11 YORKVILLE AVENUE

Energy Performance Report for SPA Submission

MARCH 8, 2018
PROJECT #1703153

SUBMITTED TO

11 Yorkville Partners Inc.
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SUBMITTED BY

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EXECUTIVE SUMMARY

This report presents preliminary energy simulation results for the 11 Yorkville Avenue development, located at 11, 17, 19, 21 Yorkville Avenue, & 16, 18 Cumberland Street in Toronto, Ontario. The project's 55,000m^2 of gross floor area consists of residential, amenity, and retail spaces.

IES Virtual Environment 2017 was utilized to develop these results. Energy modelling and analysis is a tool used to help the design team to evaluate the relative performance implications of optional elements of the design. The purpose of energy modelling is not to predict actual built energy cost or energy consumption of the proposed design after construction. Instead, energy modelling is a decision facilitation tool used to evaluate the relative performance of energy conservation measures and facilitate design decisions that improve built energy performance. "Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this standard, changes in energy rates between design of the building and occupancy, and precision of the calculation tool." [ASHRAE 90.1 - 2004, 11.1.4 Informative Note]

In summary, the results of the model show a 1.5% Energy Use Reduction over the NECB 2015 as modified by SB-10 2017 reference building. Further, peak demands of the proposed building are lower than that of the reference building. As such, the project meets the Tier 1 performance measure GHG 1.1 of the Toronto Green Standard (TGS version 2.0 as updated January 2017).

RESULTS

The proposed design model ("Proposed Building") is based on documentation for Site Plan Control Application, including architectural drawings dated March 2018, and mechanical and electrical design briefs, dated February 2018. Inputs that could not be confirmed by the design team at this design stage were assumed to be equal to the OBC reference building requirements: NECB 2015 as modified by SB-10 2017.

In summary, the results of the model show a 1.5% energy use reduction over the NECB 2015 as modified by SB-10 2017 reference building ("OBC Reference"). A detailed breakdown of the results are provided on the next page.

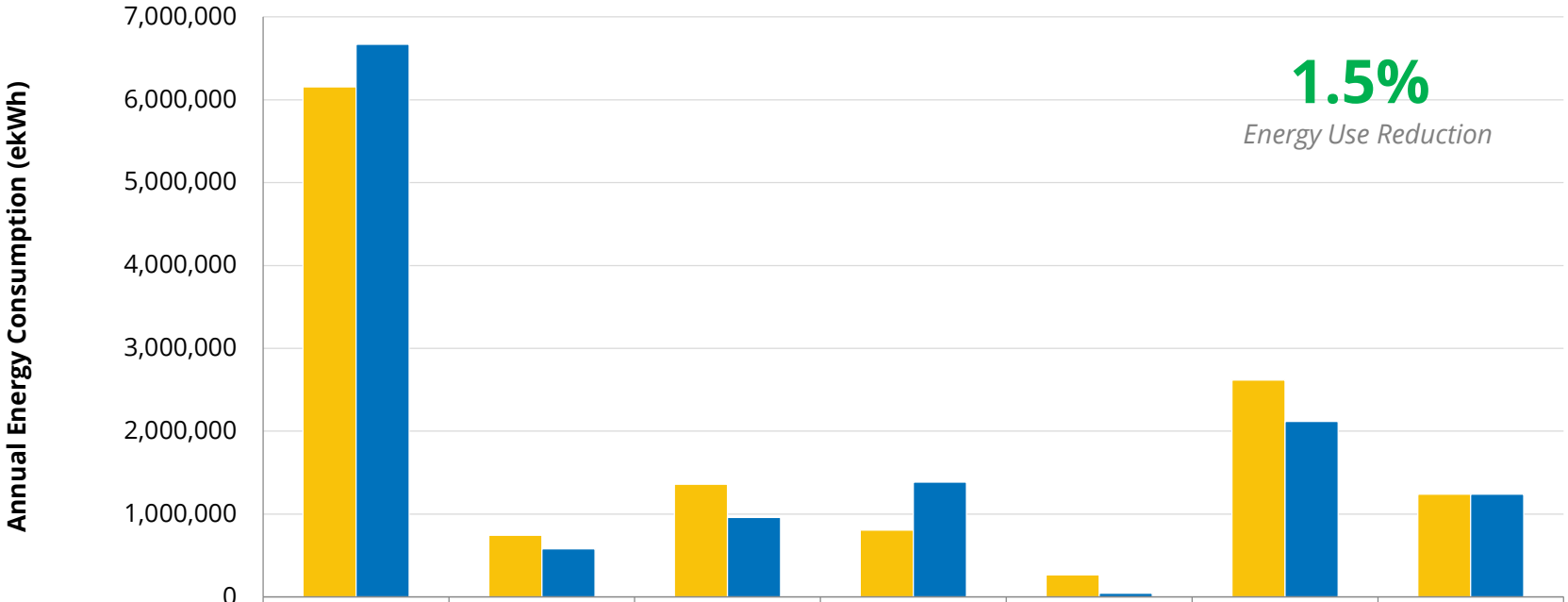
The energy savings for the building are primarily attributable to:

- Condensing boilers with a rated efficiency of 95%;
- Water-cooled magnetic bearing chiller with IPLV of 0.35;
- Condensing boiler with a rated efficiency of 95% for domestic hot water heater;
- VRF heating and cooling in amenity spaces;
- LED lighting throughout the building combined with occupancy sensors in non-residential and parking spaces;
- Low flow kitchen (5.7 LPM), and lavatory (5.7 LPM) fixtures; and
- VFDs on all pumps and AHU fans.

Key model inputs for both the Proposed and Reference models are also outlined on pages 6 and 7 of this report.

RESULTS (CONTINUED)

Total annual energy consumption (ekWh) for the Proposed Building and OBC Reference models are presented below:



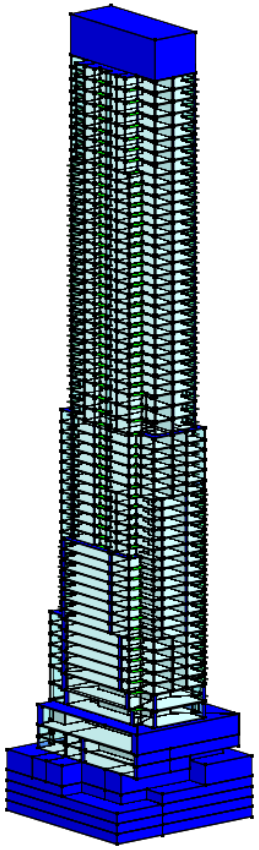
	Space Heating	Space Cooling	Interior Lighting	Fans	Pumps	Domestic Hot Water	Receptacle
OBC Reference	6,154,900	745,403	1,359,087	808,282	268,918	2,618,941	1,241,523
Proposed Building	6,669,601	580,420	958,038	1,384,332	46,604	2,117,062	1,241,522

It is important to note that the final reduction percentages and point threshold are subject to change in line with any alterations from the set of project documents and assumptions utilized to build this model. As such, it is important to review any changes that could affect energy usage with RWDI to gauge the impact of those changes on energy performance.

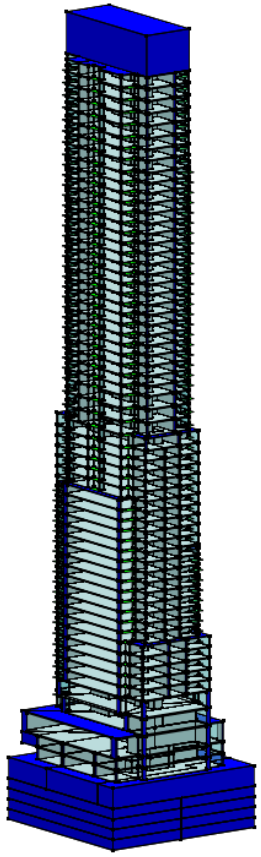
BUILDING ORIENTATION & GEOMETRY

The images below provide a visual representation of the key building massing, orientation, and geometry assumptions that have an effect on energy consumption and that were utilized to generate the current energy performance results. Please note that the façade colors are used to represent the project assemblies, not the intended architectural finish color.

South-West:



North-East:



KEY MODEL INPUTS

The below table provides an overview of the primary energy model inputs for the Proposed Building and for the NECB 2015 as modified by SB-10 2017 Reference Building.

