



Performance Path Study

Summary of Edmonton Part 9 Performance
Path Building permit submissions

Edmonton, AB – Climate zone 7a

June 4, 2026

PREFACE – DATA CONTEXT FOR EDMONTON

This report is based on 2024 residential building permit data submitted to the City of Edmonton. The dataset includes information derived from energy compliance documentation, mechanical schedules, and design-stage energy modeling, which were used to demonstrate compliance with Section 9.36 of the Alberta Building Code.

It is important to note that this dataset:

- Reflects design-intent performance based on submitted documentation rather than verified post-construction testing.
- Represents new housing projects for which detailed energy modeling or performance documentation was required as part of the permitting process.
- Provides a snapshot of building permit data of typical building envelope characteristics and equipment efficiencies for Edmonton’s 2024 new residential sector.

While not based on field-verified results, the permit data offers a credible and conservative representation of the energy performance built into Edmonton’s residential designs under current minimum Tier compliance pathways.

SINGLE DETACHED HOUSES

Energy Performance / Breakdown of Energy Tier

Below is a summary of energy performance and a breakdown of the energy tier of single detached houses, with a sample size of 116.

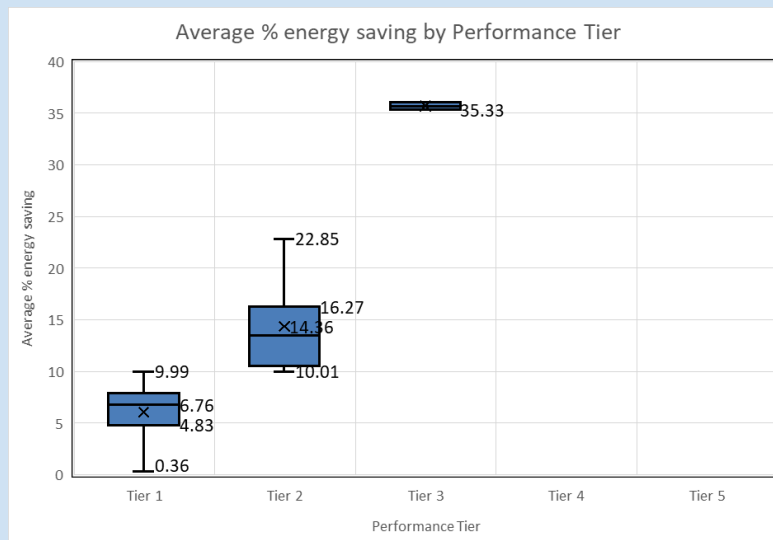
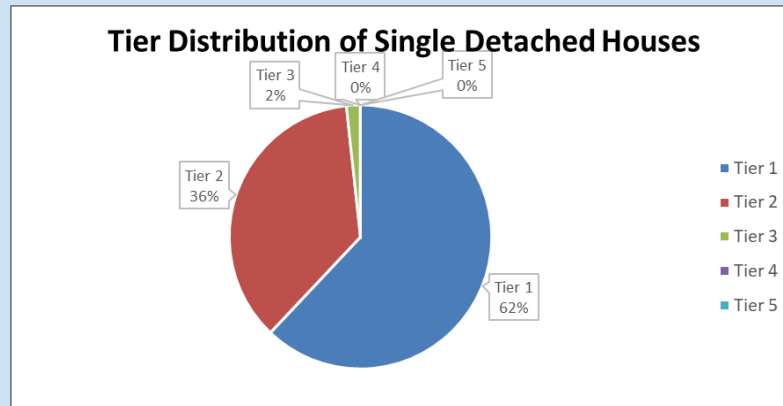


Figure 1 - City of Edmonton Part 9 Single Detached homes Energy Performance Tier summary

Commentary on Energy Performance Trends

- Tier distribution shows that most homes (62%) fall within the minimum Tier 1, code-level energy compliance.
- Higher tiers (2–5) together represent 38%, showing increasing adoption of enhanced energy-efficiency measures.

