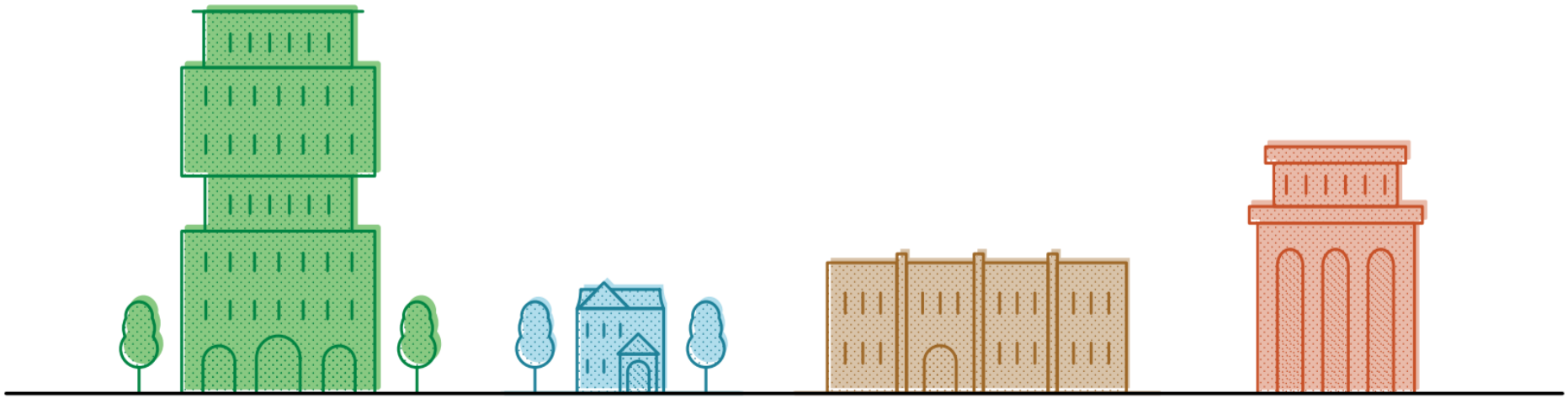
Net Zero Building Retrofit Guides

Measure Specific Checklist

Checklist for Single Family Homes

Checklist for Commercial and Multi-Unit Residential Buildings



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Measure Specific Checklist for **Single Family Homes**

Measure Specific Checklist - *Single Family Homes*

This tool is a checklist of measures which prompt you to identify opportunities and feasibility considerations as you progress through developing a net zero roadmap and retrofitting your **Single Family Homes.** This tool is designed to help ensure that critical factors are considered from the onset of your net zero journey and can then be used throughout as a reference. The measures align with the implementation steps identified in the Net Zero Building Retrofit Guides.

1 Complete the checklist questionnaire for your home.

Review each question in the checklist and select the option that best applies to your building. You can revisit and update this checklist as your net zero retrofit progresses.

2 Refer to the suggested action based on the answer inputted.

3 Keep this checklist up to date and refer to it regularly throughout your net zero retrofit journey.

Contents:

Measure Specific Checklist - *Single Family Homes*

Building Envelope	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the building envelope for a potential future retrofit?	☐	☐	☐	☐	Complete an EnerGuide evaluation or home inspection to understand your home's existing building envelope.	No further action required.	Refer to the City of Toronto Technology Companion Guides for Insulation, High-Performance Windows, and Air Sealing and Airtightness to find out more about the benefits of upgrading the building envelope.
Were the building envelope systems (walls and roof) built more than 30 years ago?	☐	☐	☐	☐	Upgrading the insulation of the walls, roof, attic, and foundations is likely required. Consult with an envelope consultant to complete an inspection to understand next steps.	Plan for upgrade building envelope systems once the systems exceed 30 years old. Ensure the building envelope systems are being maintained annually and inspected every 5 years.	Consult with an envelope consultant for advice and support or complete an EnerGuide evaluation or home inspection to understand the existing conditions.
Are the building windows single-pane glass, do you feel drafts near the windows, or are the windows older than 30 years?	☐	☐	☐	☐	Upgrade to high performance windows. Consult with a window provider to understand next steps.	Plan for upgrade once windows exceed 30 years old. Ensure windows are maintained annually and inspected every 5 years.	Consult with an envelope consultant for advice and support or complete an EnerGuide evaluation or home inspection to understand existing conditions.

