City of Red Deer

SUSTAINABLE BUILDING STRATEGY

December 2024

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EXECUTIVE SUMMARY

A. PROJECT OVERVIEW

Stok was engaged by The City of Red Deer ("the City"), to develop a Sustainable Building Strategy ("the Strategy") that provides guidance to plan, design, construct, manage, renovate, maintain, and deconstruct City-owned facilities. The Strategy serves primarily as a framework for the City to develop policies and tools for sustainable buildings. It provides leaders with the necessary clarity and information to comprehend what is required of City-owned facilities to achieve the environmental targets outlined in the Environmental Master Plan (EMP).

B. KEY STRATEGY INPUTS

To best align with the City's goals, needs, and operating realities, we collected input and direction for the Strategy from the following three sources:

1. Stakeholder Feedback: During stakeholder feedback, we engaged stakeholders across various City functions and facilities to better understand their experiences and perspectives with sustainable building practices. Findings were summarized in a What We Heard Report that documented key recurring themes identified throughout the interviews.
2. Policy Direction and Gap Analysis: They City identified seven key policy documents that outlined the environmental targets, requirements, and plans for the City, and consequently, City-owned facilities. Stok undertook an analysis of the policy direction and remaining gaps from these policies – including where future plans are indicated – as a starting point for the scope of content of the Strategy. This analysis revealed significant gaps in direction, content, and metrics pertaining to sustainable building practices and identified a need for greater direction and detail at the facility-level.
3. Sustainability Standards: We researched different sustainability standard options and summarized the benefits and drawbacks of sustainability tools based on the specific gaps and priorities of The City. Direction from this research provided three certification recommendations to align with the City-owned portfolio with the energy, water, and waste targets of the EMP that minimize cost and burden while maximizing environmental outcomes. These three certification pathways are summarized in Technical Requirements of our recommendations.

C. RECOMMENDATIONS

One of the key success factors to an effective sustainable building program is ensuring clear guidance for internal and external users. To do so, there is often a balance between defined, prescriptive, certifications and methodologies, such as Leadership in Energy and Environmental Design (LEED), and more flexible, performance-based standards such as Building Owners and Managers Association Building Environmental Standards (BOMA Best). This is about not 're-inventing the wheel', but rather finding the best fit for The City while acknowledging that there are

many existing certifications, standards, and frameworks in the sustainable building sector in which to borrow the right tools and benchmarks.

The Sustainable Building Strategy comprises several recommendations, categorized into immediate (year 1), intermediate (year 2), and project-initiated. The timing of these recommendations is purposeful, designed to provide structure, standards, and clear direction in year 1, then scale internal capacity and knowledge in year 2. Project-initiated recommendations are not specifically time-bound, instead intended to be implemented alongside major projects as they arise.

Recommendation		Description
Immediate (Year 1)		
1	Establish Metrics for Key Building Performance Targets	• Establish performance measures, milestones, and targets proportional to the impact of its facilities and its portfolio as a whole. Recommended performance measures include water, waste, and energy.
2	Develop Owner's Project Requirements (OPRs)	• Develop specific Owner's Project Requirements (OPR) that provides a basis for design and / or outline specification for these new construction and major renovations. • Tailor OPRs to each project by providing a base OPR that has standard requirements as well as facility-specific criteria.
3	Develop a Sustainable Building Policy	• Develop a sustainability building policy. This policy would operationalize the broader goals outlined in our strategy and complement the overarching targets of the EMP.
Intermediate (Year 2)		
4	Procure a Dedicated Resources to Support the Portfolio	• Hire an energy manager or building performance specialist who has the capacity, skills, and expertise to oversee the portfolio performance and support the measurement and ongoing implementation of the portfolio and its sustainability initiatives.
5	Provide Training and Role Clarity for Individuals Across the Building Lifecycle	• Define the expected role of each individual involved in the building lifecycle. This should include those directly involved (Project Managers, Operators, etc.) as well as those with related functions (Procurement, Greenhouse Gas inventory, Waste Services, etc.).
Project-Initiated		
6	Provide O&M Training and Documentation to Building Operators	• Establish protocols for project handover to facilities operators, including operations and maintenance (O&M) training for during and after project execution.
7	Prioritize Sustainability Investment Based on Data	• Use quantitative insights to select solutions for major projects to select solutions that suit the needs of the City, address key sustainability and climate criteria, and progress toward EMP targets.
8	Conduct Regular Project and Portfolio Check-In's	• Assess how well sustainable building interventions performed for the City at the project and portfolio level.

