using the Emissions Neutral Portfolio Plan and Decision Making Framework (which is in development) to help direct decisions around how deep retrofits should be and work with Lifecycle Management to determine which buildings are good candidates for deep retrofits.

Estimated costs in this profile are preliminary estimations. Validation with the key implementers will be required to confirm these estimations.

RESOURCES

This profile will be delivered using a combination of internal and external resources. Specialized external resources may be required for some aspects and would be procured in accordance with corporate procurement directives and policies. Resources are required to facilitate project management, technical work and design related work both from UPE and IIS. These can likely be capitalized as part of future project work, as with most capital projects.

CONCLUSIONS AND RECOMMENDATIONS

These funds are required to ensure deep energy retrofits and adaptation measures are considered for existing renewal as presented in (CM-11/12/13-0000). Without these funds traditional renewal in these facilities could lock in carbon consuming equipment beyond the City's 2040 emissions neutral corporation target date in the facilities planned for renewal through Lifecycle management. This profile should be funded in full to support climate resilient renewal of City facilities.

CHANGES TO APPROVED PROFILE

August 21, 2023 Update: Matching grant funding of up to \$21 million to support this work was unsuccessful.

2023 Fall SCBA (#23-30, 6.2-19): The scope change is required to fund the installation of Phase 2 Solar at the Edmonton EXPO Centre. At the time the standalone profile was created there was not enough funding available in the previous On-Site Microgeneration Solar PV profile to fund the entirety of solar and thus the solar portion of the project was phased. This funding adjustment would add \$5,000,000 from "CM-10-0001 Climate Resilient City Facility Upgrades" to standalone profile "21-12-0350 Edmonton EXPO Centre Rehabilitation".

2024 Spring SCBA (#24-10, Council 7.1-9): The Kathleen Andrews Transit Garage Solar Photovoltaic & Battery Energy Storage System Project has reached Checkpoint 3 of the PDDM and requires approval for delivery within a new standalone profile with an overall estimated costs of \$5,930,623. Out of these estimated costs, \$51,906 was already incurred in 2023 and prior years. The new funding request for this capital profile is \$5,878,717 and will be financed from capital profile "CM-10-0001 Climate Resilient City Facility Upgrades" (\$4,170,406 Tax-Supported Debt) and capital profile "CM-10-1012 On-Site Microgeneration Solar Photovoltaics" (\$1,708,311 Tax-Supported Debt).

CAPITAL PROFILE REPORT

PROFILE NAME: **Climate Resilient City Facility Upgrades**
 PROFILE NUMBER: **CM-10-0001**
 BRANCH: **Infrastructure Planning and Design**

FUNDED
 PROFILE TYPE: **Composite**

CAPITAL BUDGET AND FUNDING SOURCES (000's)

APPROVED BUDGET		Prior Years	2024	2025	2026	2027	2028	2029	2030	2031	2032	Beyond 2032	Total
	Approved Budget												
	Original Budget Approved	-	-	-	-	-	-	-	-	-	-	-	-
	2022 Cap Budget Request for Next Cycle	5,000	16,000	22,000	10,000	-	-	-	-	-	-	-	53,000
	2023 Cap Council	-	-5,000	-	-	-	-	-	-	-	-	-	-5,000
	2023 Cap Carry Forward	-5,000	5,000	-	-	-	-	-	-	-	-	-	-
	2024 Cap Council	-	-1,323	-2,847	-	-	-	-	-	-	-	-	-4,170
	Current Approved Budget	-	14,677	19,153	10,000	-	-	-	-	-	-	-	43,830
	Approved Funding Sources												
	Tax-Supported Debt	-	14,677	19,153	10,000	-	-	-	-	-	-	-	43,830
	Current Approved Funding Sources	-	14,677	19,153	10,000	-	-	-	-	-	-	-	43,830

BUDGET REQUEST													
Budget Request		-	-	-	-	-	-	-	-	-	-	-	-

REVISED BUDGET (IF APPROVED)													
Revised Budget (if Approved)		-	14,677	19,153	10,000	-	-	-	-	-	-	-	43,830
Requested Funding Source													
Tax-Supported Debt		-	14,677	19,153	10,000	-	-	-	-	-	-	-	43,830
Requested Funding Source		-	14,677	19,153	10,000	-	-	-	-	-	-	-	43,830

CAPITAL BUDGET BY ACTIVITY TYPE (000's)