Building Envelope (Continued)	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are there overly warm or cold areas of the home? Or drafts felt throughout the home?	☐	☐	☐	☐	The building envelope may require repair or intervention, including air sealing. Refer to the City of Toronto Technology Companion Guides for Air Sealing and Airtightness. Consult with an envelope consultant who can conduct an inspection, perform a hygrothermal analysis to assess moisture risks, perform thermographic imaging to identify areas of heat loss, carry out a blower door test to evaluate airtightness, and determine the next steps.	No further action required. Ensure the building envelope systems are being maintained annually and inspected every 5 years.	Consult with an envelope consultant for advice or complete an EnerGuide evaluation or home inspection to understand the existing conditions.
Are there any damp or moldy areas throughout the home?	☐	☐	☐	☐	The building envelope may require repair or intervention. Consult with an envelope consultant to conduct an inspection and/or hygrothermal analysis to assess the risk and determine next steps.	No further action required. Ensure the building envelope systems are being maintained annually and inspected every 5 years.	Consult with an envelope consultant for advice or complete an EnerGuide evaluation or home inspection to understand the existing conditions.

Measure Specific Checklist - *Single Family Homes*

HVAC Systems - Heating, Cooling, Ventilation	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the HVAC system for a potential future retrofit?	☐	☐	☐	☐	Consult with a HVAC contractor and conduct an EnerGuide evaluation or home inspection to understand your existing HVAC systems.	No further action required.	Refer to the City of Toronto Technology Companion Guides for Energy Recovery Ventilation, Air Source Heat Pumps for Homes and Small Buildings, Ground Source Heat Pumps to find out more about the benefits of upgrading this system.
Is the heating system connected to natural gas, oil, or a fossil fuel source?	☐	☐	☐	☐	The heating system should be electrified. Consider replacing the heating system with an air source heat pump or a ground source heat pump. Consult with an HVAC contractor to discuss options and identify next steps.	Plan to upgrade the heating system once it has reached end-of-life. Ensure equipment is professionally cleaned annually.	Check your utility bills to see if you are paying for natural gas, oil, or another fossil fuel. If so, your heating system likely relies on that fuel type. If you are still unsure, consult an HVAC contractor to assess the system and confirm its fuel type.
Are there overly warm or cold areas of the home?	☐	☐	☐	☐	Consider rebalancing the HVAC system. Consult with HVAC contractor.	No further action required.	Walk through the home at different times of the day to identify if rooms feel noticeably warmer or colder (+/- 5 °C) than others. Pay attention to areas near windows, exterior walls, or upper/lower floors, as they may have greater temperature variations.
Does the building have energy recovery ventilators?	☐	☐	☐	☐	No further action required.	Consider adding energy recovery ventilators. Consult with a HVAC contractor to determine next steps.	Consult with a HVAC contractor and conduct an EnerGuide evaluation or home inspection to understand your existing HVAC systems. Refer to the City of Toronto Technology Companion Guides for Energy Recovery Ventilation for more information.

