

Caledon GDS Case Study - Townhouse, End Unit		3-Storey Townhouse (End Unit) in North York			
Created on:	2023-12-06				
<div style="display: flex; justify-content: space-between;"> <span style="color: green;">■</span> Upgrades against NBC 2015 <th>NBC 2015 - Reference</th> <th>GDS 2024 - NBC Tier 3, Dual Fuel</th> <th>GDS 2027 - NBC Tier 4, Dual Fuel</th> <th>GDS 2030 - NBC Tier 4, Full Electric</th> </div>		NBC 2015 - Reference	GDS 2024 - NBC Tier 3, Dual Fuel	GDS 2027 - NBC Tier 4, Dual Fuel	GDS 2030 - NBC Tier 4, Full Electric
<span style="color: red;">■</span> Downgrades against NBC 2015		NBC Climate Zone 5	20% Improvement	40% Improvement	40% Improvement
<b>BUILDING ENVELOPES <sup>1</sup></b>					
RSI 10.56 / R60 [Effective RSI 10.43 / R59.2]	Ceiling with Attic Space	Effective RSI 6.91 / R39.2	N/A	N/A	N/A
RSI 5.46 / R31 [Effective RSI 4.87 / R27.7]	Ceiling without Attic Space	Effective RSI 4.67 / R26.5	RSI 5.46 / R31 [Effective RSI 4.87 / R27.7]	RSI 5.46 / R31 [Effective RSI 4.87 / R27.7]	RSI 5.46 / R31 [Effective RSI 4.87 / R27.7]
RSI 5.46 / R31 [Effective RSI 5.25 / R29.8]	Exposed Floor	Effective RSI 4.67 / R26.5	RSI 5.46 / R31 [Effective RSI 5.25 / R29.8]	RSI 5.46 / R31 [Effective RSI 5.25 / R29.8]	RSI 5.46 / R31 [Effective RSI 5.25 / R29.8]
RSI 3.87 / R22 [Effective RSI 3.00 / R17.0]	Above Grade Walls	Effective RSI 2.97 / R16.9	RSI 3.87 / R22 [Effective RSI 3.08 / R17.5]	<b>R24 + R5 C.I.</b> [Effective RSI 3.99/ R22.7]	<b>R24 + R5 C.I.</b> [Effective RSI 3.99/ R22.7]
RSI 3.52 / R20 [Effective RSI 3.72 / R21.1]	Basement Walls Below Grade (B.G.)	Effective RSI 2.98 / R16.9	RSI 3.52 / R20 [Effective RSI 3.72 / R21.1]	RSI 3.52 / R20 [Effective RSI 3.72 / R21.1]	RSI 3.52 / R20 [Effective RSI 3.72 / R21.1]
-	Below Grade Slab Entire Surface > 600 mm B.G.	-	-	-	-
RSI 1.76 / R10 [Effective RSI 1.96 / R11.1]	Heated Slab On Ground	Effective RSI 2.32 / R13.2	N/A	N/A	N/A
	Slab ≤ 600 mm Below Grade	Effective RSI 1.96 / R11.1	N/A	N/A	N/A
	Edge of Below Grade Slab ≤ 600 mm B.G.				
<b>WINDOWS &amp; DOORS (Window to Wall Ratio = 13.0%)</b>					
U <sub>ip</sub> 0.29 (U <sub>si</sub> 1.6) / ER 25 (SHGC-0.26)	Windows/Sliding Glass Doors	U <sub>ip</sub> 0.32 (U <sub>si</sub> 1.8) / ER 21 (SHGC-0.26)	Energy Star Zone 2 Windows: U <sub>ip</sub> 0.25 (U <sub>si</sub> 1.4) / ER 29 (SHGC-0.26)	Energy Star Zone 3 Windows: U <sub>ip</sub> 0.21 (U <sub>si</sub> 1.2) / ER 34 (SHGC-0.26)	Energy Star Zone 3 Windows: U <sub>ip</sub> 0.21 (U <sub>si</sub> 1.2) / ER 34 (SHGC-0.26)
U <sub>ip</sub> 0.50 (U <sub>si</sub> 2.8)	Skylights	U <sub>ip</sub> 0.51 (U <sub>si</sub> 2.9)	N/A	N/A	N/A
As Per OBC (RSI 0.70 / R3.97)	Doors (1 Door can be non-ENERGY STAR Certified)	As Per NBC (RSI 1.10 / R6.25)	Steel Polystyrene (RSI 0.98 / R5.56)	Steel Polystyrene (RSI 0.98 / R5.56)	Steel Polystyrene (RSI 0.98 / R5.56)
<b>MECHANICALS</b>					
96% AFUE	Space Heating Equipment	92% AFUE	ASHP (8.2 HSPF <sub>iv</sub> , 14 SEER)	ASHP (8.2 HSPF <sub>iv</sub> , 14 SEER)	ASHP (8.2 HSPF <sub>iv</sub> , 14 SEER) w/ Electric Backup
13 SEER	Space Cooling Equipment	14.5 SEER	w/ 96% AFUE Furnace Backup	w/ 96% AFUE Furnace Backup	w/ 96% AFUE Furnace Backup
75% SRE	HRV/ERV Efficiency	60% SRE	75% SRE	75% SRE	75% SRE
0.80 EF	Domestic HWH (Thermal Eff. Or EF)	0.67 EF	Electric Conventional Tank 0.82 EF	Hybrid Heat Pump Water Heater (3.0 EF)	Hybrid Heat Pump Water Heater (3.0 EF)
N/A	Combined Space and Water	N/A	N/A	N/A	N/A
As Per OBC	Fireplace	As Per NBC	As Per OBC	As Per OBC	As Per NBC
As Per OBC	Duct Work	As Per NBC	As Per OBC	As Per OBC	As Per NBC
Programmable	Thermostat	Programmable	Programmable	Programmable	Programmable
<b>ELECTRICAL</b>					
As Per OBC	Lighting (1 Bulb can be non-ENERGY STAR Certified)	As Per NBC	As Per OBC <sup>2</sup>	As Per OBC	As Per OBC
As Per OBC	Exhaust Fans	As Per NBC	As Per OBC	As Per OBC	As Per OBC
As Per OBC	Electrical Savings	As Per NBC	As Per OBC	As Per OBC	As Per OBC
<b>OTHER</b>					
42% Efficiency — 2 showers	Drain Water Heat Recovery	N/A	N/A	N/A	N/A
3.0 ACH - Detached ; 3.5 - Attached	Air Tightness Target (ACH@50Pa)	2.5 ACH	Assumed 2.5 ACH <sup>3</sup>	Assumed 2.5 ACH	Assumed 2.5 ACH

