

Opportunities and Challenges

Supporting construction to higher tiers of the energy code can help reduce energy use and greenhouse gas emissions from buildings. For example, building to Tier 2 of the 2020 NBC (AE) instead of Tier 1 would reduce energy use by an estimated 10 per cent for small buildings and houses less than 600 metres squared / m², at an estimated incremental capital cost of 0.1 to 1.05 per cent. Increasing to Tier 5 would reduce energy use by an estimated 70 per cent, at an estimated incremental capital cost of 15 to 25 per cent. Although capital costs may be higher, depending on design, there is a potential for cost savings over the lifetime of the building, as lower energy use may correspond to lower utility costs (more detailed cost impacts analysis can be found in the section below).

There are also opportunities to support economic development and diversification in Edmonton through improved energy efficiency in new construction. Actions that support energy efficiency in new and existing buildings, help grow the energy efficiency industry (manufacturing, consulting, technological advancements). There are also a number of benefits with energy efficient buildings, including improved performance in extreme hot and cold, improved thermal comfort, and improved indoor air quality.

As new construction becomes more energy efficient, energy labels provide a way to share information on a building's energy performance and allow the value of energy efficiency to be considered when making decisions about buying or renting a building. Energy labelling, in combination with other supporting measures, can promote energy efficiency upgrades in existing buildings as they improve to compete in a market that values energy efficiency (see February 27, 2024 Urban Planning Committee report UPE01755 Implementing Mandatory Energy Labelling for New Construction).

There are challenges associated with improving energy efficiency in new construction. Although energy efficient buildings may result in cost savings over the long term, they require a higher upfront capital cost. This could impact short-term affordability and discourage public support. Inconsistency in regional requirements could make Edmonton a less attractive market for building new homes and businesses, and could drive investment away from Edmonton. Finally, capacity constraints within the building industry and availability of new technologies could be barriers for accelerated implementation.

Although some builders may be well equipped to design and build more energy efficient buildings, other builders who may not yet have the technical expertise,

could need additional support. Not only will buildings need to be built differently, but related infrastructure may also need to be changed. For example, buildings may need to be serviced with 200 amps to support more electrification of buildings.

Aside from implementing more advanced energy performance tiers, the City could explore opportunities for regulating or providing incentives for fuel switching buildings and homes from natural gas to lower carbon heating sources. This is most applicable in areas where connection to a renewable district energy system may be possible (e.g. Blatchford). Analysis has shown that although fuel switching to electricity on its own can reduce greenhouse gas emissions as the electricity grid is decarbonized, it may be more costly due to the higher cost of electricity, compared to natural gas. Therefore, any actions to regulate or incentivize fuel switching should be paired with measures to reduce energy consumption, and/or provide additional electrical capacity (for example, by installing solar panels). This must also be balanced with increased load and capacity constraints of electrical utility infrastructure.

Cost Impacts

Table A3-1 shows the estimated capital cost impacts of each energy performance tier for new houses. Incremental capital costs are shown from a Building Industry & Land Development Association of Alberta (BILD Alberta) report¹ as well as internal City analysis. Administration also conducted a lifecycle cost assessment to understand the long term cost impacts of higher energy performance tiers. There are multiple ways for builders to meet the energy performance tier requirements. Although improved energy efficiency may result in lower lifecycle costs in some cases, the solutions with the lowest capital cost, might not result in lifecycle cost savings, due to the higher cost of electricity compared to natural gas. Education and energy labeling could help homeowners to advocate for, and choose, homes that are designed for lower lifecycle costs.

Table A3-1. Estimated Cost Impacts

Energy Performance Tier	Capital Cost Increase (%)		Capital Cost Increase for a new \$400,000 house (\$)*
	BILD Alberta	City of Edmonton	
1	0% - 0.34%	0%	\$0 - \$1,360

¹ BILD Alberta. *Tiered Energy Code Roadmap*. 2022.

Attachment 4

2	0.35% - 1.05%	0.1%	\$400 - \$4,200
3	1.05% - 1.40%	2%	\$4,200 - \$8,000
4	7.0%	8.6%	\$28,000 - \$34,400
5	25%	15.5%	\$62,000 - \$100,000

*Estimated based on a \$400,000 house using the BILD Alberta and City of Edmonton estimated capital cost increase (%) as low/high ends of the range.

Table A3-2 shows the estimated greenhouse gas reductions of each energy performance tier for new houses relative to a reference building. The results are based on internal City analysis. Houses and buildings currently make up roughly 30 per cent of the City's community greenhouse gas inventory, or approximately six million tonnes of carbon dioxide equivalent (CO₂e) per year. Note that it is estimated that Tier 2 can be achieved for the same cost as Tier 1 with the addition of an energy model, this does not represent any additional greenhouse gas savings.

Table A3-2. Estimated Greenhouse Gas Impacts for Houses

Energy Performance Tier	Greenhouse Gas Reduction (%)	Annual Greenhouse Gas Reduction per House (tonnes CO ₂ e)	Annual Community Greenhouse Gas Reduction* (tonnes CO ₂ e)
2	—	—	—
3	12	0.8	6,000
4	40	2.6	21,000
5	55	3.6	29,000

*Relative to a new house built to Tier 1 and based on an estimated 8,000 new homes built in Edmonton per year. The analysis uses forecasted electricity grid emission factors from 2026-2030.