Measure Specific Checklist - *Single Family Homes*

HVAC Systems - Heating, Cooling, Ventilation (Continued)	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Is the air conditioning system a window-mounted air conditioning unit?	☐	☐	☐	☐	Consider replacing the cooling system with an mini-split heat pump or central air conditioning system. If the heating system is also being upgraded, consider an air source heat pump or a ground source heat pump system that provides heating and cooling. Consult with an HVAC contractor.	Plan for upgrade once the cooling system has reached end-of-life. Ensure equipment is professionally cleaned annually.	Investigate existing cooling systems further. Walk around the house to look for any equipment that extends from windows. If present, it is likely a window mounted air conditioning unit.
Are you interested in installing an air conditioning system if there is not already one installed?	☐	☐	☐	☐	Consider installing a mini-split heat pump or central air conditioning system. If the heating system is also being upgraded consider an air source heat pump or a ground source heat pump system that provides heating and cooling. Consult with HVAC contractor to explore your options.	No further action required.	Investigate if the thermostat has a cooling setting, typically labelled 'Cool' or 'AC'. Walk around the house to look for a large metal box with a fan outside, usually near the foundation, or equipment extending from windows, which may indicate an air conditioning system. If you are still unsure, consult an HVAC contractor.
Can you identify your monthly electricity use in kWh, demand in kW, and monthly fossil fuel use in m^3 from your monthly utility bill?	☐	☐	☐	☐	No further action required.	Review your utility bills and use the following two websites for guidance on how to interpret them. **Understand your electricity bill:** Look up 'Understanding your electricity bill' at www.oeb.ca **Understand your natural gas bill:** Look up 'Understanding your natural gas bill' at www.oeb.ca	
Are you considering air sealing or façade upgrades as outlined in Building Envelope section?	☐	☐	☐	☐	Consult with an HVAC contractor to determine if a ventilation system is required or needs to be upgraded.	No further action required.	Ask about ventilation systems when consulting with an envelope consultant.

Measure Specific Checklist - *Single Family Homes*

Lighting	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the lighting in your home for a potential future retrofit?	☐	☐	☐	☐	Consult with a lighting consultant and plan to upgrade lighting systems to improve energy efficiency and load reduction.	No further action required.	Refer to the City of Toronto Technology Companion Guide for Lighting to find out more about the benefits of upgrading this system.
Do interior and exterior lighting fixtures use LED bulbs and energy efficient fixtures?	☐	☐	☐	☐	No further action required.	Upgrade to LED bulbs and Energy Star certified light fixtures.	Inspect the light bulbs for a 'LED' and/or Energy Star logo on the base of the bulb. If the fixture has a built-in bulb, (which is more common with exterior lighting), it likely uses LED bulbs.
Is the interior lighting controlled by manual switches?	☐	☐	☐	☐	Consider upgrading the lighting system to include smart lighting controls with scheduling capabilities.	Where applicable, set the lighting to automatically turn on only when needed, such as when people are present or at dusk, and ensure it turns off at night or when you are away on vacation to optimize energy efficiency.	Check for standard on/off or dimmer switches in each room, as these indicate manual control of the lighting. If the lighting turns on or off at set times, or can be controlled by an app, smartphone, or voice command, it's not manually controlled.
Is the exterior lighting controlled by manual switches?	☐	☐	☐	☐	Upgrade the exterior lighting with motion sensors or timed controls.	Ensure the lighting is set to automatically turn on only when needed, such as at dawn or dusk, or when people are present.	Check for standard on/off or dimmer switches usually located near entryways or exterior doors that control the exterior lighting, as these indicate manual control of the lighting. If the lighting turns on or off at set times automatically or can be controlled by an app, smartphone or voice command, it's not manually controlled.

Measure Specific Checklist - *Single Family Homes*

Smart Homes and Appliances	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the appliances in your home for a potential future retrofit?	☐	☐	☐	☐	Create an inventory of major appliances (refrigerators, dishwashers, clothes washers, dryers) and document the model numbers, ages, and any existing energy ratings for each appliance. Consider using an energy monitor or a smart plug with energy tracking to measure the real-time consumption of individual appliances.	No further action required.	Refer to the City of Toronto Technology Companion Guide for Smart Homes and Appliances to find out more about the benefits of upgrading appliances.
Are the refrigerators, dishwashers, and clothes washers Energy Star or CEE Tier 1 certified appliances?	☐	☐	☐	☐	Plan to upgrade appliances after 10 years of use.	Upgrade refrigerator, dishwasher, and clothes washer to Energy Star or CEE Tier 1 certified appliances.	Check the appliance for the Energy Star logo or CEE Tier 1 Labeling, which is typically located on the front or side of the appliance. If you can't find this, visit the appliance manufacturer's website or Energy Star website and search for the appliance model number.
Do the kitchen appliances (ie. range, fryer, griddle) use natural gas?	☐	☐	☐	☐	Upgrade the appliances to electric or induction appliances and select energy efficient models that are Energy Star or CEE Tier 1 rated.	No further action required.	Inspect the ranges, fryers, and griddles for burners or heating elements that produce visible flames when in use. Additionally, check for a gas supply line or a gas shut-off valve connected to the appliances, as these indicate the use of natural gas.