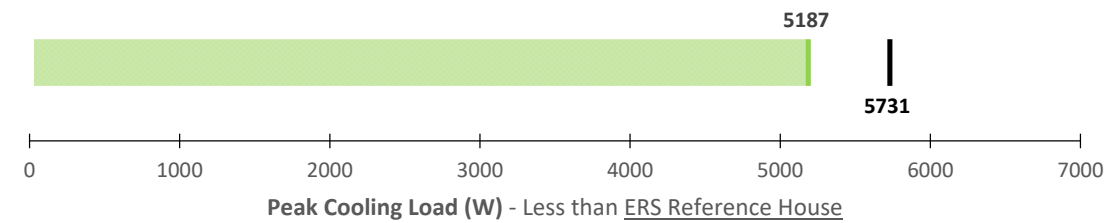
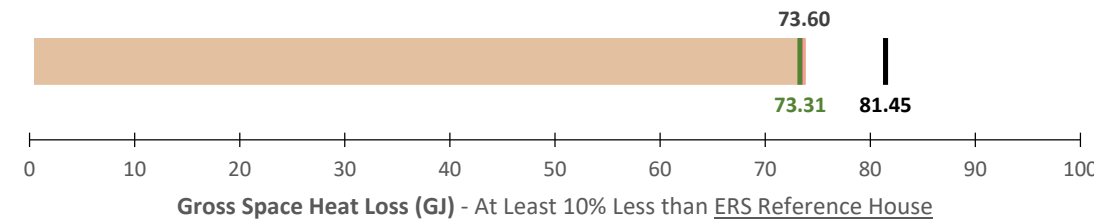
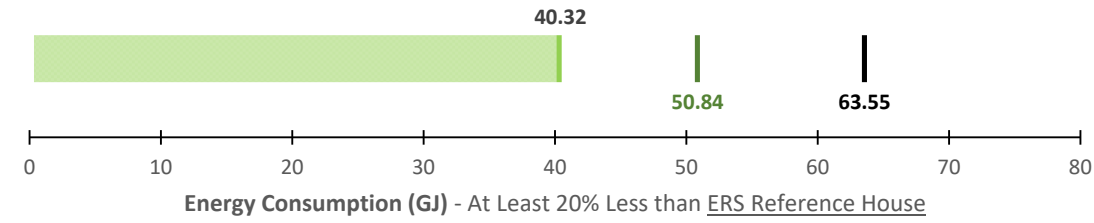
Results For NBC Compliance	NBC Compliance Requirement		GDS 2024 - NBC Tier 3, Dual Fuel		Not Compliant (X)	GDS 2027 - NBC Tier 4, Dual Fuel		Compliant (✓)	GDS 2030 - NBC Tier 4, Full Electric		Compliant (✓)
	Tier 3	Tier 4	Reference <sup>4</sup>	Proposed		Reference <sup>4</sup>	Proposed		Reference <sup>4</sup>	Proposed	
Energy Consumption (GJ)	≥ 20%	≥ 40%	63.55	40.32	36.6% ✓	63.55	28.09	55.8% ✓	60.93	27.83	54.3% ✓
Gross Space Heat Loss (GJ)	≥ 10%	≥ 20%	81.45	73.60	9.6% X	81.45	65.00	20.2% ✓	81.42	65.00	20.2% ✓
Peak Cooling Load (W)	Lower Than Reference House		5731	5187	Pass ✓	5731	5076	Pass ✓	5731	5076	Pass ✓
Fuel Consumption - Natural Gas (m <sup>3</sup> /year)	-	-	1144.6	265.0	-	1144.6	209.0	-	0.0	0.0	-
Fuel Consumption - Propane (L/year)	-	-	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
Fuel Consumption - Electricity (kWh/year)	-	-	12924.5	15576.0	-	12924.5	12756.0	-	24042.8	14849.0	-
GHG Emissions (kgCO <sub>2</sub> eq/year) <sup>5</sup>	-	-	2.6	1.0	62.3%	2.6	0.8	69.7%	0.7	0.4	38.2%