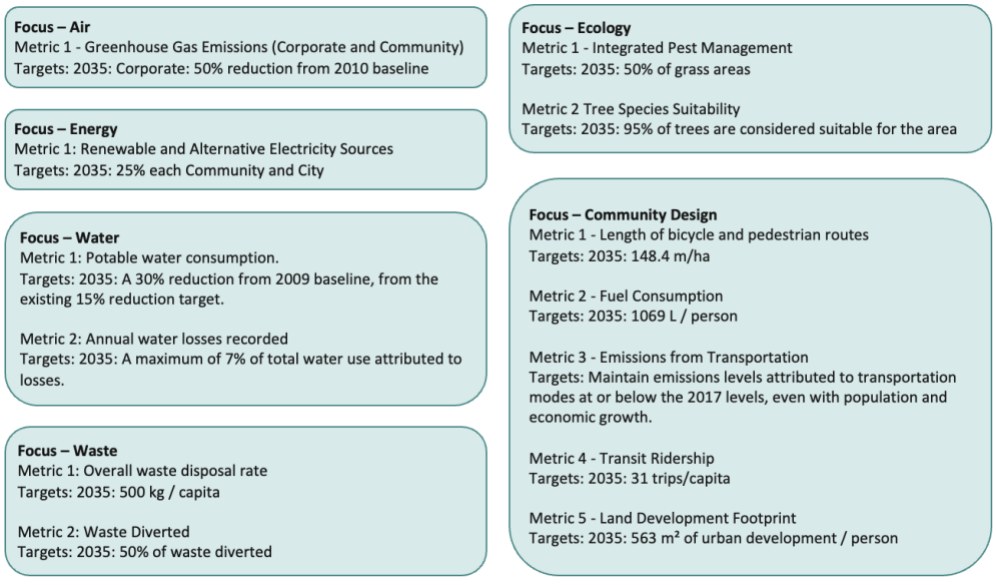
INTRODUCTION

A. SCOPE AND OBJECTIVES

Stok was engaged by The City of Red Deer ("the City"), to develop a Sustainable Building Strategy ("the Strategy") that provides guidance to plan, design, construct, manage, renovate, maintain, and deconstruct City-owned buildings. The objective of this scope of work was to develop a guiding framework direction, standardization, and guidance to:

- Implement consistent sustainability practices across the portfolio that contribute to the targets of the Environmental Master Plan (EMP).
- Bolster the resiliency of the City-owned portfolio to build and preserve facilities that are safe and long-lasting assets.
- Inform strategic investment and decision-making across the building lifecycle.
- Ensure clarity for City leaders, staff, and vendors in the execution of the strategy.
- Support portfolio-level progress and performance measurement.

The Strategy serves primarily as a framework for the City to develop policies and tools for sustainable buildings. It provides leaders with the necessary clarity and information to comprehend what is required of City-owned facilities to achieve the environmental targets outlined in the Environmental Master Plan (EMP).



In doing so, the Strategy outlines the key decision points that will shape the scope, scale, and stringency of sustainable building policy and practices.

B. METHODOLOGY AND APPROACH

To achieve this, we undertook a three-pronged project methodology to guide the development of our workplan, shown in Table 1 below.

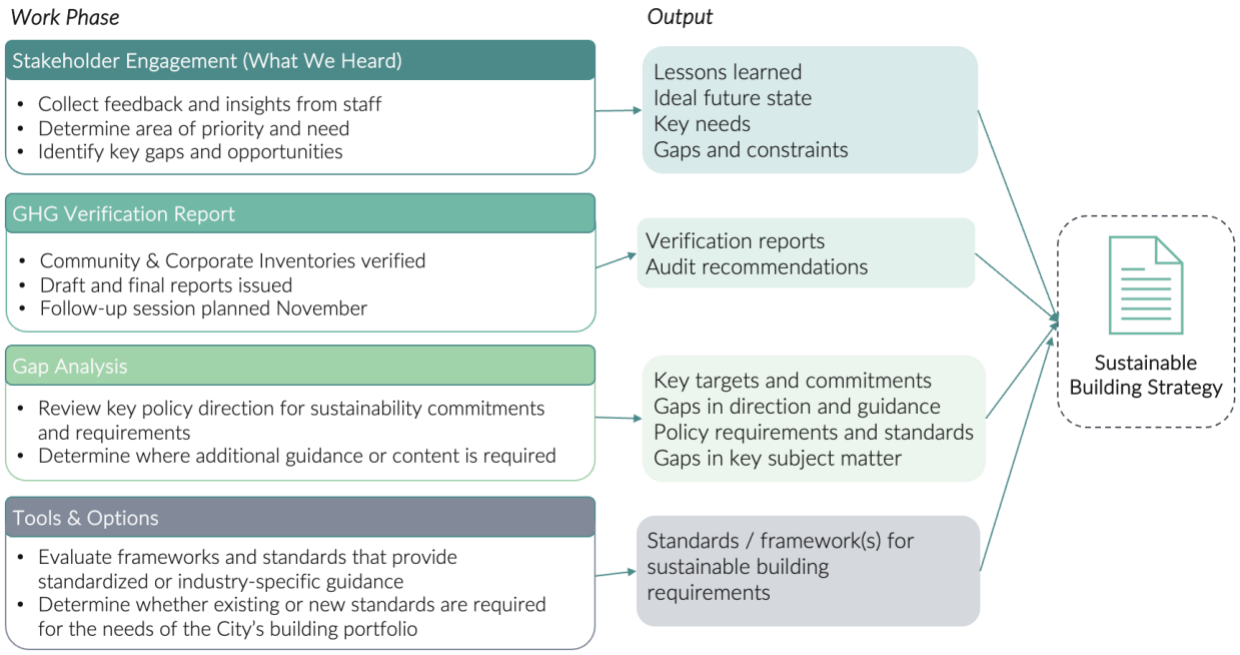
Table 1: Workplan Methodology

Area		Methodology
1	Policy Direction	The Strategy is informed by seven key policy documents: • Environmental Master Plan (EMP), 2019 • Municipal Development Plan (MDP), 2021 • City Council's 2023-2026 Strategic Plan, 2023 • Waste Management Master Plan (WMMP), 2013 • Water Conservation, Efficiency, and Productivity Plan (WCEPP), 2016 • Environmental Sustainability Policy, 2023 • Enterprise Asset Management Program, 2017 In addition to these documents, we also reviewed the recently developed 2024 Climate Adaptation Plan.
2	Building Lifecycle	An important aspect of this Strategy was addressing the environmental impacts of City-owned buildings across their entire lifecycle, from planning, procurement, design and construction, to management, maintenance and retrofits, and to deconstruction and material diversion. We also assessed how these lifecycles may differ between types of buildings included in the City's building stock and the current age of these assets and infrastructure.
3	Operational Alignment	It was a priority to ensure that this Strategy could be feasibly implemented across the organization, such that the desired environmental impact reduction can be realized. Included in this work was understanding the current skills, capacity, and budgets available to support the execution of the sustainable building strategy as well as any market or technological constraints that may influence the outcomes of EMP.