Smart Homes and Appliances (Continued)	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Does the clothes dryer use natural gas?	☐	☐	☐	☐	Upgrade the clothes dryer to an electric dryer. Select an energy efficient model that is Energy Star or CEE Tier 1 rated.	No further action required.	Check if the clothes dryer has a gas supply line connected to it and a gas shut-off valve nearby. Additionally, consult the appliance label or manual to confirm the fuel type.
Are you interested in installing smart home technologies, such as lighting systems controlled via smartphones, or other internet connected devices to reduce energy use and improve resilience?	☐	☐	☐	☐	Consult with experts, such as smart home specialists, to guide you through the selection and installation of smart technology. Select and install smart devices that meet your needs and fit with your existing systems.	No further action required.	Refer to the City of Toronto Technology Companion Guide for Smart Home Appliances to find out more about the benefits of upgrading this system.
Is a programmable thermostat installed that allows you to set different temperatures for various time periods of the day?	☐	☐	☐	☐	Ensure that during sleeping hours or when the house is unoccupied, the thermostat set to below the normal setpoint in the winter and above the normal setpoint in the summer to save energy. Consider upgrading to a thermostat that be automatically adjust based on schedule, temperature occupancy, weather, and energy usage patterns in 5 years.	Install a programmable thermostat that can be automatically adjust based on schedule, temperature occupancy, weather, and energy usage patterns. Select a device that meet your needs and fit with your existing systems.	Check the wall thermostat for buttons or options labeled "Program," "Schedule," "Set," or "Hold." If your thermostat can connect to Wi-Fi or be controlled remotely via an app, it is programmable. Search the model online to confirm if it has programmable features.

Measure Specific Checklist - *Single Family Homes*

Domestic Hot Water	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the domestic hot water system for a potential future retrofit?	☐	☐	☐	☐	Conduct an EnerGuide evaluation or home inspection to understand your home's existing domestic hot water system.	No further action required.	Refer to the City of Toronto Technology Companion Guide for Domestic Hot Water to find out more about the benefits of upgrading this system.
Does the home have natural gas, oil, or other fossil fuel fired water heaters?	☐	☐	☐	☐	Upgrade the domestic hot water heater to an electric water heater or heat pump water heater to reduce greenhouse gas emissions.	No further action required.	Check the water heater's label or manual to identify the fuel type or look for a gas line connected to the water heater or an oil tank nearby for fuel.
Does the home use water efficient fixtures and appliances?	☐	☐	☐	☐	No further action required.	Upgrade kitchen and bathroom fixtures and appliances to low-flow models. This will help conserve water and energy, reduce operational costs, and lower greenhouse gas emissions.	Investigate the labels and etchings on fixtures and appliances to check their flow rates and WaterSense ratings. If no WaterSense label or flow rate etching is found, consider replacing them with certified models for better water efficiency.

Measure Specific Checklist - *Single Family Homes*

Energy Generation and Storage	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Do you generate renewable energy from sources such as solar photovoltaic panels or solar thermal systems?	☐	☐	☐	☐	Continue focusing on reducing electricity consumption throughout the house to further minimize reliance on grid power and maximize the benefits of your renewable energy system.	Consider installing renewable energy generation and storage to reduce grid electricity bill costs. Consider solar thermal for hot water and solar PV for electricity generation.	Refer to the City of Toronto Technology Companion Guide for Solar and Batteries to find out more about the benefits of adding renewable energy systems.
Do you know how much energy can be generated from renewable energy sources at the home?	☐	☐	☐	☐	No further action required.	Asses how much renewable energy could be generated from renewable energy systems in relation to the amount of energy the home consumes. Search your address on the SolarTO map on the City of Toronto website to get a preliminary estimate of the potential of your building for solar generation from photovoltaic panels.	
Does the home have access to unshaded rooftop space?	☐	☐	☐	☐	Consider installing renewable energy generation and storage system to reduce grid electricity bill costs.	Rooftop solar energy generation may not be suitable for the home.	Walk around the building and identify any tall nearby structures or trees that may cast shadows on the roof. Consider consulting with a solar consultant to confirm.
Will rooftop renewable energy impact the warranty on the roof?	☐	☐	☐	☐	Rooftop solar energy generation may not be suitable for your home.	No further action required.	Consult with your roofing contractor to confirm.
Does your home use energy storage?	☐	☐	☐	☐	No further action required. Plan to upgrade energy storage when it reaches end-of-life.	Consider including battery storage when adding a renewable energy system.	Look in your garage, basement, utility room, or an outdoor enclosure for a battery system. Battery storage systems are often wall-mounted or in standalone cabinets connected to your electrical panel.

