

Emissions Reduction Guidebook



Green Economy
London



A guide to help Green
Economy Leaders select and
complete projects to reduce
greenhouse gas emissions

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Overview:

This guidebook is meant to help members select projects that will help them tackle reducing greenhouse gas (GHG) emissions. The framework consists of 28 projects that members can undertake to address their GHG emissions.

What are GHG Emissions:

The earth's atmosphere is made up of different gases. Greenhouse gases are produced as a result of certain hydrocarbons being burned, for example natural gas and oil are released into the atmosphere. GHG emissions act as a layer of insulation and traps heat, warming the earth. The major GHG emissions released by human activity include carbon dioxide, methane, and nitrous oxide. In Canada, the growth of emissions since 1990 has been a result of oil and gas extraction and transportation (Environment and Climate change Canada, 2022).

Why Track Your Emissions:

With climate change impacts continuing to impact us all, many governments, businesses, and other organizations are taking the steps to reduce their GHG emissions. This includes emissions trading programs (voluntary or required), carbon or energy taxes, net-zero targets, and regulations and standards on emissions and energy efficiency. As a result, it is crucial for companies to understand their emissions to stay on top of any future climate policies.

Tracking emissions from operational activities leads to a better understanding of where your emissions are coming from and how much environmental impact they're having. Sources such as energy consumption, employee commuting, business travel, and purchased products to name a few are all measurable. When put into a comprehensive GHG inventory, it gives you an understanding and breakdown of each source and can identify where to focus your reduction efforts. Preparing a GHG inventory report can help to track and monitor emissions.

Scopes:

There are direct and indirect emissions for operations that companies need to define when tracking emissions. Businesses are required to report scope 1 direct GHG emissions in their inventory.

Scope 1: Direct Emissions

These emissions occur from sources that are owned or controlled by your company. These typical sources include natural gas, heating, refrigerants, and fire suppressants.

Scope 2: Indirect Emissions

These emissions occur from the generation of purchased electricity or steam by your company. These emissions physically occur at the facility where electricity is generated.

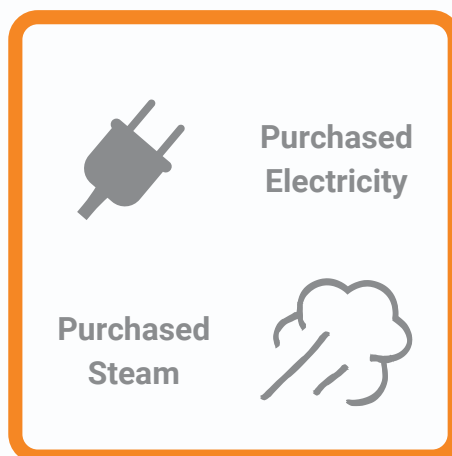
Scope 3: Other Indirect Emissions

These emissions are all other emissions that are linked to your business's operations. These sources can include waste, employee commuting, electronics, businesses travel, and investments. The emissions are consequences of the activities of the company, but occur from sources not owned or controlled by your company. These emissions are currently optional to report.

Scope 1



Scope 2



Scope 3



How to Set a Target:

Green Economy London supports members in moving through the milestones to eventually set targets in four different areas. Members are able to choose one or more target areas depending on what their sustainability goals are. When members select their target, Green Economy London announces the target, helps the member implement their action plan and celebrates the success of the member as they move towards achieving their goals. Targets must be set within three years of joining the hub.

General notes for target setting:

- Members identify, track and reduce their impacts of their facilities and fleet
- Members must develop an initial GHG emission baseline within 3 years of joining
- Baseline year for targets cannot be more than (max) 3 years previous to the year of joining the program, but if you have existing targets or baselines, you can keep them internally
- Members must report annually after setting a target
- Target cannot be set more than (max) of 10 years
- Members will be recognized for their successful actions and achievements

Specific notes for GHG target setting:

- Scope 1 & Scope 2 are mandatory to track and reduce
- Scope 3 is optional
- Targets can be either absolute or intensity
- Maximum of 49% of total reduction targets can be achieved through Restricted Reductions (Offsets, Renewable Energy Credits, MicroFIT, etc.)

Levels of Recognition:



GHG

20% + Reduction



GHG

40% + Reduction



GHG

60% + Reduction

Sustainable Development Goals:

The Sustainable Development Goals (SDGs) were developed by the United Nations as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. There are 17 SDGs and 169 associated targets.

Businesses have a role to play to ensure that we are able to achieve the SDGs. Aligning your business with advancing the SDGs can help to track and share social and environmental contributions as pillars of economic success. There are three SDGs that closely align with GHG reduction target setting.



Affordable and Clean Energy: Switching to renewable energy to reduce GHG emissions is a solution many businesses are looking to in order to reduce operating costs and reduce carbon output. Setting a GHG emissions reduction target, creating an action plan, implementing products to reduce energy usage and switching to renewable energy will align your business with this goal.