- A breakdown of the design of the buildings for each Tier follows to understand the typical makeup of energy savings.
- The two tier 3 homes included combination heat and hot water system (CSA P.11 combi systems). These appear to get very favorable ratings because the reference house efficiency is poor, i.e., these may not be that much more efficient, but the improvement is better as the baseline is worse.

Building Envelope

Below is a summary of the significant building envelope characteristics.

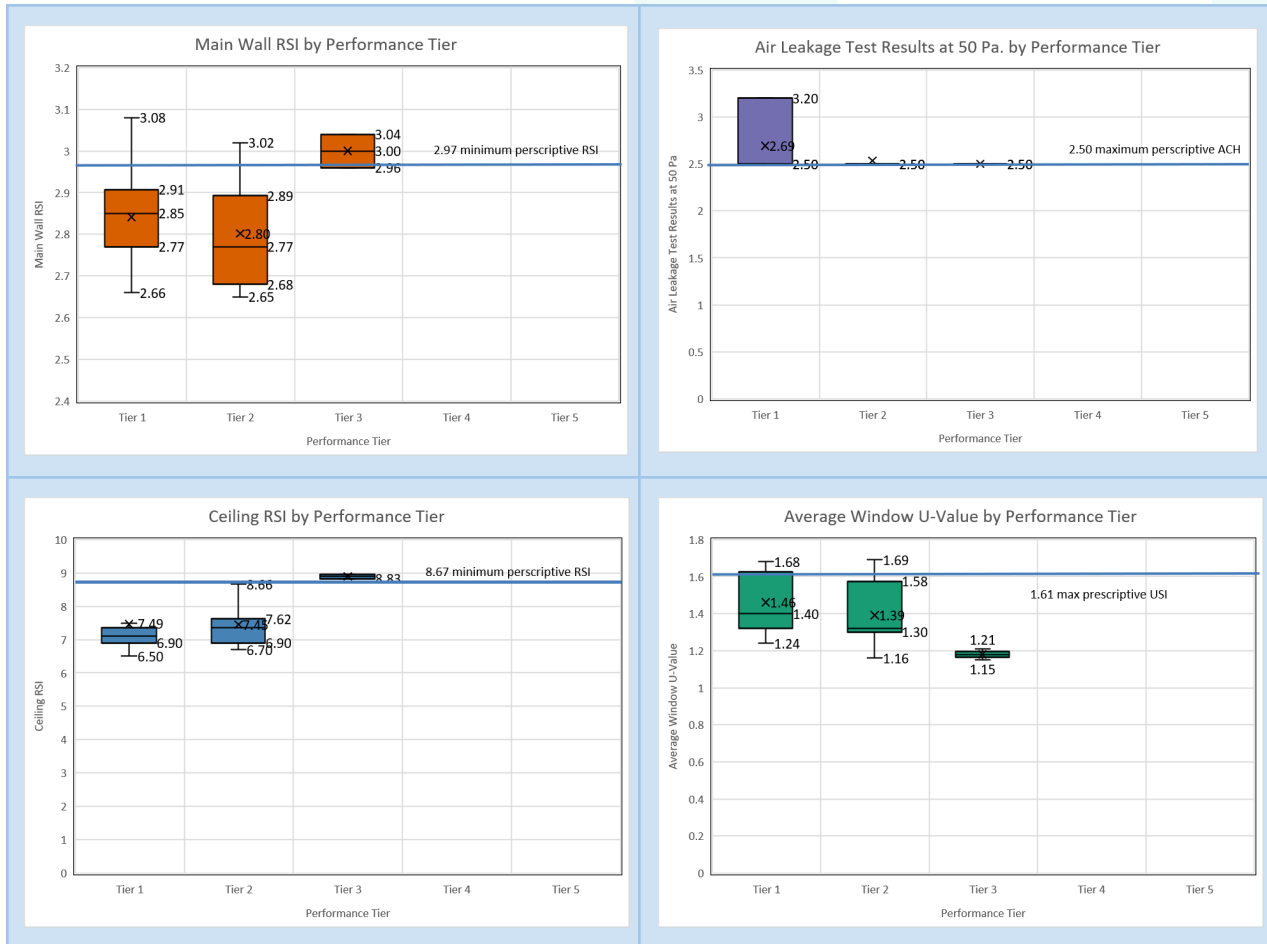


Figure 2 - Building envelope major components by performance tier

Commentary on Building Envelope

- Wall insulation levels are consistently below prescriptive code minimum.** This means the envelope performance is being made up in other upgrades like windows. There is not a clear pattern in the changing above grade wall insulation values moving up the performance tiers. This could be a result of how the data is sorted into the tiers - i.e., some better performing houses do not have better envelopes.
- Airtightness levels remain similar** across tiers ($ACH@50Pa \approx 2.5$), reflecting builders using code minimums for permit compliance. The results reported here are *not* tested values. This suggests the builders either do not know their typical test results, or are not willing to arrange testing.

- **Window performance is consistently better than the minimum prescriptive code.** This is the only case where the envelope is better than the minimum prescriptive requirement.
- **Ceiling Insulation improves with increased tiers.** While the insulation improves with tiers it falls short of the minimum prescriptive value until tier 3.