Measure Specific Checklist for

Commercial & Multi-Unit Residential Buildings

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

This tool is a checklist of measures which prompt you to identify opportunities and feasibility considerations as you progress through developing a net zero roadmap and retrofitting your **Commercial & Multi-Unit Residential Building.** This tool is designed to help ensure that critical factors are considered from the onset of your net zero journey and can then be used throughout as a reference. The measures align with the implementation steps identified in the Net Zero Building Retrofit Guides.

1 Complete the checklist questionnaire for your home.

Review each question in the checklist and select the option that best applies to your building. You can revisit and update this checklist as your net zero retrofit progresses.

2 Refer to the suggested action based on the answer inputted.

3 Keep this checklist up to date and refer to it regularly throughout your net zero retrofit journey.

Contents:

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

Building Envelope	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the building envelope for a potential future retrofit?	☐	☐	☐	☐	Conduct a building condition assessment and energy audit to understand your building's existing building envelope.	No further action required.	Refer to the City of Toronto Technology Companion Guides for Insulation, High-Performance Windows, and Air Sealing and Airtightness to find out more about the benefits of upgrading the building envelope.
Were the building envelope systems (walls and roof) built more than 30 years ago?	☐	☐	☐	☐	Upgrading the insulation of the walls, roof, attic, and foundations is likely required. Consult with an envelope consultant to complete an inspection to understand next steps.	Plan for upgrade building envelope systems once the systems exceed 30 years old. Ensure the building envelope systems are being maintained annually and inspected every 5 years.	Consult with an envelope consultant and conduct a building condition assessment and an energy audit.
Are the building windows single-pane glass, are drafts felt near the windows, or are the windows older than 30 years?	☐	☐	☐	☐	Upgrade to high performance windows. Conduct a building condition assessment and an energy audit. Consult with an envelope consultant for a thermographic inspection, blower door test and to determine next steps.	Plan for upgrade once windows exceed 30 years old. Ensure windows are maintained annually and inspected every 5 years.	Consult with an envelope consultant and conduct a building condition assessment and an energy audit.

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

Building Envelope (Continued)	**YES**	**NO**	**UNSURE**	**N/A**	**Suggested action, if answered: YES**	**Suggested action, if answered: NO**	**Suggested action, if answered: UNSURE**
	Refer to Suggested Action			Not Applicable			
Are drafts felt close to the walls, attic, foundation any building envelope component?	☐	☐	☐	☐	The building envelope may require repair or intervention, including air sealing. Refer to the City of Toronto Technology Companion Guides for Air Sealing and Airtightness. Consult with an envelope consultant who can conduct an inspection and/or hygrothermal analysis to assess moisture risks, perform thermographic imaging to identify areas of heat loss, carry out a blower door test to evaluate airtightness and determine the next steps.	No further action required. Ensure the building envelope systems are being maintained annually and inspected every 5 years.	Consult with an envelope consultant and conduct a building condition assessment and an energy audit.
Are there any damp or moldy areas close to the building envelope?	☐	☐	☐	☐	The building envelope may require repair or intervention. Consult with an envelope consultant to conduct an inspection and/or hygrothermal analysis to assess the risk and determine next steps.	No further action required. Ensure the building envelope systems are being maintained annually and inspected every 5 years.	Consult with an envelope consultant and conduct a building condition assessment and an energy audit.