KEY INPUTS TO THE SUSTAINABLE BUILDING STRATEGY

Our approach included four phases of work that provided key inputs to the Strategy. Each of these phases provided outputs that are incorporated into the recommendations in this document. A summary of these inputs is shown in Figure 1 on the page to follow.

Figure 1: Inputs to the Strategy



Note that the Greenhouse Gas (GHG) Verification Report scope was completed adjacent to this Strategy, with key insights and opportunities for the Strategy incorporated into this scope of work as relevant. This work in its entirety can be found in Appendix A. A summary of each of the other three work phases is provided in this section, with detailed reports appended for reference.

A. STAKEHOLDER FEEDBACK

During stakeholder feedback, we engaged stakeholders across various City functions and facilities to better understand their experiences and perspectives with sustainable building practices. The objectives of stakeholder engagement were three-fold:

1) To understand the past experiences and perspectives of stakeholders across city functions and facilities regarding sustainable building practices.

2) To provide the project team with critical insights and feedback that will inform the development of practical, effective, and contextually appropriate sustainability strategies.

3) To foster communication between stakeholders and decision-makers, ensuring ongoing dialogue and mutual understanding.

In these interviews, we gathered feedback about sustainability initiatives that have been undertaken throughout the building lifecycle and their successes and challenges. Stakeholders' experiences and insight into City-owned facilities also provided insight into both project-specific and portfolio-wide opportunities for sustainability areas of energy, water, and waste.

Findings were summarized in a What We Heard Report that documented key recurring themes identified throughout the interviews. These aggregated responses were grouped in the below key findings to facilitate a better understanding of the common opportunities, challenges, and lessons learned from sustainable building initiatives and practices across the City.

Key findings:

1) A sustainable building strategy must be more than policy.
2) The EMP is not well known or integrated across the organization.
3) Staff universally demonstrated engagement and willingness to further sustainability outcomes for City facilities.
4) Sustainable building initiatives and projects have been implemented in the City to varying degrees of success.
5) Budget is a known and significant constraint.
6) There is no defined "owner" of sustainable buildings and their environmental outcomes throughout a facility's lifecycle at the City.
7) New construction and existing facilities have different sustainability considerations.
8) Climate resilience, mitigation, and adaptation remains a new and undefined aspect of environmental performance for City facilities.

Detailed explanation for each of these findings can be found in the full What We Heard Report in Appendix B.

B. POLICY DIRECTION AND TARGETS

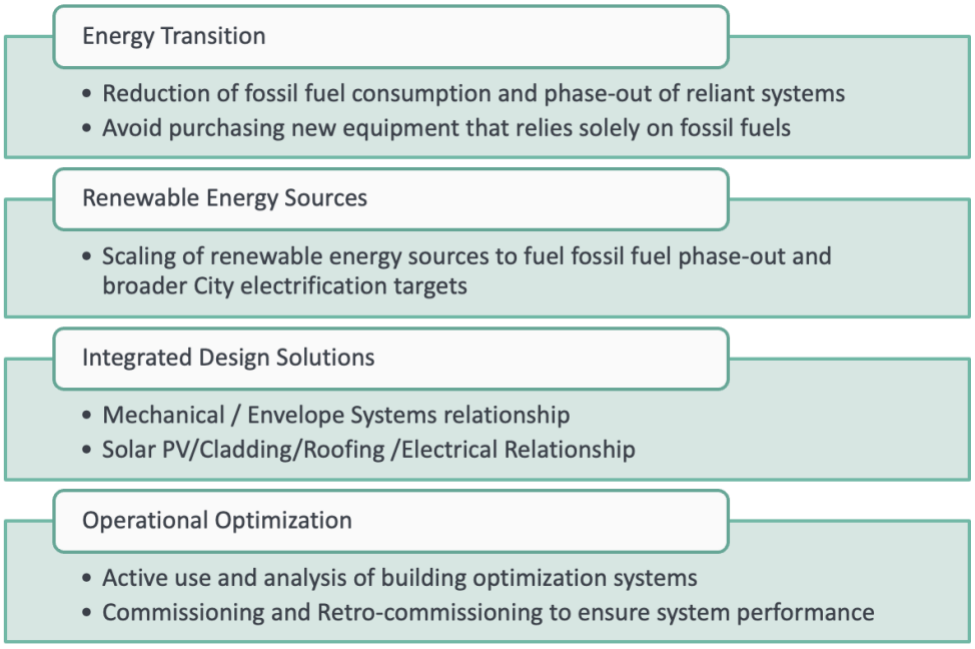
For each of the key policy documents indicated in the previous section, there are key environmental targets, requirements, and plans that provide guidance as to the expectations and content of the Strategy. Stok undertook an analysis of the policy direction and remaining gaps from these policies – including where future plans are indicated – as a starting point for the scope of content of the Strategy.

Table 2 summarizes the key aspects of all seven plans and policies that were scoped into the Strategy.

Table 2: Documentation Reviewed

Plan / Policy	Sustainable Building Strategy Needs
EMP	✓ Flexibility to adapt to and align with content from other plans underway ✓ Clear metrics and criteria specific to facilities ✓ Sustainable building procurement requirements
Water CEP Plan	✓ Plumbing system and equipment requirements that optimize water reuse and non-potable water sources ✓ Commissioning and retro-commissioning to monitor water performance and use ✓ Guidance for retrofit priorities
WMMP	✓ Construction & Demolition and operations waste diversion requirements ✓ Diversion infrastructure planning and integration with building planning ✓ Building operations monitoring to include waste
Environmental Sustainability Policy	✓ Sustainable material requirements (e.g., minimum percentage of recycled materials) ✓ Definition of facilities "impact" and associated metrics against which that impact can be measured and monitored
Climate Adaptation Plan	✓ Scope specific to new buildings and major renovations ✓ Sustainability guidance for facilities procurement ✓ Climate resilience requirements

While this provides a starting place for the Strategy, significant gaps in direction, content, metrics, and level of detail remained. Key gap areas included:



The complete findings from this phase of work can be found in Appendix C.