OR

Results For Energy Star v17.1 Revision 2 Performance Compliance	GDS 2024 - Energy Star v17.1 Rev. 2		Compliant (✓)	
	Reference <sup>6</sup>	Proposed		
Energy Consumption (GJ)	At least 15.0% lower than Reference <sup>6</sup>	89.24	66.25	25.8% ✓

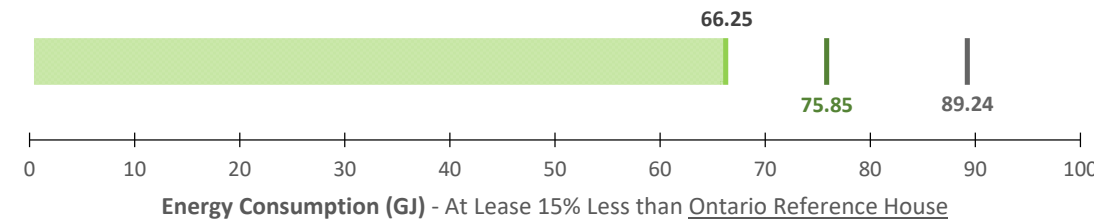
NOTES
<sup>1</sup> All GDS 2024, 2027 and 2030 building envelope meets or exceeds the minimum thermal resistance requirements of Energy Star v17.1 Revision 2.
<sup>2</sup> Minimum 75% ENERGY STAR Lighting Required for the Energy Star Compliance.
<sup>3</sup> For the purpose of calculating Energy Star Compliance, the Air Tightness Target for Detached is 2.5 ACH@50 Pa ; for Attached is 3.0 ACH@50 Pa
<sup>4</sup> EnerGuide Rating System (ERS) Reference House <sup>6</sup> Ontario Reference House
<sup>5</sup> GHG Emission Factors - Values obtained from the NRCan Emission Factors and Reference Values Website (Link) : Natural Gas = 1.921 kgCO <sub>2</sub> /m <sup>3</sup> Propane = 1.515 kgCO <sub>2</sub> /L Electricity = 0.030 kgCO <sub>2</sub> /kWh