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

HVAC Systems - Heating, Cooling, Ventilation	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the HVAC system for a potential future retrofit?	☐	☐	☐	☐	Consult with an HVAC contractor and conduct a building condition assessment and an energy audit to understand the existing HVAC systems.	No further action required.	Refer to the City of Toronto Technology Companion Guides for Energy Recovery Ventilation, Air Source Heat Pumps for Homes and Small Buildings, Ground Source Heat Pumps, Low Carbon District Energy to find out more about the benefits of upgrading this system.
Is the heating equipment older than 30 years old? Or is the cooling equipment older than 15-20 years old?	☐	☐	☐	☐	Heating and/or cooling equipment should be replaced. Consult with a HVAC contractor to determine next steps.	No further action required.	Locate the nameplate on HVAC systems, boilers, chillers, water heaters, and electrical panels. Look for the manufacture date, serial number, or model number. Check as-built drawings, past inspection reports, or maintenance logs for installation dates.

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

HVAC Systems - Heating, Cooling, Ventilation (Continued)	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Is the heating system connected to natural gas, oil, or a fossil fuel source?	☐	☐	☐	☐	The heating system should be electrified. Consider replacing the heating system with an air source heat pump or a ground source heat pump. Consult with an HVAC contractor.	Plan to upgrade the heating system once it has reached end-of-life. Ensure equipment is professionally cleaned annually.	Check the utility bills to see if there is a natural gas, oil, or another fossil fuel utility bill. If so, the heating system likely relies on that fuel type. If you are still unsure, consult an HVAC contractor to assess the system and confirm its fuel type.
Are there overly warm or cold areas of the building?	☐	☐	☐	☐	Consider rebalancing the HVAC system. Consult with a HVAC contractor.	No further action required.	Walk through the building at different times of the day to identify if spaces feel noticeably (+/- 5 °C) warmer or colder than others. Pay attention to areas near windows, exterior walls, or upper/lower floors, as they may have greater temperature variations.
Is the air conditioning system a non central or window-mounted air conditioning unit?	☐	☐	☐	☐	Consider replacing the cooling system with a mini-split heat pump or central air conditioning system. If the heating system is also being upgraded, consider an air source heat pump or a ground source heat pump system that provides heating and cooling. Consult with an HVAC contractor.	Plan for upgrade once cooling system has reached end-of-life. Ensure equipment is professionally cleaned annually.	Consult with an HVAC contractor and conduct a building condition assessment and an energy audit.

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

HVAC Systems - Heating, Cooling, Ventilation (Continued)	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Do you understand the building's current heating and cooling demand and usage?	☐	☐	☐	☐	No further action required.	Investigate the building automation system if one is present and identify seasonal trends and peak demand periods. An energy analyst can also be hired to complete an energy audit to identify this information. Alternatively, review monthly utility bills and identify annual and peak demand heating and cooling usage. Use the following two websites for guidance on how to interpret utility bills. **Understand your electricity bill:** Look up 'Understanding your electricity bill' at www.oeb.ca **Understand your natural gas bill:** Look up 'Understanding your natural gas bill' at www.oeb.ca	
Does the building have energy recovery ventilators?	☐	☐	☐	☐	No further action required.	Consider adding energy recovery ventilators. Consult with a HVAC contractor to determine next steps.	Consult a HVAC contractor and conduct a building condition assessment and an energy audit. Refer to the City of Toronto Technology Companion Guides for Energy Recovery Ventilation for more information.
Is the ventilation system zoned per unit or per space type?	☐	☐	☐	☐	No further action required.	Consider a system retrofit to improve thermal and ventilation zoning. Consult with a HVAC consultant to determine next steps.	Consult a HVAC contractor to conduct a detailed audit of the existing systems.