C. SUSTAINABILITY STANDARDS AND CERTIFICATION SYSTEMS

One of the key success factors to an effective sustainable building program is ensuring clear guidance for internal and external users. To do so, there is often a balance between defined, prescriptive, certifications and methodologies, such as Leadership in Energy and Environmental Design (LEED), and more flexible, performance-based standards such as Building Owners and Managers Association Building Environmental Standards (BOMA Best). This is about not 're-inventing the wheel', but rather finding the best fit for The City while acknowledging that there are many existing certifications, standards, and frameworks in the sustainable building sector in which to borrow the right tools and benchmarks.

In this phase of work, we researched different sustainability standard options and summarized the benefits and drawbacks of sustainability tools based on the specific gaps and priorities of The City. Direction from this research provided the following recommendations as a pathway to aligning the City-owned portfolio with the energy, water, and waste targets of the EMP:

1) Follow Alberta Infrastructure mandatory LEED credits.

    - "Technical Design Requirements (TDR) require certain minimum LEED v4 credits following the Building Design & Construction (BD+C) or Interior Design & Construction (ID+C) paths for all new buildings and major renovations[1]".

[1] https://www.alberta.ca/system/files/custom_downloaded_images/tr-dtseries07grstd2017.pdf

- Following these mandatory credits targets key areas of performance across energy, water, waste, and materials and positions the City to align with targets that may assist in pursuing provincial funding for joint projects.

2) Follow BOMA Best for all projects.

- Incorporate BOMA Best as minimum requirements for Owner's Project Requirements, including aligning building design with BOMA Best. While BOMA Best certifications only apply to existing buildings, the specified requirements can be used as a performance standard for all project types when incorporated into Owner's Project Requirements.
- Utilizing BOMA Best establishes the use of a single policy /standard that can drive consistent operational data for year-over-year reporting. Consistent practices and data allow for performance monitoring to City of Red Deer's targets. BOMA Best is the right tool with the right level of effort for the scale and portfolio of buildings the City manages.

3) For projects >$25 million, pursue LEED with a *no-target* clause.

- The value of LEED certifications and the cost to implement the associated credits are proportional to the scale and cost of the building and its impact. The level of effort and documentation required to certify credits require investment of time that larger projects can roll into the administration work of higher budget projects. Smaller projects (under $25 million) may not have the budget to afford the necessary documentation and administration for LEED.
- A no-target clause means that there is no official requirement to obtain a level of LEED certification (e.g., Silver, Gold, Platinum). This enables the City to be able to focus on the most impactful credits that will support investment and effort toward EMP targets. This means the City of Red Deer will not "point-chase" to hit a targeted certification and therefore will not have to spend money on impractical or unnecessary credits/ features.

Additional details on the standards and options explored during this phase of work are available in Appendix D.

SUSTAINABLE BUILDING STRATEGY

A. STRATEGY DEVELOPMENT

A Note on Scope

This strategy was developed specific to City-owned facilities. However, because of the many different types of facilities within the City portfolio, there are some exceptions where this Strategy is not applicable. For example, infrastructure projects often use different sustainability standards, such as Envision. Facilities associated with infrastructure (utilities buildings, wastewater treatment, etc.), may therefore already be part of an existing sustainability program.

Figure 2 on the right summarizes our approach to developing the strategy, beginning with Intention and Target Setting and circling through to Continuous Improvement. The Strategy is not designed to be linear, with a defined "end" date. Rather, it is a continuous feedback loop that allows for evolution over time, designed to adapt to changes City in policy, plans, budgets, and needs over time. This is particularly important in a quickly evolving field like sustainability, where availability of technologies and data are changing, and the costs of such interventions fluctuate with shifting market demand.

Figure 2: Approach to Strategy Development

For each step in this approach, we asked key questions that informed the recommendations implementation planning of the Strategy.

This process begins with Intention and Target Setting: *what are you trying to achieve and why?*

- What are the guiding policies that provide the direction for the strategy?
- What are the commitments that the strategy will help to achieve?
- Where do you invest limited resources? How does your organization prioritize one initiative, opportunity, or facility over another?

Then, with intention and target setting established, you must determine Technical Specifications:

- Which specifications will drive the actions and outcomes required of the strategy?
    - E.g., EMP targets, impact areas of Climate Risk Assessments

- How will these specifications be translated into requirements across the building lifecycle?

Roles, Responsibilities, and Capacity Building considers:

- What is expected of individuals across the building lifecycle to ensure that technical specifications are consistent, integrated and implemented?
- Are there new skills or knowledge that require training or additional resources to support the ongoing implementation of the strategy?
- How is accountability measured for these roles (i.e., how do you know what is supposed to be done is getting done?)?
- Who is the decision-makers for the strategy? How are trade-offs (e.g., budget constraints) determined?

Implementation and Performance Measurement includes the integration of the strategy into operations and the measures used to ensure its progress:

- What documentation (policy, tools, standard operating procedures) needs to be developed or updated to include the strategy?
- Which performance metrics will be used to measure the effectiveness of the strategy?
    - What specificity or refinement of these metrics would make these metrics most relevant (e.g., at the building level, by type of building, portfolio-wide, etc.)?
    - What data is available to support these metrics right now? What data is missing?
    - How will data be collected, stored, and analyzed?
    - Who will manage this data?
    - How often will metrics be evaluated? Is progression expected to be linear? Exponential?
    - How will performance be disclosed / shared with the public?