Location	Toronto, Ontario (CWEC 2016 weather file)
Primary Space Types	Residential, Amenity, Retail, Parking
Residential Occupancy Schedule and Set Points	Occupied Mon-Fri in AM & PM, Sat-Sun all day Heating Set Point: 22°C, Set Back 18°C | Cooling Set Point 24°C, No Set Back
Non-Residential Occupancy Schedule and Set Points	Occupied Mon-Fri 8AM to 6PM, Sat 9AM to 5PM, Sun 10AM to 4PM Heating Set Point: 22°C, Set Back 18°C | Cooling Set Point 24°C, Set Back 26°C
Outdoor Air Rates	Residential: 47 L/s per Suite | Non-residential: Meet but do not exceed ASHRAE 62.1-2013

	Proposed Building	**OBC Reference Building** (NECB 2015 as modified by SB-10 2017)
General		
GFA | Number of Stories	55,000 m^2 (excluding parking) | 62 above grade, 5 below grade	
Schedules	Residential: NECB 2015 Schedule G | Non-Residential: NECB 2015 Schedule C | Parking: NECB 2015 Schedule K	
Envelope		
Typical Exterior Wall (RSI-value)	RSI-0.9 (R-6.3)	RSI-3.6 (R-20.4)
Typical Roof (RSI-value)	RSI-6.4 (R-36.4)	RSI-6.4 (R-36.4)
Gross Window to Wall Ratio	75%	40%
Glazing Performance	USI-1.9 (U-0.33) | SHGC 0.40	USI-1.9 (U-0.33) | SHGC 0.40
Infiltration Rate	0.25 L/s-m^2 of façade	0.25 l/s/m^2 of façade
Plant Level		
Space Heating Efficiency	Condensing boilers: 95%	Modulating boiler: 90%
Cooling Efficiency	Water-cooled magnetic bearing chiller: IPLV 0.35	Water-cooled centrifugal chiller: IPLV 0.52
DHW Efficiency	Condensing boiler: 95%	Modulating boiler: 90%
Space Level		
Equipment Load	5.6 W/m^2 (weighted average)	5.6 W/m^2 (weighted average)
Lighting Power Density	Residential: 5.0 W/m^2 | Non-Residential: 6.0 W/m^2 | Parking 1.05 W/m^2	Residential: 5.0 W/m^2 | Non-Residential: 6.7 W/m^2 | Parking 1.50 W/m^2
Lighting Controls	Per NECB 2015	Per NECB 2015
Fixture Flow Rates (LPM)	Lav: 5.7 LPM | Shower: 7.6 LPM | Kitchen: 5.7 LPM	Lav: 8.35 LPM | Shower: 7.6 LPM | Kitchen: 8.35 LPM

KEY MODEL INPUTS (CONTINUED)

	Proposed Building	OBC Reference Building (NECB 2015 as modified by SB-10 2017)
System Level – Residential		
HVAC Type	100% OA MUA with 4-pipe Fan Coil Units	100% OA MUA with 4-pipe Fan Coil Units
Airside Heat Recovery	None	None
Heating	Hydronic	Hydronic
Cooling	Hydronic	Hydronic
Fans	1 W/CFM MUA | 0.5 W/CFM Fan Coils	Per NECB 2015
System Level – Amenity		
HVAC Type	100% OA MUA with 4-pipe Fan Coil Units	NECB 2015 System 3 – Single-zone packaged rooftop unit with baseboard heating
Airside Heat Recovery	55% Sensible | 55% Latent	55% Sensible | 55% Latent
Heating	Hydronic	Hydronic
Cooling	Hydronic	Hydronic
Fans	1 W/CFM MUA | 0.5 W/CFM Fan Coils	Per NECB 2015
System Level – Retail		
HVAC Type	100% OA MUA with Air-Source Variable Refrigerant Flow (VRF)	NECB 2015 Packaged unitary rooftop heat pump
Airside Heat Recovery	55% Sensible | 55% Latent	55% Sensible | 55% Latent
Heating	VRF COP of 3.2 (seasonal)	Gas-fired furnace: 80%| Hydronic Baseboard
Cooling	VRF COP of 4.2 (seasonal)	DX Cooling
Fans	1 W/CFM MUA | 0.5 W/CFM Fan Coils	Per NECB 2015
System Level – Parking		
HVAC Type	Intermittent parking exhaust	Intermittent parking exhaust
Airside Heat Recovery	None	None
Heating	Unconditioned	Unconditioned
Cooling	Unconditioned	Unconditioned
Fans	6 kW, NECB 2015 Schedule K	6 kW, NECB 2015 Schedule K