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

Lighting	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the lighting in your home for a potential future retrofit?	☐	☐	☐	☐	Conduct a lighting demand analysis and plan to upgrade lighting systems to improve energy efficiency and load reduction.	No further action required.	Refer to the City of Toronto Technology Companion Guide for Lighting to find out more about the benefits of upgrading this system.
Do interior and exterior lighting fixtures use LED bulbs and energy efficient fixtures?	☐	☐	☐	☐	No further action required.	Upgrade to LED and Energy Star certified light fixtures.	Inspect the light bulbs for a 'LED' and/or Energy Star logo on the base of the bulb. If the fixture has a built-in bulb, (which is more common with exterior lighting), it is likely an LED.
Is the interior lighting controlled by manual switches?	☐	☐	☐	☐	Consider upgrading the lighting system to include smart lighting controls, automated window shades, occupancy sensors and integrated into a building automation system.	Ensure the lighting is set to automatically turn on only when needed, such as when people are present or at night.	Check for standard on/off or dimmer switches that control the lighting system, as these indicate manual control. If the lighting is connected to a building automation system, it is not manually controlled.
Is the exterior lighting controlled by manual switches?	☐	☐	☐	☐	Upgrade exterior lighting with motion sensor controls or photosensors and integrate into a building automation system.	Ensure the lighting is set to automatically turn on only when needed, such as at dawn or dusk, or when people are present.	Check for standard on/off or dimmer switches, as these indicate manual control of the lighting. If the lighting turns on or off at set times, automatically turn on at dusk and off at dawn, or is connected to a building automation system it is not manually controlled.

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

Domestic Hot Water	**YES**	**NO**	**UNSURE**	**N/A**	**Suggested action, if answered: YES**	**Suggested action, if answered: NO**	**Suggested action, if answered: UNSURE**
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the domestic hot water system for a potential future retrofit?	☐	☐	☐	☐	Conduct an audit of existing system to understand hot water demand and existing energy consumption. Upgrade the domestic hot water system to improve energy efficiency and contribute to water conservation.	No further action required.	Refer to the City of Toronto Technology Companion Guide for Domestic Hot Water to find out more about the benefits of upgrading this system.
Does the building use natural gas, oil, or other fossil fuel fired water heaters?	☐	☐	☐	☐	Upgrade to an electric water heater or heat pump water heater.	No further action required.	Check the water heater's label or manual to identify the fuel type or look for a gas line connected to the water heater or an oil tank nearby for fuel.
Does the building use water efficient fixtures and appliances?	☐	☐	☐	☐	No further action required.	Upgrade fixtures and appliances to low-flow models. This will help conserve water and energy, reduce operational costs, and lower greenhouse gas emissions.	Investigate the labels and etchings on fixtures and appliances to check their flow rates and WaterSense ratings. If no WaterSense label or flow rate etching is found, conduct a building condition assessment and an energy audit to identify flow rates and end uses with high water consumption.
Can the building's electrical infrastructure support the increased load from electrified domestic hot water technology?	☐	☐	☐	☐	No further action required.	Consider heat pump water heaters as they are more energy efficient and require less peak electrical load. Look for domestic hot water technologies with high COP (Coefficient of Performance) or energy factor ratings.	Consult with electrical engineers to determine the electrical capacity.

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

Energy Generation and Storage	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Does the building generate renewable energy from sources such as solar photovoltaic panels or solar thermal systems?	☐	☐	☐	☐	Continue focusing on reducing electricity consumption throughout the building to further minimize reliance on grid power and maximize the benefits of the renewable energy system.	Consider installing renewable energy generation and storage to reduce grid electricity bill costs. Consider solar thermal for hot water and solar PV for electricity generation.	Refer to the City of Toronto Technology Companion Guide for Solar and Batteries to find out more about the benefits of adding renewable energy systems.
Do you know how much energy can be generated from renewable energy sources at the building?	☐	☐	☐	☐	No further action required.	Asses how much renewable energy could be generated from renewable energy systems in relation to the amount of energy the building consumes. Search your address on the SolarTO map on the City of Toronto website to get a preliminary estimate of the potential of your building for solar generation from photovoltaic panels.	
Does the building have access to unshaded rooftop space?	☐	☐	☐	☐	Consider installing renewable energy generation and storage to reduce grid electricity bill costs. Consult with a solar consultant to determine next steps.	Rooftop solar energy generation may not be suitable for the building.	Walk around the building and look for rooftop obstructions such as HVAC units, vents, or antennas. Identify any tall nearby structures or trees that may cast shadows on the roof. Consult with a solar consultant to perform a solar assessment.
Will rooftop renewable energy impact the warranty on the roof?	☐	☐	☐	☐	Rooftop solar energy generation may not be suitable for the building. Consult with the roofing manufacturer to understand options available.	No further action required.	Consult with the roofing manufacturer or contractor to confirm.
Can the rooftop support the weight of renewable energy systems?	☐	☐	☐	☐	No further action required.	Rooftop solar energy generation may not be suitable for the building.	Consult a structural engineer to confirm the roof can support the weight of solar energy generation.
Does the building use energy storage?	☐	☐	☐	☐	No further action required. Plan to upgrade energy storage when it reaches end-of-life.	Consider including battery storage when adding a renewable energy system.	Consult with facility management or maintenance staff. Look for battery storage systems installed onsite, often located in electrical rooms, basements, or dedicated enclosures.