Finally, Continuous Improvement is the process of evaluating the progress of the strategy in the context of the needs of the City and broader market conditions:

- Is the strategy still aligned with the policy direction of the City?
- Are there plans or initiatives that should be included or integrated with the strategy?
- Have there been changes to the market that would impact the strategy?
    - Have new technologies, standards, or solutions become available?
    - Has the cost of implementing sustainability requirements changed?
    - Are there other social, economic, or environmental priorities that have emerged?
    - Is the City seeing the desired progress of the portfolio against its EMP targets?

- If not, what changes should be made to the strategy and its supporting documentation / processes that would address this lack of progress?

Following this approach, we developed several recommendations for the technical and non-technical aspects of sustainable building for the City's owned facilities. These recommendations are included in the section to follow.

B. RECOMMENDATIONS

The Sustainable Building Strategy comprises several recommendations, categorized into immediate (year 1), intermediate (year 2), and project-initiated. The timing of these recommendations is purposeful, designed to provide structure, standards, and clear direction in year 1, then scale internal capacity and knowledge in year 2. Project-initiated recommendations are not specifically time-bound, instead intended to be implemented alongside major projects as they arise and recur therein.

Immediate (Year 1) Recommendations

1. Establish Metrics for Key Building Performance Targets

While the EMP provides 2035 targets for the corporation, the City should establish performance measures, milestones, and targets proportional to the impact of its facilities and its portfolio as a whole. Recommended performance measures include:

- Energy:
  - Energy Use Intensity (EUI): (total energy use / square feet of facility or portfolio)
  - Thermal Energy Demand Intensity (TEDI): annual heating energy demand for space conditioning and conditioning of ventilation air
- Water:
  - Indoor Water Use Intensity (total water use / square feet of facility or portfolio) of potable and non-potable water
- Waste:
  - Operational Waste: Waste reduction and Percent of waste diverted (total or for specified material streams)
  - Construction and Demolition Waste: Waste reduction and Percent of waste diverted (total or for specified material streams)

Metrics should include building-level and portfolio-level data that carry relevant analysis attributes (e.g., facility type, facility size, age of facility, etc.) for each performance target area (energy, water, waste), allowing for:

- Performance measurement and comparison based on facility size or function and,

- Calculation of the cost of sustainability initiatives measured relative to the project's outcomes and context, for example: at dollars per square foot and dollars per (metric tonne of carbon dioxide equivalent (MTCO2e) saved, etc.

Greenhouse Gas Emissions: An Option for a Master EMP Metric

An additional scope to this work included verifying, validating, and updating the greenhouse gas (GHG) calculators to ensure the most up to date and accurate emissions profile for reporting on corporate and community GHGs. While this scope was not a direct input to the Strategy, it revealed the availability of high-quality, detailed emissions data the portfolio of City-owned facilities. As data availability and granularity is a common pitfall of sustainability efforts, this readily accessible data set should be shared with facility and asset managers and leveraged as a starting place for performance tracking of facilities.

GHG data provides the most direct insights into energy performance, but is also an underlying metric for water and waste metrics as well. Because the City has this data already, pursuing annual tonnes of carbon dioxide equivalent (tCO_2e) as a common, "master" metric would establish a clear, comparable standard with which to evaluate the current and proposed performance of a facility. Moreover, using a common metrics allows for the evaluation of trade-offs – both environmental and economic – between water, waste, and energy outcomes. The graphic on the following page demonstrates how a "master" tCO_2e could be used for all EMP targets. As shown below, Corporate Annual tCO_2e from the GHG Inventory can act as a master metric– it is connected to other key EMP metrics.

For example, a reduction in water consumption would reduce the emissions associated with water and wastewater (energy used to pump and treat the water). A reduction in waste would reduce the amount of waste that goes to landfill, which would otherwise generate methane emissions, where methane is one of the greenhouse gas emissions "equivalent" to carbon dioxide (the "e" in tCO_2e). In the case of energy, reductions in energy use direction reduce carbon emissions.

2. Develop Owner's Project Requirements

To achieve consistency and rigor for the development of new buildings, as well as the retrofit and renovation of existing building, Stok recommends the development of specific Owner's Project Requirements (OPR) that provides a basis for design and / or outline specification for these types of projects. These requirements would provide:

- Minimum requirements that provide standard, industry-recognized requirements and comparable benchmarks for all projects.
- Guidance on how these requirements should be implemented based on industry experience, current practices of the operations and maintenance team and the needs of Red Deer.

- Specifications relevant to the project type.

OPRs can tailor to each project by providing a base OPR that has standard requirements as well as facility-specific criteria. The OPR will focus particularly on energy and carbon reduction targets, water conservation, sustainable materials and waste reduction goals.

Please see Appendix E for recommendations on key LEED credits and BOMA Best requirements that can frame the base OPR. Appendix F contains examples of OPR content from other organizations in Alberta.

The OPRs can provide guidance to City of Red Deer personnel for each stage of a project as outlined below:

i. Procurement Phase

Before the City of Red Deer procures services for design, renovations, construction or even maintenance of facilities, the OPR can be utilized by various departments to set the stage for a project's success. This will involve breaking down silos between City departments to realize building solutions that will service the procurement team and follow throughout the project to operations, maintenance and even the eventual de-construction of buildings. Key requirements in procurement are:

- Incorporate OPR as part of Project Charter / Terms of Reference in Requests for Proposals.
- Work with project managers and the operations & maintenance team to update OPR on a regular basis, based on lessons learned from current building practices and experience.
- Take into consideration the full Lifecycle Costs of building components.