REVISED BUDGET (IF APPROVED)	Activity Type	Prior Years	2024	2025	2026	2027	2028	2029	2030	2031	2032	Beyond 2032	Total
	Construction	-5,000	14,677	19,153	10,000	-	-	-	-	-	-	-	38,830
	Design	5,000	-	-	-	-	-	-	-	-	-	-	5,000
	Total	-	14,677	19,153	10,000	-	-	-	-	-	-	-	43,830

OPERATING IMPACT OF CAPITAL

Type of Impact:

Branch:																
	Rev	Exp	Net	FTE	Rev	Exp	Net	FTE	Rev	Exp	Net	FTE	Rev	Exp	Net	FTE
Total Operating Impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CAPITAL PROFILE REPORT

PROFILE NAME:	KATHLEEN ANDREWS TRANSIT GARAGE SOLAR PV & BATTERY PROJECTS	FUNDED
PROFILE NUMBER:	24-10-9411	PROFILE STAGE: Approved
DEPARTMENT:	Integrated Infrastructure Services	PROFILE TYPE: Standalone
LEAD BRANCH:	Infrastructure Delivery	LEAD MANAGER: Jason Meliefste
PROGRAM NAME:		PARTNER MANAGER: Pascale Ladouceur
PARTNER:	Infrastructure Planning and Design	ESTIMATED START: June, 2024
BUDGET CYCLE:	2023-2026	ESTIMATED COMPLETION: December, 2025

Service Category: Corporate Support

Major Initiative:

GROWTH	RENEWAL	PREVIOUSLY APPROVED:	5,879
100		BUDGET REQUEST:	-
		TOTAL PROFILE BUDGET:	5,879

PROFILE DESCRIPTION

The City's Corporate Greenhouse Gas Management Plan identifies mitigating strategies for reducing greenhouse gas emissions from City operations. The accelerated deployment of on-site microgeneration solar photovoltaics on City buildings and sites is one of the measures identified by the Plan to reduce greenhouse gas emissions by offsetting the energy used by City buildings. By accelerating the installation of solar photovoltaics from 2019 through 2030, the City will reduce corporate GHG emissions by 10,000 to 15,000 tonnes and are anticipated to have positive financial returns over the lifetime of the assets.

PROFILE BACKGROUND

The acceleration of solar photovoltaic installations on City buildings and sites is one of the tactics recommended as part of the portfolio of options detailed in the City's draft Corporate GHG Management Plan. The options are supported by best available data and information on capital requirements, life cycle cost benefit analysis, and further informed by extensive input and advice from corporate project planning, design, engineering, and project delivery staff. The deployment of solar photovoltaic installations could be coordinated with the planned facility rehabilitation schedule that identifies buildings for rehabilitation based on condition needs assessments as well as new building construction designs. The alignment with building rehabilitation and new building construction schedules will ensure efficient use of time and resources and limit the amount of disruption to service operations and customer impacts.

PROFILE JUSTIFICATION

The rigorous analysis and consultation used in developing the Corporate GHG Management Plan found that the business case actions from a Financial Return on Investment (FROI) standpoint, ranging from strongest to weakest, were building energy retrofits, LED street lights, electric buses, large microgeneration solar photovoltaics, and green electricity purchases. All of the options related to investing in City assets, including microgeneration solar photovoltaic systems, have positive net present value benefits over a 20 year period from a FROI standpoint. Internal discussion has led to the alignment of funds for potential projects on a per-building basis, this alignment is based on the 2019-2022 new construction schedule and on a study to determine which existing facilities could be potential sights for solar installations. Refinement of this allocation will occur as projects are reviewed on a building by building basis for structural and other feasibility. A total of 20MW of solar PV is planned to be installed between 2019-2030 with a total estimated carbon reduction of 10,000 tonnes CO_{2e}. All funding for new construction projects is to accelerate solar photovoltaic installations above the required 1% funding required for all new construction projects as per the Sustainable Building Policy C532.

STRATEGIC ALIGNMENT

Corporate building energy retrofits are one important GHG mitigation tactic identified in the draft City of Edmonton Corporate Greenhouse Gas Management Plan. The Plan is a response to the global threat of climate change. Its mandate comes from a number of City Council directives including: (a) a goal in The Way We Green for Edmonton to become "a carbon-neutral city"; (b) Strategic Action 6.10.1 contained in The Way We Green that directs the City of Edmonton to establish, implement and maintain "a [Corporate] Greenhouse Gas Management Plan aimed at significantly reducing greenhouse gas emissions from City operations"; and (c) Strategic Direction 4 contained in Edmonton's Community Energy Transition Strategy (C585) that the City of Edmonton will take a lead role in supporting Edmonton's energy transition efforts, including leading-by example in its own civic operations; and (d) alignment with the Pan Canadian Framework on Clean Growth and Climate Change, a comprehensive, multi-sectoral plan to meet interim 2030 targets of 30% reduction below 2005, as a part of demonstrating Canada's commitment to The Paris Agreement and its 2050 targets. This plan "leads by example" — adopting and demonstrating high standards of sustainable, energy conserving, climate change mitigation practices that are encouraged throughout the community.