REFERENCES

Modelling Documents

1. ANSI/ASHRAE Standard 90.1-2013
2. National Energy Code of Canada for Buildings 2015
3. ANSI/ASHRAE Standard 62.1-2010
4. IES Virtual Environment 2017
5. LEED Canada 2009 Supplementary Energy Modelling Guidelines (December 16, 2014 Update)
6. MMAH Supplementary Standard SB-01: Climatic and Seismic Data
7. MMAH Supplementary Standard SB-10: Energy Efficiency Requirements (December 22, 2016)

Design Documents

1. Architectural drawing set, issued for Site Plan Control Application, dated March 2018
2. Mechanical & Electrical Design Brief, dated February 2018

Appendix-A

Better Buildings Partnership - New Construction

Energy Modeling Report Summary

PROJECT INFORMATION

Project Address:	11 Yorkville Avenue	Date (dd/mm/yyyy):	March 8, 2018
SPA-Number:		Building Type:	Multi-Unit Residential
		Building Area:	55,000 m2 above grade
Energy Modeller Name:	Juan Sebastian Carrizo	Architect Name:	Caroline Richard, Alexei Guerra
Energy Modeller Telephone:	519.823.1311 x 2070	Architect Telephone:	416.971.6252
Energy Modeller E-Mail:	sebastian.carrizo@rwdi.com	Architect E-Mail:	caroline@sweenyandco.com
Modelling Software Used:	IES Virtual Environment 2017	Code Compliance Path:	NECB 2015 as modified by SB-10 2017

	Reference Building					Proposed Building					Energy Savings			
Energy End Use	Electrical Annual Consumption (kWh)	Natural Gas Annual Consumption (kWh)	Energy Use Intensity (kWh/m2/year)	Peak Demand Summer (kW)	Peak Demand Winter (kW)	Electrical Annual Consumption (kWh)	Natural Gas Annual Consumption (kWh)	Energy Use Intensity (kWh/m2/year)	Peak Demand Summer (kW)	Peak Demand Winter (kW)	Peak Demand Summer (% reduction)	Peak Demand Winter (% reduction)	Annual Consumption (ekWh saved)	Energy Efficiency Above Base Case (% reduction)
Lights	1,359,087	0	24.7			958,038	0	17.4						
Misc. Equipment	1,241,523	0	22.5			1,241,522	0	22.5						
Space Heating	150,178	6,004,722	111.8			135,753	6,533,849	121.1						
Space Cooling	745,403	0	13.5	1,328	1009	580,420	0	10.5	1,269	946				
Pumps	268,918	0	4.9			46,604	0	0.8						
Fans	808,282	0	14.7			1,384,332	0	25.1						
Service Hot Water	0	2,618,941	47.6			0	2,117,062	38.4						
Totals	**4,573,391**	**8,623,663**	**239.7**			**4,346,667**	**8,650,911**	**236.0**			**4.5%**	**6.3%**	**199,476**	**1.5%**

I herby certify that the energy demand and consumption are properly representative of the energy modelling report submitted for the above project.

Energy Modeler Name:	Juan Sebastian Carrizo
	Energy Consultant
Company:	RWDI Consulting Engineers
Signature:	

Appendix-B

Better Buildings Partnership - New Construction

Energy Modeling Report Template

Date:
March 8, 2018

Submission Overview:

The proposed design model for the project is based on architectural drawings, dated January 2018, and mechanical and electrical design briefs, dated February 2018. Inputs that could not be verified by the design team at this early design stage were assumed to be the same as the NECB 2015 Chapter 8 as modified by SB-10 2017 reference building. The results of the current model show a 1.5% Energy Use Reduction over the NECB 2015 as modified by SB-10 2017 reference building. Further, peak demands of the proposed building are lower than that of the reference building.

Project Description:

The project's 55,000m2 of gross floor area consists of residential, amenity, and retail spaces, plus 4 levels of below-grade parking (9,000 m2).

Project's key energy conserving / efficiency measures proposed

Passive Design Measures:

SHGC optimized to balance reduction of heating demand with avoidance of excessive summer heat gains

Envelope Measures:

High performance glazing complete with thermally broken Al frame

Lighting Measures:

LED lighting throughout the building combined with occupancy sensors in most non-residential and parking spaces

Mechanical and Electrical Measures:

Condensing boilers for space heating and DHW with a rated efficiency of 95%, water-cooled magnetic bearing chiller with IPLV of 0.35, VFDs on all pumps and AHU fans, low flow shower and lavatory fixtures, and air-source variable refrigerant flow in retail spaces.