Best Practice: Create Integrated Building Teams

Involve personnel from procurement, project management, operations/maintenance as well and end-users of facilities to create and revise OPRs. This allows for cross-functional knowledge and capacity building, removes blind spots, and facilitates proactive problem solving.

ii. Design & Construction

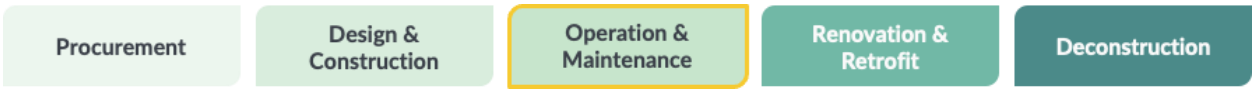
Ahead of the design and construction of facilities, the OPR is a critical document for the design and construction team to reference and build into drawings and specifications. The City can utilize this

document for project managers to reinforce what are the "must-haves" and essential aspects of facilities they are working with design teams to create.

- Reference OPR and work with design and construction teams to follow and incorporate OPR requirements in new and retrofit projects.
- Consultant team is to design the building and write project specifications from guidance in the OPR, including requirements for commissioning, building turn-over and Operations and Maintenance (O&M) training.

Best Practice: Enforce Your Contract Terms

It is critical to establish accountability and checkpoints across the build cycle to ensure that the OPR is followed with drawings and specifications providing how this will be executed, and ensuring the warranty period for fixing any deficiencies are enforced.



iii. Operations and Maintenance

The Owner's Project Requirements will be critical to successful running of facilities, in particular the more complex building types such as recreational facilities. Operations and maintenance personnel can:

- Utilize the OPR as a reference guide for Standard Operating Procedures.
- Ensure building is operating to meet the management targets set in OPR, and that should be followed through with training on building management and automation systems.

Best Practice: Invest in Building Handover

Emphasize the building handover once construction is complete. Hand-over should ensure building operators have the training and knowledge to be successful in running the facility to the high performance level of sustainable buildings.

iv. Renovation and Retrofit

For renovations and retrofits, a similar direction is taken as design and construction, with the caveat that specific project requirements will be required to tailor to the vintage / age and condition of the facility.

- Reference OPR and work with design and construction teams to follow / incorporate OPR requirements in new and retrofit projects.
- Design team to design the building and write project specifications from guidance in the OPR, including requirements for Commissioning, building turnover and operations and maintenance training.

Best Practice: Renovations (and the OPR) are Bespoke to Each Project

There will be unique parameters depending on the age and function of the facility. Avoidance of "carbon lock-in" during this process should be a priority. This is the idea that by replacing fuel-fired equipment/ systems with like systems will "lock in" further carbon-emissions for the lifecycle of that particular equipment (which is usually decades). Beyond the major advantage of reducing greenhouse gas emissions, opting for new equipment powered by renewable energy can also reduce utility costs. Although such equipment may have higher initial costs, the rapidly changing market is seeing a significant decrease in these costs, making it more affordable. Conducting a life cycle cost analysis is essential to fully understand these long-term financial benefits. Additionally, it's important to check if the existing infrastructure can support this new equipment.

v. Deconstruction

At the end of a building's useful life, the OPR can provide guidance on how best to decommission and provide for disassembly of building components. This is becoming increasingly important as landfills should be avoided and perhaps materials can have a second life or "up-cycled" purpose. The OPR will provide:

- Specifications of how to reuse, retain or building materials, to avoid landfill.
- Create circular economy opportunities and business drivers within the City of Red Deer. Circular economies focus on strategies and practices designed to minimize waste, maximize resource efficiency, and prolong the lifecycle of materials. In contrast to the traditional linear economy's pattern of "build-use-demolish," this approach promotes a cycle of "build-use-reuse." For example, during our interviews with stakeholders, we learned that demolished asphalt had been successfully reused for paving trails, serving as an excellent example of the circular economy in action.

Best Practice: Start Small

Based on market and program maturity, we recommend at this time focusing on waste diversion, then advancing to deconstruction practices.

3. Develop A Sustainability Building Policy

To ensure the consistent application of best practices across all future building projects, we recommend that the City develop a sustainability building policy. This policy would operationalize the broader goals outlined in our strategy and complement the overarching targets of the Environmental Master Plan (EMP). By formalizing these principles and objectives into a specific policy, the City can guarantee that all construction and renovation projects align with its comprehensive sustainability goals.

The policy should include, at minimum:

- Clear environmental performance targets for City-owned facilities;
- Roles and accountabilities of staff and contractors in delivering to these performance targets, including cross-functional and integrated team roles; and,
- Codification of the OPRs as standard for major projects (new construction and renovations).

Intermediate (Year 2) Recommendations

4. Procure a Dedicated Resources to Support the Portfolio

Sustainable building performance is a highly technical and swiftly evolving field. While the City can look to the market to provide subject matter expertise and direction, it is prudent to hire an energy manager or building performance specialist who has the capacity, skills, and expertise to oversee the portfolio performance and support the measurement and ongoing implementation of the portfolio and its sustainability initiatives. This role can support ongoing training for staff and stakeholders and provide insight into emerging market trends, technologies, and opportunities to integrate sustainability into City facilities. This role may also advise project teams on project sustainability targets and in the evaluation of vendor proposals.