Sustainable Cities and Communities: All target areas, waste, GHG emissions, water, and environmental stewardship play an important role making a city more sustainable. Setting targets in any of these areas will help align your businesses with this goal.



Climate Action: Reducing GHG emissions will help become an environmental steward to create a more resilient community to climate change to help reduce emissions.

Adaptive Controls(Activity/ Illumination Sensors):

Install occupancy/activity sensors in rooms where lights are often left on and unoccupied. This helps to reduce overall electricity consumption in your facility. Sensors typically monitor for movement, but can also respond to ambient light levels (i.e. to turn on exterior lights near sundown).

Activity sensors can easily be purchased at hardware stores. The costs can be between \$30 to \$130 depending on the type of sensor. The installation costs can be \$30 or more per sensor depending on the electrical wiring system.

Average **40%**
savings on
electricity costs



Save **25%+**
on electricity
costs over
lifetime

Air Conditioning Maintenance:

Simply maintaining your central air conditioning unit can result in incredible cost savings. Average AC systems will last 10-15 years, but with regular maintenance, your AC unit can last anywhere from 20-25 years. Regular maintenance typically will result in keeping the AC running with at least **95% efficiency** from the first year until end-of-life. A standard annual checkup on an average commercial building (based on 1000 sqft) costs approximately \$125/year.

Dimmable Light Switches and Task Lamps:

Task lighting and dimmers give employees full control over lighting in their workspace. It allows for reducing artificial lighting when sunlight is available. Dimmers help to fine-tune the amount of artificial light generated depending on how much is actually needed, leading to increased lighting efficiency. The main benefit is the potential to engage employees in preserving energy at the office.



Resources:

- [payback periods for dimmer switches](#)

Endpoint Management:

Having power management settings enabled on company computers to ensure they don't waste energy when not used makes sense; however, this can interfere with IT functions. An endpoint management solution can be part of a strategy to reduce computer electricity consumption.

Software can be installed on the company server and connected computers and laptops can be managed centrally. This ensures computers turn off after a period of inactivity and can turn on computers for any updates during the night.

Your IT professional will be able to pick an option that satisfies organizational needs. Popular software solutions include:

- Absolute Manage
- Microsoft SCCM
- Symantec Altiris
- Dell Kace
- Specops
- Novell ZENworks

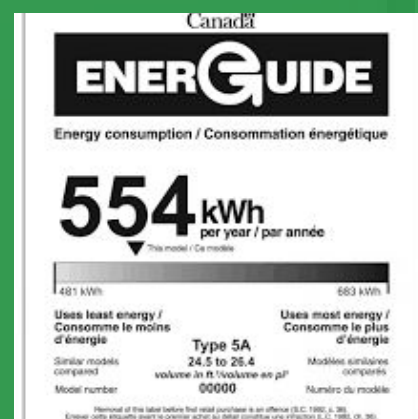
Energy Efficient Products:

Energy efficient products operate with less energy and can substantially reduce operating costs. They should be considered when it is necessary to add or replace energy-using applications, electronics, or other equipment.

Look for the [ENERGY STAR](#) label on products which indicates that it meets the qualifying stands for energy efficiency established by Natural Resources Canada. Another way to compare product efficiency is to compare estimated kWh/year information. This information is displayed on the [EnerGuide](#) label in Canada; however, you may need the manufacturer's specifications when considering industrial-sized equipment.

Resources:

- [ENERGY STAR Purchasing Guide](#)



Hand Dryers & Reusable Towels:

High speed energy efficient (HSEE) hand dryers can save a great deal of energy compared to conventional hot air dryers and paper towels by drastically reducing drying times and heat generation. Most new models use motion sensors to prevent unnecessary energy use. The initial cost to purchase and install 1 dryer is \$800.

Another alternative is reusable hand towels. Reusable fabric towels can be reused hundreds of times before reaching end-of-life. This option is ideal for small offices with less bathroom traffic.

Save **\$60/year** on
electricity costs



LED Exit Signs:

LED exit signs are an excellent way to save money by reducing the electricity needed to power these year-round, always-on devices. These signs draw on average **44 kWh** each compared to 140 kWh for CFL signs and 350 kWh for incandescent signs. Replacement occurs less often, resulting in reduced maintenance costs. High electricity savings, combined with a longer life expectancy are great for exit signs.

LED Lighting:

Switching to LED lights from fluorescent lights for indoor and outdoor lighting systems is a great way to reduce GHG emissions. LEDs use less than **75%** energy and last up to **25x** longer than traditional incandescent lighting. The production cost is low and the efficiency allows for longer use of the same amount of lights at a lower wattage.

Additionally, adding signage to rooms to remind people to turn off lights when they leave a room that is occasionally occupied throughout the day can help.