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

Appliance Upgrades	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the appliances used in the building for a potential future retrofit?	☐	☐	☐	☐	Create an inventory of major appliances (refrigerators, dishwashers, clothes washers, dryers) and document the model numbers, ages, and any existing energy ratings for each appliance.	No further action required.	Refer to the City of Toronto Technology Companion Guide for Smart Homes and Appliances to find out more about the benefits of upgrading this system.
Are the refrigerators, dishwashers, and clothes washers Energy Star or CEE Tier 1 certified appliances?	☐	☐	☐	☐	Plan to upgrade appliances after 10 years of use.	Upgrade refrigerator, dishwasher, and clothes washer to Energy Star or CEE Tier 1 certified appliances.	Check the appliance for the Energy Star logo or CEE Tier 1 Labeling, which is typically located on the front or side of the appliance. If you cannot find this, visit the appliance manufacturer's website or Energy Star website and search for the appliance model number.
Do the kitchen appliances (ie. range, fryer, griddle) use natural gas?	☐	☐	☐	☐	Upgrade the appliances to electric or induction appliances and select energy efficient models that is Energy Star or CEE Tier 1 rated.	No further action required.	Inspect the ranges, fryers, and griddles for burners or heating elements that produce visible flames when in use. Additionally, check for a gas supply line or a gas shut-off valve connected to the appliances, as these indicate the use of natural gas.
Do the clothes dryers use natural gas?	☐	☐	☐	☐	Upgrade the clothes dryer to an electric dryer. Select an energy efficient model that is Energy Star or CEE Tier 1 rated.	No further action required.	Check if the clothes dryer has a gas supply line connected to it and a gas shut-off valve nearby. Additionally, consult the appliance label or manual to confirm the fuel type.

Measure Specific Checklist -
Commercial & Multi-Unit Residential Building

Building Controls and Automation Systems	YES	NO	UNSURE	N/A	Suggested action, if answered: YES	Suggested action, if answered: NO	Suggested action, if answered: UNSURE
	Refer to Suggested Action			Not Applicable			
Are you interested in gaining a deeper understanding of the building controls and/or automation system for a potential future retrofit?	☐	☐	☐	☐	Hire a controls engineer to advise and support you on how to apply this retrofit to your building and to conduct a system audit.	No further action required.	Refer to the City of Toronto Technology Companion Guide for Building Automation Systems to find out more about the benefits of upgrading this system.
Is there a building automation systems or automation technologies installed?	☐	☐	☐	☐	Plan to connect any future or non connected equipment to the building automation system.	Plan to upgrade building controls and install a building automation system. Hire a controls engineer to advise and support you on how to apply this retrofit to your building and to conduct a system audit.	Check with the facility management or maintenance staff. Consider conducting a building condition assessment and an energy audit.
Do you know what the current communication protocols and network infrastructure?	☐	☐	☐	☐	No further action required. Share information with control engineer updating the building automation system.	Investigate controls and systems further. Talk with building operators.	
Are there any current operational challenges or issues with your Building Automation System?	☐	☐	☐	☐	Hire a controls engineer to investigate and repair the building automation system.	No further action required.	Check with the facility management or maintenance staff. Consider conducting a building condition assessment and an energy audit.