### GDS 2024 - NBC Tier 3, Dual Fuel Compliance

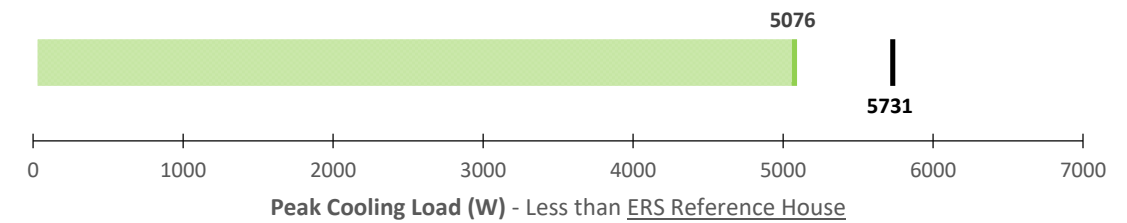
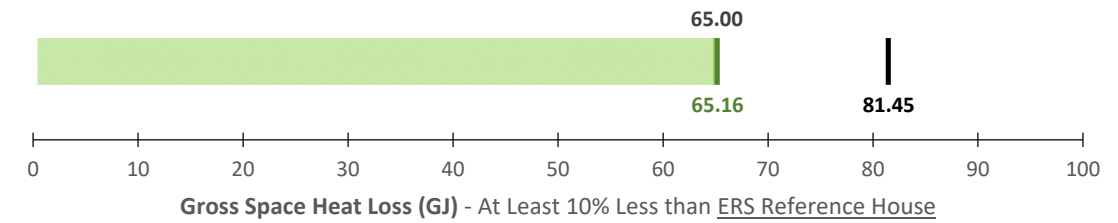
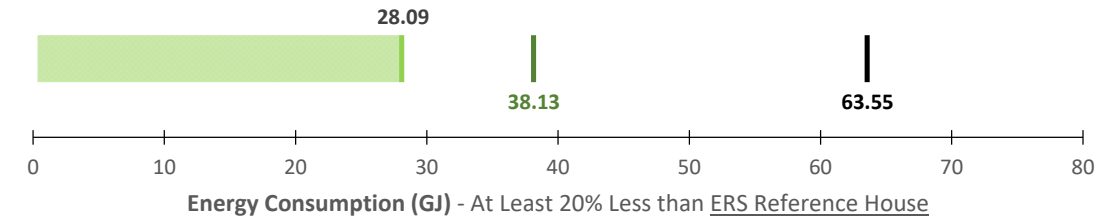


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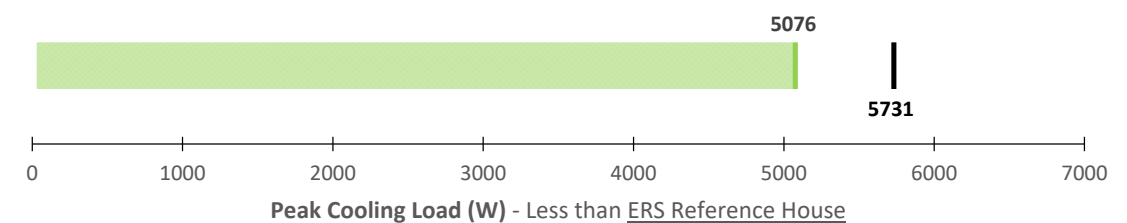
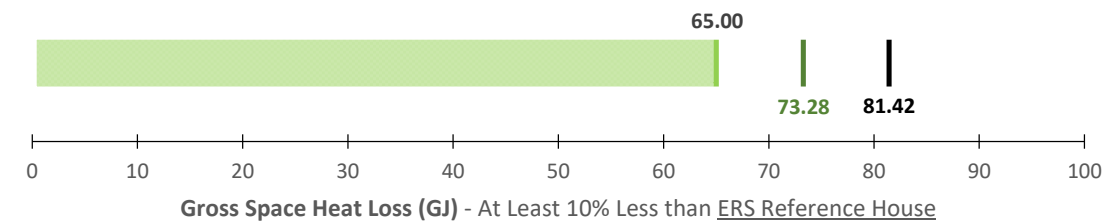
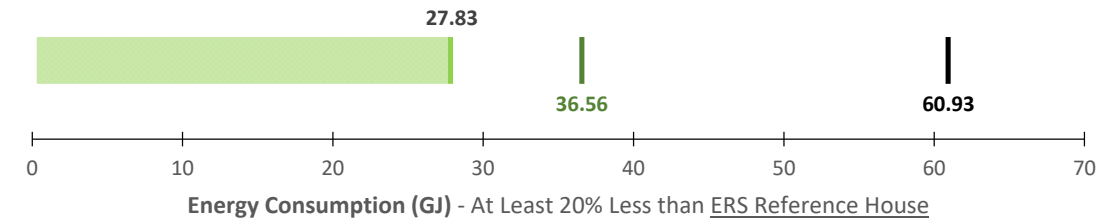
### GDS 2024 - Energy Star v17.1 Revision 2 Performance Compliance



### GDS 2027 - NBC Tier 4 (Dual Fuel) Compliance



### GDS 2030 - NBC Tier 4 (Full Electric) Compliance



- EnerGuide Rating System Reference House
- Ontario Reference House
- Compliance Target
- Proposed Design - Meet the Requirement
- Proposed Design - Does Not Meet the Requirement

\* All three categories (Energy Consumption, Gross Space Heat Loss, Peak Cooling Load) need to meet the requirement to be compliant for NBC Tier Compliance Path.