5. Provide Training and Role Clarity for Individuals Across the Building Lifecycle

Define the expected role of each individual involved in the building lifecycle. This should include those directly involved (Project Managers, Operators, etc.) as well as those with related functions (Procurement, Greenhouse Gas inventory, Waste Services, etc.). Because technical requirements like the OPRs are new to the organization, individuals will need to be trained to understand the OPRs in the context of their role and what their accountabilities are in supporting OPR execution. For example, as a Contract Specialist, the OPR must be integrated into request for proposal (RFP) requirements for all future projects. Translating these into contract obligations and understanding what contravening them looks like is critical to the procurement and contacting function. For Project Managers and their design teams, being able to determine which proposals meet the standards of the OPR and which do not is important to the quality assurance of the project. For a Building Operator, certain aspects of the OPR are more relevant, such as commissioning and maintenance. Collectively, training in sustainability literacy in the context of each impacted role is a critical success factor to the implementation of this strategy.

To enable consistency of behaviours and decisions, Standard Operating Procedures (SOPs) may be developed alongside training materials. For greater cost and time efficiency, require SOPs, operations and maintenance (O&M) manuals, and training on specific aspects of a project or design to be part of project scope and commissioning. While training for organization-specific expectations and nuance is still required, it can build upon that already provided from vendors and contractors.

Project-Initiated Recommendations

6. Provide Operations and Maintenance Training and Documentation to Building Operators

Handover is a component of the technical requirements, but to operate facilities for sustainable performance, additional training should be provided. This includes training for during and after project execution. Implementing these requirements and processes holds the individual or team accountable for commissioning to a consistent, prescribed standard.

Requirements[2]:

- Operations and Maintenance Training
    - Developing Requirements: During the design phase, the Commissioning Agent (CxA) should work closely with the design team and owner to establish specific training requirements, including identifying which personnel and systems need training and the level of instruction required.
    - Delivery: At the end of the construction phase, the contractor or manufacturer's representative should conduct O&M training for each major piece of equipment installed according to the requirements. They should also provide comprehensive handouts to attendees.
    - Documentation and Evaluation: The CxA should supply training evaluation forms and a tracking sheet to verify that the training meets the specified requirements. Additionally, video recordings of the training sessions should be made for future reference.
- Post-Construction Documentation
    - Commissioning (Cx) Report: CxA to document the history of system functional testing, equipment deficiencies, corrective actions taken, etc.
    - O&M Manual and Current Facility Requirements (CFR): CxA to include all necessary information for operating, maintaining, troubleshooting, and recommissioning all energy-consuming or energy-producing systems (e.g.

[2] Source: United States Green Building Council (USGBC)

including lighting, process loads, HVAC, domestic water heating, and renewable energy) within the facility.

- Ongoing Cx Plan: CxA to include a recommended schedule for future recommissioning to ensure continued system efficiency and performance. Such plan can be established for existing building

Process:

- Documentation Maintenance: Establish a system that allows operators to continuously log and track equipment deficiencies and corrections. This will also facilitate integration of new operators into ongoing operational tasks.
- Feedback Mechanism: Set up a system for operators to share their firsthand experiences with each other and with key departments such as procurement and project management. This fosters continuous improvement and helps prevent the recurrence of past mistakes.
- Early Design Involvement: Implement a protocol for including operators during early phase(s) of the project. Operators offer invaluable insights from their direct experience with building systems, which is essential for ensuring that the building's design is both practical and sustainable.

Routine Recommissioning (ReCx): Following the established ongoing Cx plan (see above), recommissioning agents (ReCxA) or qualified professionals will routinely assess and recalibrate critical building systems. The frequency and priority of each system's ReCx will depend on its complexity, usage patterns, and historical performance data.

7. Prioritize Sustainability Investment Based on Data

To ensure alignment with EMP targets and to best invest in sustainability interventions for the City's facility portfolio, the City should use quantitative insights to select solutions for major projects. Using data provides quantifiable insight into how a solution will suit the needs of the City, address key sustainability and climate criteria, and progress toward EMP targets. This is important not only to achieve sustainability outcomes, but also to ensure that investment in these solutions garners the intended return for the City.

Data-driven options include:

- Feasibility studies or case studies that demonstrate proven solutions in similar geography, topography, weather, and function. Those studies are essential tools that assess the viability of projects in environments with similar geographic and functional characteristics. They typically include a thorough area, demographic, and neighborhood analysis, a detailed site review, and market analysis to gauge demand and potential risks. They also encompass a proposed development usage and pricing analysis, financial projections, valuation assessments, and a comparison of value created against

projected costs. Please see Appendix G for *Renewable Energy Feasibility Study, Los Alamos National Laboratory*

- Carbon Lifecycle Assessments (LCAs) use "systematic analysis of environmental impact over the course of the entire life cycle of a product, material, process, or other measurable activity. LCA models the environmental implications of the many interacting systems that make up industrial production. When accurately performed, it can provide valuable data that decision-makers can use in support of sustainability initiatives"[3].

  LCAs Versus Total Cost of Ownership: The Total Cost of Ownership (TCO) "captures the costs associated with a product over its lifetime—from the development and design of a product through its use, maintenance, and disposal"[4]. TCO is a methodology used in sustainability and non-sustainability costing equations to compare the actual cost of products based on its quality, longevity, and resiliency relative to its purchase cost and the costs on ongoing operation. Incorporating TCO into project budget decisions and asset planning is helpful to optimize investment in facilities.

  TCO can be calculated at the whole-building level, known as Total Cost of Building Ownership (TCBO). Calculating TCO or TCBO is particularly important in construction projects, where project costs are typically 10 percent of TCBO[5]. For example, a $10 million facility could cost an estimated $100 million to operate, maintain, and decommission. High performing, sustainable buildings typically have TCBO 30 to 40 percent lower than traditional builds (SEEFAR Building Analytics), thus, significantly changing the costing decision of projects.