Provide a complete summary of energy simulation inputs and assumptions, referencing the relevant plans, drawings or reports.

Design Parameters Description / Name	Proposed Building	Reference the relevant plans, drawings or reports
Schedules:	Residential: NECB 2015 Schedule G; Non-res: NECB 2015 Schedule C; Parking: NECB 2015 Schedule K	Architectural drawings, dated March 2018; mechanical and electrical design briefs, dated February 2018
Space Use Classification:	Residential, Amenity, Retail, Parking	
Conditioned Floor Area:	55,000 m2	
Total Floor Area:	63,800 m2	
Window-Wall Ratio		
Gross Wall Area (ft^2 or m^2):	29,100 m2 above grade	
South Fenestration Area: 71.0% / East Fenestration Area: 75.3% / West Fenestration Area: 75.8% / North Fenestration Area: 77.6%		
Window Wall Ratio:	75.0%	
Skylight-Roof Ratio		
Gross Roof Area (ft^2 or m^2):	2,500 m2	
Skylight Area (ft^2 or m^2):	0 m2	
South Fenestration Area (ft^2 or m^2): 0% / East Fenestration Area (ft^2 or m^2): 0% / West Fenestration Area (ft^2 or m^2): 0% / North Fenestration Area (ft^2 or m^2): 0%		
Skylight-Roof Ratio:	0%	

Passive Design Strategies/Elements:	
SHGC optimized to balance reduction of heating demand with avoidance of excessive summer heat gains	

	Design Parameters Description / Name	Reference Building	Proposed Building	Reference the relevant plans, drawings or reports
Building Envelope				
	Exterior Wall (RSI)	RSI-3.6	RSI-1.1	
	Roof (RSI)	RSI-6.4	RSI-6.4	
	Glazing (USI)	USI-1.90, SHGC 0.40	USI-1.90, SHGC 0.40	
Lighting				
	Lighting Power Density	Residential: 5.0 W/m2	Residential: 5.0 W/m2	
		Non-Residential: 6.7 W/m2	Non-Residential: 6.0 W/m2	
		Parking: 1.5 W/m2	Parking: 1.1 W/m2	
	Controls	As per NECB 2015	As per NECB 2015	
Plug Loads				
	Average Plug Load	5.6 W/m2	5.6 W/m2	
HVAC Equipments	**Plant Level**			
	Space Heating Boiler	Modulating boiler, 90% efficient	Condensing boiler, 95% efficient	
	DHW Boiler	Modulating boiler, 90% efficient	Condensing boiler, 95% efficient	
	Chiller	IPLV 0.52	IPLV 0.35	
	HVAC Equipments System Level			
	Primary HVAC	100% OA MUA with 4-pipe fan coil	100% OA MUA with 4-pipe fan coil	
	Heat Recovery	Res: none	Res: none	
		Non-res: 55% sensible and latent	Non-res: 55% sensible and latent	
	Heating & Cooling	Hydronic	Hydronic	

Domestic Hot Water (DHW)				
	DHW Boiler	90% Efficient	95% Efficient	
	Fixture Flow Rates (LPM)	Shower: 9.5 | Lav: 8.3 | Kitchen: 8.3	Shower: 7.6 | Lav: 5.7 | Kitchen: 5.7	
Other				

Appendix-C

Design Development Stage Energy Report Submission Checklist

Check each box to confirm the required documentation is submitted:

- ☒ Design Development Stage Energy Report Submission Checklist
- ☒ Better Buildings Partnership New construction Energy Modeling Report Summary. The report should be completed and signed by a licensed Architect or a Professional Engineer (Appendix – A)
- ☒ Better Buildings Partnership New construction Energy Modeling Report Template (Appendix – B)
- ☒ Energy Modelling Output Report / Compliance Report; the base case and the design case (Not applicable given the model was created in IES VE. However, key compliance information has been added to Energy Report)
- ☒ Electronic simulation files, base case and design case
- ☒ Electrical and Mechanical Design Brief
- ☒ Related supporting drawings and calculations
- ☒ Other documents as may be required