Resources:

- [SaveON Energy Retrofit Program](#)
- [What you need to know about LED retrofitting](#)

Power Bars:

Eliminate the 'phantom power' wasted by inactive equipment and appliances by installing power bars. Devices such as computers, monitors, printers, and appliances such as toasters and microwaves draw small amounts of electricity even when turned off or inactive. A power bar allows you to cut the power to the devices completely but flicking a switch instead of unplugging each device. Power bars only cost \$10 - \$30 each and actual cost savings will depend on which devices are shut down.

Resources:

- [What is phantom power](#)
- [Phantom power tips & tricks](#)

Reduce **10%** of
electricity
consumption



Low or No VOC Paint:

Volatile Organic Compounds (VOCs) are found in a variety of products and materials, including paint, wood stains and air fresheners, and are known to negatively affect human health. Up to 80% of a typical building's surfaces are coated in paint.

While VOCs from exterior paints can contribute to ground-level ozone, the main concern is their direct indoor health effects where the concentration is up to ten times higher.

VOCs are in paint for performance reasons. One of the main VOCs, propylene glycol, helps to keep paint wet for longer to allow for a more complete finish. VOC-free paints may dry more quickly, leading to difficulties during application. Low-VOC paints may perform better but still, contain (and release) VOCs into the environment.

Resources:

- [Graphenstone Paints](#)
- [GreenTech Painting](#)



Air Curtain Installation:

Air curtains use a wall of forced air to create a barrier that allows people and vehicles to still pass through. This helps to prevent outdoor elements from coming in and indoor air from escaping. The types of facilities that can benefit from an air curtain include warehouses, industrial facilities, retail stores, and office buildings.

Air-Source Heat Pump:

Eliminate natural gas production and bills with an air-source heat pump. Electric heat pumps are the most effective HVAC installation in bringing down natural gas usage for heating. An air-source heat pump is an electrical device that uses heat energy from outdoor air and brings it inside to heat your facility.

Resources:

- [Air-source heat pumps](#)
- [Smart Renewables and Electrification Program](#)
- [Most efficient air conditioners and air-source heat pumps](#)



Green Roofs:

Green roofs can replace many black-tar roofs, which are associated with several [environmental and health impacts](#).

The types of vegetation supported by a green roof depend on whether it is extensive or intensive. Extensive green roofs weigh and cost less, require less maintenance and can be used on roofs with shallow (less than 30 degrees) slopes. Typically, these roofs can only grow grasses as there is little (if any) irrigation and conditions are stressful. Intensive green roofs, on the other hand, provide deeper soil and better irrigation, which provides for more varied plant life. These roofs cost more and are more work, but they have better insulating properties and typically have better aesthetic and ecosystem value.

In some cases, rooftops have been used as space for small-scale farming. Rooftop farms can be a source of local food and opportunities for community learning and volunteerism.

Resources:

- [Green Roofs Report](#)



High Efficiency Furnace:

Replacing an outdated furnace with a more efficient model can result in 33% - 50% heating cost savings. Furnaces today have between 78% and 96% annual fuel utilization efficiency (AFUE). It is recommended to replace your furnace if you feel your business is experiencing high heating costs. The costs can range from \$1,500 to \$3,000.



High Efficiency Windows:

Upgrade your single-pane windows to triple-pane windows. Triple pane windows have the potential to reduce up to 20% of energy usage and costs. When looking for windows to purchase, ensure that they are ENERGY STAR certified.

Conventional windows can account for up to 30% of heat loss. Using blinds or awnings to reduce solar glare during the summer and capitalize on natural solar heat during the winter can also contribute to savings on heating and cooling bills.

Thermostat Control:

With no associated upfront cost and **5% to 10%** in energy cost savings from heating and cooling less air, manually adjusting office temperature is an excellent option

Adjusting your thermostat to 2°C lower during the winter and higher during the summer could reduce the amount of emitted CO₂ by roughly one tonne.

Natural Resources Canada recommends setting your thermostat to 17° C when the office is not in use and 20°C when there is traffic in the office. You can save approximately **2%** on your heating bill for every 1° C the temperature is turned down overnight.



Insulation:

Insulation can be one of the most cost-effective ways to reduce energy consumption. There are four main types of insulation: batt, loose-fill, rigid board, and spray foam. There is an opportunity to improve energy efficiency by adding insulation to roofs, attics, and in walls.

Resources:

- [Air-sealing roofs and attics](#)
- [R-value explanations](#)



Weather Stripping Windows/ Doors:

Proper weather stripping helps to maintain consistent indoor comfort and temperature. The air sealing of doors at your facility can improve overall air quality and energy efficiency. Great part is that you can easily do it yourself!