ALTERNATIVES CONSIDERED

The Kathleen Andrews Transit Garage (KATG) facility was structurally designed to support solar PV installations. Several existing City facilities have already been retrofitted with PV systems. This facility is the last major facility to incorporate Solar PV as well as Battery Energy Storage Systems (BESS) which will charge the City's electric bus fleet. No viable alternative locations remain that could support both Solar PV and Battery Storage systems.

COST BENEFITS

The KATG facility has been chosen as a Pilot Project to provide a new Battery Energy Storage System (BESS) unit to provide battery charging of the City's electric bus fleet. A Provincial Grant from Emissions Reduction Alberta (ERA) will cover the equipment costs of the Battery Storage equipment. (\$4.44M) This new Battery Storage equipment will be complementary to a Solar PV installation, as the Solar PV system can re-charge the Battery System which in turn will charge the electric buses. Any surplus energy will also be used to offset the building electrical grid load.

KEY RISKS & MITIGATING STRATEGY

The major risks to this large system is to counteract Harmonic Distortion of the existing building equipment, with the addition of these new systems. Knowing of this possibility, is the key to mitigating the possible impacts of Harmonic Distortion. Plans are in place to monitor the situation and provide measures to counteract these potential effects.

RESOURCES

With the specialized nature of the various installations (BESS, Solar PV + electric Bus charging), a specialist engineer familiar with the various systems has been engaged to provide an integrated design approach to the installations at KATG. In addition, with support from Engineering Services and project management through Facilities Infrastructure Delivery, the project will be managed to provide an optimized system and commissioned prior to operation.

CONCLUSIONS AND RECOMMENDATIONS

With the integration of the Battery Energy Storage System, Solar PV and Bus charging, this Pilot project will provide optimum energy for bus charging as well as reduced building energy requirements with a large reduction in GHG emissions.

CAPITAL PROFILE REPORT

PROFILE NAME: **Kathleen Andrews Transit Garage Solar PV & Battery Projects**
 PROFILE NUMBER: **24-10-9411**
 BRANCH: **Infrastructure Delivery**

FUNDED
 PROFILE TYPE: **Standalone**

CAPITAL BUDGET AND FUNDING SOURCES (000's)

APPROVED BUDGET		Prior Years	2024	2025	2026	2027	2028	2029	2030	2031	2032	Beyond 2032	Total
	Approved Budget												
	Original Budget Approved	-	-	-	-	-	-	-	-	-	-	-	-
	2024 Cap Council	-	2,400	3,454	25	-	-	-	-	-	-	-	5,879
	Current Approved Budget	-	2,400	3,454	25	-	-	-	-	-	-	-	5,879
Approved Funding Sources													
	Tax-Supported Debt	-	2,400	3,454	25	-	-	-	-	-	-	-	5,879
	Current Approved Funding Sources	-	2,400	3,454	25	-	-	-	-	-	-	-	5,879

BUDGET REQUEST		Prior Years	2024	2025	2026	2027	2028	2029	2030	2031	2032	Beyond 2032	Total
Budget Request		-	-	-	-	-	-	-	-	-	-	-	-

REVISED BUDGET (IF APPROVED)	Revised Budget (if Approved)	Prior Years	2024	2025	2026	2027	2028	2029	2030	2031	2032	Beyond 2032	Total
	Requested Funding Source		-	2,400	3,454	25	-	-	-	-	-	-	-
	Tax-Supported Debt	-	2,400	3,454	25	-	-	-	-	-	-	-	5,879
	Requested Funding Source	-	2,400	3,454	25	-	-	-	-	-	-	-	5,879

CAPITAL BUDGET BY ACTIVITY TYPE (000's)

REVISED BUDGET (IF APPROVED)	Activity Type	Prior Years	2024	2025	2026	2027	2028	2029	2030	2031	2032	Beyond 2032	Total
	Construction		-	2,400	3,454	25	-	-	-	-	-	-	-
	Total	-	2,400	3,454	25	-	-	-	-	-	-	-	5,879

OPERATING IMPACT OF CAPITAL

Type of Impact:

Branch:																
	Rev	Exp	Net	FTE	Rev	Exp	Net	FTE	Rev	Exp	Net	FTE	Rev	Exp	Net	FTE
Total Operating Impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-