COUNCIL – AGENDA REPORT

Meeting Date:	15 October 2024
Subject:	Energy and GHG Performance Standard on Municipal New Construction
Directorate:	Community Infrastructure

Issue:

Administration is presenting Council with options to establish criteria related to GHG reduction requirements on new municipal builds to be used for large municipal structures not yet in the design phase.

Policy / Council Direction:

The AirdrieONE Sustainability Plan and the Corporate Energy and GHG Reduction Strategy are guiding documents. There is currently no policy in place, and direction is required for large new municipal builds entering the design phase now. This direction will be incorporated into a corporate sustainability policy to be brought forward at a later date.

Background:

Through its AirdrieONE sustainability plan (2011) and Corporate Energy and GHG Reduction Strategy (2023) the City has set aspirational goals to reduce its corporate greenhouse gas emissions five per cent per year over the next five years through a lifecycle costing approach that identifies, assesses and implements potential energy and GHG reduction projects in City-owned buildings and operations.

The most up-to-date National Energy Code for Buildings (NECB 2020), referenced in the latest National Building Code – Alberta Edition [NBC (AE) 2023] does not capture life-cycle cost impacts and is already outdated with respect to *Canada Green Buildings Strategy.* However, the NBC (AE) 2023 sets energy performance tiers, replicating the British-Columbia Energy Step Code. The BC Energy Step Code sets a more than 50% annual energy consumption reduction target compared to the reference building for a net zero energy (NZE)-ready commercial or institutional building (Figure 1, Tier 4) while the NECB 2020 sets a 60% reduction as a minimum (Figure 2, Tier 4).

In the context of new construction planning, the City has not been budgeting so far to get from architects and engineers alternative, low GHG emitting design options for its new Inspire

library, Highland Park firehall and SW recreation centre. This decision implied the default design option was the NECB 2020 Tier 1, the level adopted by the Government of Alberta. However, life-cycle costing of various low carbon building options is not included within a Tier 1 design approach. The lifecycle cost impacts of higher Tiers represents a significant endeavor that architectural and engineering firms do not undertake, unless tasked by their client to do for an extra fee. The City does currently not ask designers to conduct life-cycle costing analysis to assess the long-term net value of energy upgrades arising from higher Tiers.

With a Tier 1 level of performance, the City **cannot apply for energy efficient buildings grant funding** from the Federation of Canadian Municipalities (FCM) Green Municipal Fund (GMF) nor the federal government. Such funding programs now require new constructions to be built net zero energy (NZE) or NZE-ready (Tier 4) to get maximum funding, while Tier 2 may secure some funding. Design and construction costs of a new NZE facility are known to be typically higher than other lower Tiers, the City does not know what those costs actually are (with a range going from 0% to 30% depending on the construction approach, site and facility type).

Figure 1: BC Energy Step Code Energy Reduction Targets (Commercial & Institutional Buildings)

Table 10.1.2.1.
Energy Performance Tiers
Forming Part of Sentences 10.1.2.1.(1) and (2)

Energy Performance Tier	Percent *Building Energy Target*(1)	Percent Improvement(1)
1	≤ 100%	≥ 0%
2	≤ 75%	≥ 25%
3	≤ 50%	≥ 50%
4	≤ 40%	≥ 60%

Figure 2: NECB 2020 Tiered Energy Reduction Targets (Commercial & Institutional Buildings

Options

By establishing a *Sustainable Buildings Policy*, the City of Airdrie could set a Tier 2, Tier 3 or Tier 4 energy performance as a requirement for its corporate buildings, which are relative reductions of 25%, 50% or 60%, respectively, compared to business-as-usual construction (Tier 1). The details around how those targets are achieved can be fully left in the hands of architects and engineers, who will propose the most cost-effective solutions through a detailed parametric design study that would allow the City to make sounder, life-cycle based investment decisions regarding its corporate emissions. Through such a study, the design team model a new facility to minimize total costs of ownership for several building system options, and land on a few recommended solutions, from which the City can select the best.

A parametric design study is estimated to increase design costs by 3 to 4%. Construction cost increases could not be estimated at this very early stage.