- **Overall** the envelope reflects designs that may be more cost effective and/or simpler to implement, i.e., ceiling insulation is generally lowest cost, and window upgrades do not require major redesign of the wall system. Wall upgrades represent larger investment in both cost and time and are therefore less represented. The use of HRV's is allowing for walls with less insulation than the prescriptive minimum.

HVAC and DHW Systems

Below is a summary of the significant building HVAC and DHW characteristics:



Mechanical commentary

- Heating systems maintain consistently high efficiency (~95–96%)** across all tiers, indicating widespread adoption of condensing furnaces or equivalent high-performance systems. Hybrid heating systems (NG + ASHP) and all electric systems were not present in the dataset. Combination heat and hot water systems (CSA P.11) were found most in higher tiers but the performance values are reported differently to other heating sources. These systems appear to get favorable treatment for space heating compared to the reference house.
- Heat recovery performance improved** from 58% in Tier 1 to 74% in Tier 3, demonstrating greater deployment of efficient HRVs/ERVs in higher tier homes.

- **Domestic hot water systems show rising energy factors** from a median of ~0.77 in Tier 1. There is a clear trend here, with the EF value increasing with tiers. Combi systems (CSA P.11) are not well reflected here, as the performance is reported differently. These systems are NOT treated favorably compared to the reference house.
- **System type variety**, within water heating there is the greatest variety of heating equipment options.
- **Overall the mechanical systems** - especially HRVs and service water heaters are making up much of the energy reductions.

ROW HOUSES

Energy Performance / Breakdown of Energy Tier

Below is a summary of energy performance and a breakdown of the energy tier of row houses with a sample size of 387:

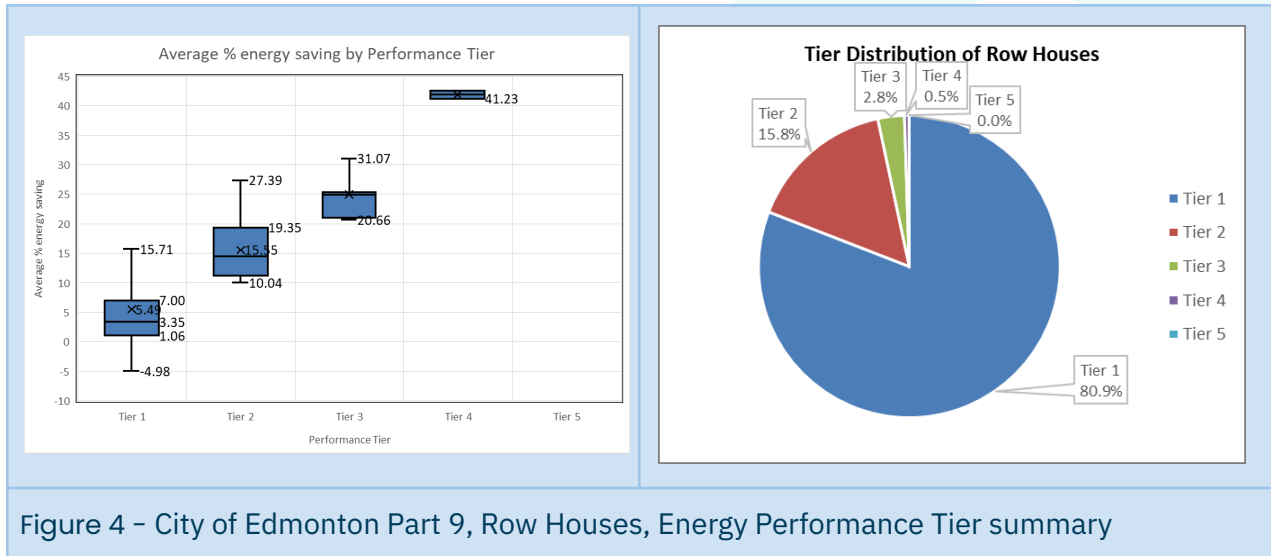


Figure 4 - City of Edmonton Part 9, Row Houses, Energy Performance Tier summary

Commentary on Energy Performance Trends

- The majority of sampled row houses achieve Tier 1 (81%). This was also the largest sample size.
- A small proportion of row houses achieve Tier 2 (16%) and Tier 3 (approximately 3%), and Tier 4 achieved by two dwellings (0.5%). This indicates that advanced energy performance is possible for row houses, but is rarely pursued under current market and cost conditions.
- The compact form and reduced exposed envelope area of row houses may contribute to lower absolute energy use and operating emissions on a per-unit basis compared to larger residential building types.

Building Envelope

Below is a summary of the significant building envelope characteristics:



Figure 5 - Building envelope major components by performance tier

Commentary on Building Envelope

- Exterior wall insulation is relatively consistent across tiers 1, 2, and 3. All are at or below the minimum prescriptive value. Generally these walls are better than insulation values for single family homes. There is significant improvement in the only units at tier 4.
- Airtightness performance is relying on code minimum for compliance. This applied even to the tier 4 units.
- Roof insulation for the first 3 tiers is similar. Only at tier 4 is there a significant improvement.
- Window thermal performance remains the most consistent improvement at higher performance tiers, and always better than code minimum.

- Overall, the envelope data indicate a design approach focused on consistent baseline compliance, with limited differentiation between tiers.

HVAC and DHW Systems

Below is a summary of the significant building HVAC and DHW characteristics:



Figure 6 - HVAC and DHW summary

Mechanical Commentary

- **Heating systems** exhibit consistently high efficiency across all performance tiers, with median values clustered at **95%**. The row houses are the only example where ASHP are applied to space heating. This is especially notable for the tier 4 units.
- **HRV/ERV effectiveness** shows a trend to higher performance, however many of these units were built without HRV's. This is significantly different to single detached homes where HRV's were always applied.
- **Domestic hot water (DHW) systems** demonstrate moderate to moderately high performance, with median energy factors around **0.75–0.80**. Tier 3 projects show slightly higher and more consistent DHW performance. The tier 4 units are using HP-DHW heaters, adding to the overall performance improvement.
- **Overall system selection trends** indicate a continued predominance of conventional and sealed direct-vent DHW and space-heating systems, with uptake of advanced technologies such as heat-pump-based or fully integrated high-performance systems only at tier 4.

SEMI-DETACHED HOUSES

Energy Performance / Breakdown of Energy Tier

Below is a summary of energy performance and a breakdown of the energy tier of houses, with a sample size of 216 entries:

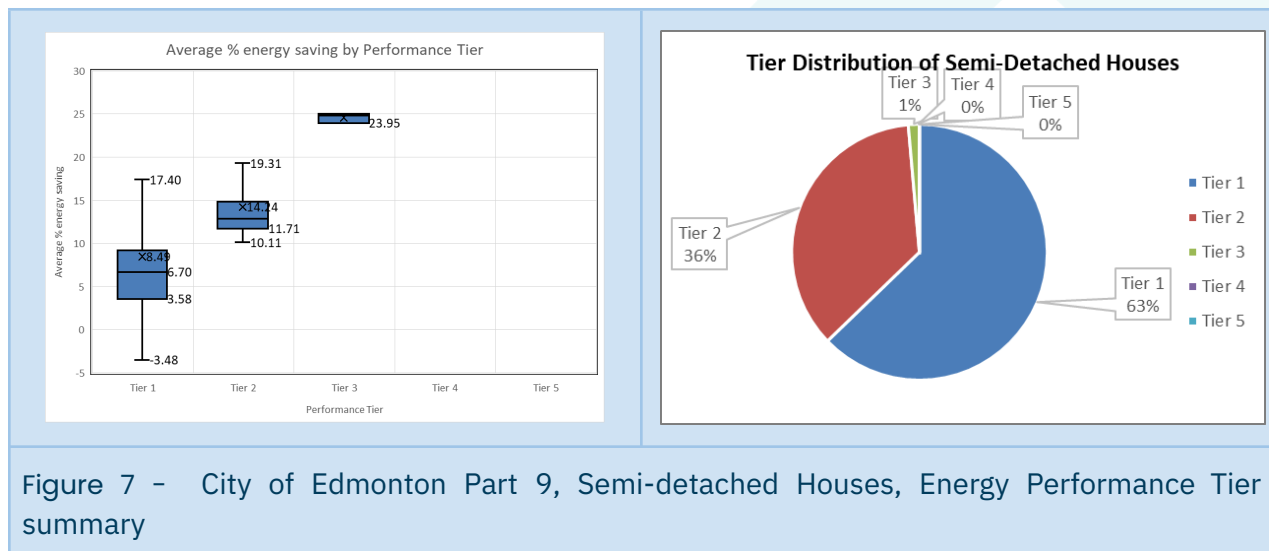


Figure 7 - City of Edmonton Part 9, Semi-detached Houses, Energy Performance Tier summary

Commentary on Energy Performance Trends

- The majority of semi-detached homes achieve Tier 1 (63%), indicating broad and consistent compliance with baseline energy code requirements across the housing stock.
- A meaningful subset of projects achieves Tier 2 (36%), demonstrating that incremental performance improvements beyond minimum compliance are being realized within this building typology.
- Overall, the distribution reflects consistent construction practices with emerging examples of enhanced envelope and system performance, providing a foundation for future improvement toward higher energy tiers.

Building Envelope

Below is a summary of the significant building envelope characteristics:

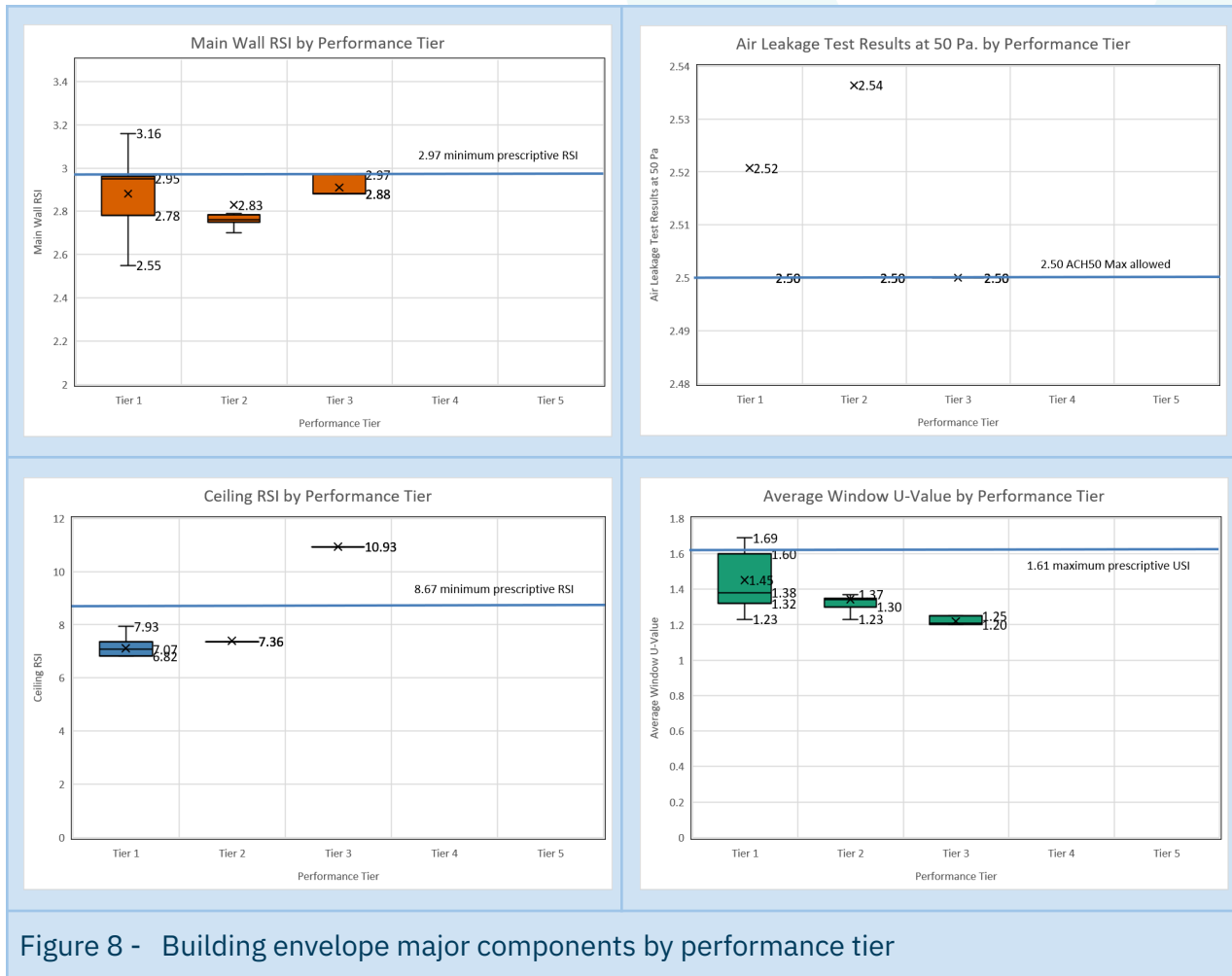


Figure 8 - Building envelope major components by performance tier

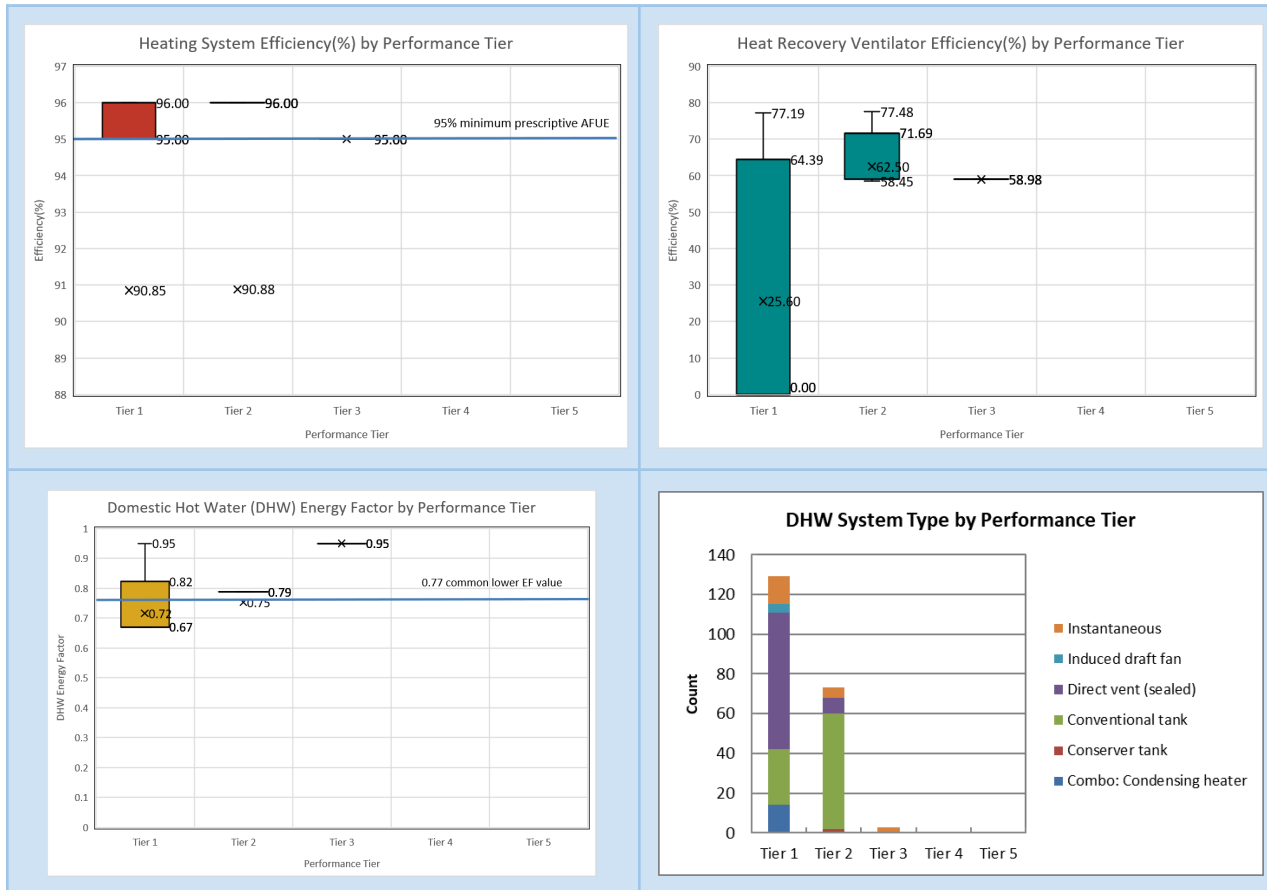
Commentary on Building Envelope

- Exterior wall insulation** is generally consistent across performance tiers, with moderate effective RSI values below baseline 9.36 compliance. While higher-tier projects show marginal improvements, overall variation is limited, indicating that wall assemblies are primarily designed to meet minimum requirements rather than to drive higher-tier performance.
- Airtightness performance** is uniform across all tiers, with air leakage results clustered at similar levels. Again reflecting a lack of blower door tests being used for code compliance.
- Roof insulation** is below prescriptive minimums for tiers 1 and 2. The tier 3 results are approximately 30% better, it suggests this was an important step at tier 3.

- **Window thermal performance** is consistently better than code minimum. Similar to other housing types, the performance steadily improves moving up the tiers, suggesting this is a central part of the design strategy.
- Overall, the envelope results reflect a design approach focused on **consistent baseline compliance**, with incremental improvements in roof and window performance at higher tiers. Airtightness and wall insulation remain largely uniform, highlighting opportunities for enhanced envelope strategies to support higher energy performance outcomes.

HVAC and DHW Systems

Below is a summary of the significant building HVAC and DHW characteristics:



There were no heat pumps adopted in this category

Figure 9 - HVAC and DHW summary

Mechanical Commentary

- Heating system efficiency is consistently high across all performance tiers, with median values clustered in the mid- to high-90% range. This reflects widespread use of modern high-efficiency and condensing heating equipment.
- Heat recovery ventilation (HRV) efficiency shows moderate increase in performance across tiers. Similar to row houses, and unlike single family homes, some units are being built with no HRV.
- Domestic hot water (DHW) system performance improves with energy tier. This suggests that for smaller semi-detached homes, the DHW make up a larger portion of the overall energy use, and is an effective strategy for improving performance. The mix of equipment is quite varied.

- Overall mechanical system trends indicate that efficiency gains between tiers are incremental rather than transformative. Heating efficiency is already near practical limits, while ventilation and DHW systems present the greatest opportunity for further performance improvement through adoption of higher-efficiency equipment and integrated system strategies.