- Energy modelling, "a process used to estimate the energy consumption of a building, typically on an annual basis. Information about climate, orientation, design geometry, building materials, and mechanical and electrical systems is collected. All this data is then entered into a software program to determine the overall energy use of the building's design. The information can then be used to compare a proposed building to a similar existing building, a specified energy target or building code requirement, and/or to assign a performance rating. Energy modelling is typically carried out by design team members [typically an energy modeler] who use the modelling results to provide advice and consultation to building owners, project teams, and individuals"[6],

[3] Whitebell, C. Rochester Institute of Technology. https://www.rit.edu/sustainabilityinstitute/blog/what-life-cycle-assessment-lca#:~:text=An%20LCA%20is%20a%20systematic,that%20make%20up%20industrial%20production.
[4] Davis Pluess, J. BSR. https://www.bsr.org/en/blog/what-total-cost-of-ownership-offers-sustainable-procurement
5 SEEFAR Building Analytics. https://ecologyaction.ca/sites/default/files/2022-08/BBSS_MonetizingSustainabilityTotalCostBuildingOwnership_slides.pdf
[6] Efficiency Manitoba

- Supplier specifications / standards, such as Environmental Product Declarations (EPDs) and Product Carbon Footprints (PCFs) are standardized systems that provide the LCA impact of a product or material. These are increasingly common in the market and the building sector and offer helpful, summarized insights into available options without incurring LCA costs or project timeline impacts.

Preferred Supplier Lists Prevent Carbon Lock-In

During interviews, stakeholders shared that often replacing systems and equipment is a matter of urgency to ensure service levels are maintained. However, this can result in defaulting to a carbon-efficient or carbon-reliant replacement when less carbon intensive alternatives are available. Establishing a preferred supplier and / or pre-approved products list that plans for asset replacement and indicates which materials, equipment, systems, and other products should be selected as more sustainable versions of existing ones – whether at end of life or for unexpected failures – provides clear guidance for operators and enables responsive swap-outs that prevent carbon lock-in.

8. Conduct Regular Project and Portfolio Check-In's

While data can assist in determining project and investment options, the "newness" of the sustainability field, particularly within the context of a given organization and location, makes it important to assess how well sustainable building interventions performed for the City.

At the project level, this should include:

- Conducting a project retrospective with the integrated project team to determine what went well and should be incorporated into future projects and what could be improved upon and should be altered or removed from current process or standards.
- Comparing planned project costs with actual project costs and adding both planned and actual costs to a consolidated record of project performance. This information should include vendor and contractor information and a high-level summary of the project's key design and build elements and any decisions that were made that impacted cost. Keeping a record of these costs helps to provide insight into future project budgets and allows for better evaluation of proposal submissions on future work.
- Meeting within the warranty period to assess the performance of a building. It is mandatory that this meeting include the building operator(s) of the facility to provide feedback and insight into how effectively the facility is operating. Completing this during the warranty period ensures the identification and resolution of deficiencies prior to warranty end. To aid in the evaluation of the facility, comparing actual performance to energy models for the project may be helpful.

At the portfolio level, this should include:

- Assessing the performance of all facilities as a whole, and identifying poor performers and evaluating if performance is:
    - As expected (i.e., are there outliers from what was expected or from how a facility has performed in previous years) and / or
    - On track to meet EMP milestones and targets, or if adjustments are needed.
- Coordinating across functions and teams to update policy direction as strategies or programs under the EMP are developed and revised (e.g., waste diversion).

STRATEGY IMPLEMENTATION

During Strategy development we used a continuous improvement feedback loop to shape our recommendations. While our recommendations primarily focus on near-term action to build out a sustainable building program for City-owned facilities, the continuous evolution is an inevitability of the fast-moving sustainability space. Therefore, in combination with foundational documentation and program development, the City should seek to scale and iterate the criteria and scope of sustainable building requirements.

For scale-up, we recommend the City focus the water, waste, and energy targets of the EMP. While the EMP covers a range of environmental metrics, water, waste, and energy are areas that can be impacted by building performance. Using only these three metrics at outset keeps the scope of policy and requirements attainable and relevant. As capacity is built within the organization, the City may include or align with more aspects of the EMP. Iteration is about adjusting and adapting to a rapidly changing market and environment. To do this, the City should monitor the availability and cost of sustainability technologies and solutions that may be incorporated for use within the City's facility portfolio. In addition, the City should monitor changes to local, provincial, and federal policy, standards, and regulations (e.g., building code, "green" funding, etc.) that may impact sustainable building efforts. The City should follow the continuous improvement framework (page 13) to support this iterative process.

What is most important to implementation, however, even begins before adoption: commitment. Defining the exact OPR requirements expected of facilities projects is a key decision point, as the OPRs will ultimately define the level of performance of the portfolio and whether that performance meets the expectations of the EMP targets. While it may appear straightforward to write the OPRs to the highest standard possible, thus ensuring facilities meet EMP targets, higher standards and more stringent requirements have other implications, such as increased cost. Not all sustainable building projects are more expensive than traditional buildings, but in most cases, there is a correlation between higher standards and greater capital outlay. As such, decision-makers should be thoughtful in the development of the OPRs.

However, up-front capital costs are not the only costs that should be considered when determining sustainability standards of a facility. Equally, decision-makers should contemplate the cost of

inaction-the risks to infrastructure and the financial impact of damages resulting from increasingly severe climate conditions. Knowing the impact of climate change – approximately $201M (million) per year (in 2021 dollars) by mid-century (2055)"[7] and $484M per year by 2085[8] – its cost should be weighed equally to that of up-front investment. Avoiding financial burden in the near-term may appear prudent, but in a changing climate landscape, fiscal responsibility requires a longer-term investment outlook.

[7] Climate Adaptation Plan, 2024.
[8] Ibid.