While a Tier 2 performance target might be achievable by the building designer without a parametric study, the uncertainty in design parameters and options will likely be transferred into higher construction costs at the next stage. If the City is not ready to build to NZE or NZE-ready (Tier 4) and still want to make progress in its corporate GHG reduction goals, the best value that is proposed consist in the following:

- **set a Tier 2 performance design construction requirement as a minimum; and**
- **conduct and budget for a parametric study with lifecycle costing at the design phase.** The study would include four design and construction scenarios:
    - Tier 1 (business-as usual reference scenario);
    - **Tier 2;**
    - **Tier 4 (NZE-ready);**
    - **NZE (Tier 4 with RE systems installed)**.

With that information, the City will be able to make an informed decision about building a Tier 2, Tier 4 or NZE facility.

Other Alberta Municipalities

See the *Energy and GHG Performance Guidance of New Constructions Additional Context* appendix.

Business-as-Usual Risks

Since approximately 2017 and especially with the US Inflation Reduction Act (IRA) introduced in 2022, the heating, ventilation and air conditioning (HVAC) and sustainable building industry is seeing a massive transformation. Investments in cleaner buildings and energy options are rapidly advancing. By continuing to rely on the NECB Tier 1 and install soon-to-be outdated heating, cooling and control solutions, the City puts itself at risk of not being able to service those systems in as little as 15 years, since little investment is anymore made by HVAC manufacturers in standard GHG-emitting systems. While those systems can be installed for cheap in the short term, they will come with high operational, maintenance and replacement costs in the future. Building and system retrofits with

prohibitive costs will be needed as soon as those systems reach their life end in 12 to 20 years and will strain further the City finances in the mid-term.

NZE facilities are being designed today in Alberta, so it is not a concept that is out of reach. NZE designs require energy and GHG modeling to be a very early component of the development process. Once a building site, orientation and roof shape have been selected, there are several NZE design options that become unattainable.

Council Committee Routed Through:

This report was presented to the Community Infrastructure and Strategic Growth Standing Committee. Questions were raised as to how the % improvement and lifecycle costing is calculated, and additional information can be found in the attachment. Administration's recommendation to move to Tier 2 as a standard for new municipal builds was unanimously accepted. Parametric studies deemed warranted on a per project basis at Council's discretion was also unanimously accepted.

Administration Recommendation:

Administration recommends that Council:

1. approves the 25% (NECB Tier 2) energy consumption reduction standard for its larger (>600 m2) new municipal standard commercial and institutional constructions (classified as NBC (AE) Part 3 buildings) be used in the design of City structures moving forward (those that have already gone through the design stage would not be impacted); and
2. directs that a sustainable buildings policy be developed for Council approval.

Alternatives/Implications:

1. Council could choose to set a Tier 2 performance design minimum construction requirement and then at Council's discretion, depending on the project size and scope, conduct and budget for a parametric study with lifecycle costing at the design phase. The SW Recreation Centre does not currently have this included in the design budget. The study would provide great value when it comes to making progress on GHG reduction goals and minimize total costs of ownership on a very large public and long-term municipal structure.
2. Council could choose to set a 60% (NECB Tier 4) energy consumption reduction target. With this option the City **can** apply for FCM and federal funding for highly energy efficient buildings.
3. Council could choose to set a third-party certification requirement (e.g. LEED Gold or Platinum, Passive House or CaGBC Zero Carbon), with life cycle cost assessment determining the best option. This approach is valuable in the short term but will be costly for minimal extra value in the long term. It could be pursued for up to two building designs and then the City could decide which certification becomes required for future buildings, recognizing the City builds and owns serval types of buildings for varied purposes.

4. 1. Council could choose to not set a Tier minimum and continue with the current minimum Alberta building standard. GHG emissions will continue to grow, and this will not show Airdrie taking proactive steps in their environmental protection initiative.

Budget Implications:

Buildings already designed will incur additional costs if the design needs to be amended (it is not recommended the City go back to redesign).

Buildings not already designed, may incur additional costs, if sustainable factors were not requested prior to the pre-design stage.

Should Council request a parametric study for the SW Recreation Facility, a budget adjustment would be required for the additional costs.

Communications and Engagement:

N/A

Recommendation:

That Council:

1. approves the 25% (NECB Tier 2) energy consumption reduction standard for its larger (>600 m2) new municipal standard commercial and institutional constructions (classified as NBC (AE) Part 3 buildings) be used in the design of City structures moving forward; and
2. directs Administration to develop a sustainable buildings policy for Council approval.

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Staff Presenter:	Monica Labait
External Presenter:	N/A
Department:	Community Infrastructure
Reviewed by:	Lorne Stevens
Attachments:	#1: Energy and GHG Performance Guidance of New Constructions Additional Context_v2.