Resources:

- [How to weather strip your windows and doors](#)
- [Weather stripping - Home Depot](#)

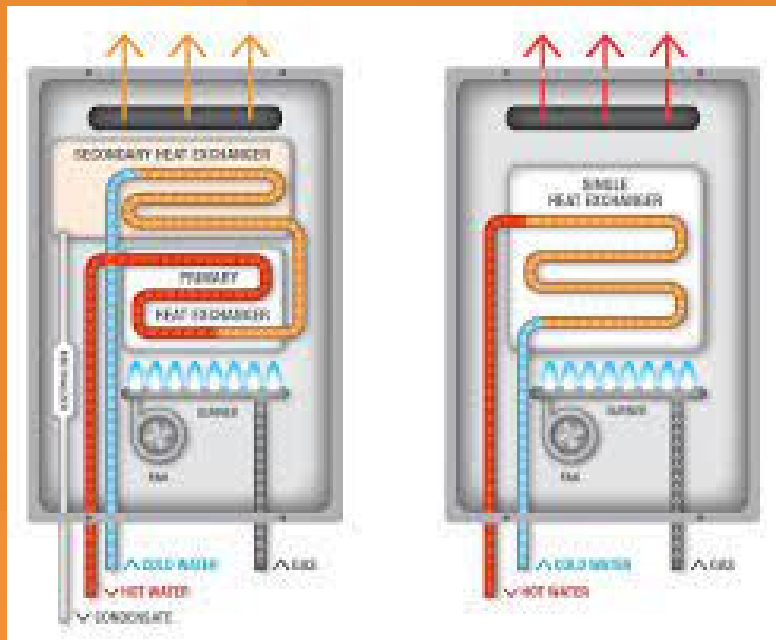
Condensing Tankless Water Heater:

Conventional water heaters store heated water continually, even when the heated water is not needed. Tankless water heaters heat water only as it is demanded.

The energy required to heat water is greatly reduced as a result of not having to continually maintain the heat in a tank of water. Installing a tankless water heater translates into cost savings of approximately **\$160** or more annually on your utility bill (assuming 155L/day) and a reduction in emitted GHGs from reducing heating energy needs.

Resources:

- [Sizing tankless water heaters](#)



Eliminate **30%**
of energy used
to heat water

Economizer Installation:

An economizer is connected to a heating and/or cooling system to automatically adjust the operation of the system for minimized energy use. When temperatures outside are cool enough, the economizer will shut off the compressor and bring cool air from outside to circulate through the building. Installing an economizer can eliminate unnecessary space cooling and reduce associated costs. Many new air conditioning models have economizers built-in and operate more efficiently than older models.

It costs around \$1,500 for a cooling capacity of 10 tons.



Hot Water/Steam Pipe Insulation:

Uninsulated hot water pipes radiate heat energy as water travels from its source (a water heater or boiler) to its destination. This heat loss means additional heating energy is required to maintain the desired temperature of the fluid.

Hot water pipes in a small building are **easily insulated** with affordable, flexible insulating sleeves, which can increase water temperature by 1° C to 2° C in the home. For commercial or industrial applications, a contractor may be required.

For a small business with an average annual water-heating bill of \$400 – \$600, you're looking at savings of about \$8 – \$12 per year.

Water Heater Temperature Reduction:

Conventional hot water heaters are set to keep the water temperature within the range of 130° F – 140° F.

Reducing the temperature of your hot water heater can lower costs and reduce your GHG footprint. Ensure that the temperature set on your hot water heater meets minimum health and safety requirements. This information can be found in your heater manual or by contacting the water heater company.

Reduce heat by
10° F to save
3-5% on energy
bill

Solar Photovoltaic Panels:

Generating your own renewable energy removes your GHG emissions and bills over the long term. Adding a solar PV array can reduce and offset electricity consumption at facilities.

Solar panels can be installed on a rooftop or on ground racking or a tracker. It is best to have the PV panels facing south to maximize energy production.

Actual electrical generation may vary due to a variety of environmental and technical factors and can be more accurately predicted using the RETScreen tool.

Resources:

- [Solar Power Ontario](#)
- [Solar Project at Heeman's](#)
- [Local service provider: German Solar Corporation](#)

Save **100%** of
electricity
usage!



Living (Green) Walls:

Living walls have become iconic features of green buildings. Living wall varieties have unique benefits and drawbacks and can fail (die) if not designed or maintained properly. There are several types of living walls: hydroponic systems, modular boxes, and green facades.

The leaves of plants can help to clean the air of Volatile Organic Compounds (VOCs) and other common indoor air pollutants. Up to **80% of indoor air pollutants** can be reduced if the living wall is combined with a biofilter, as air is drawn through the plants and other organic material of the wall and recirculated (typically after further treatment, such as dehumidification). The roots of plants in the wall can even help to eliminate nutrients in the water that would otherwise pollute local water systems if the wall is combined with rainwater or greywater recovery systems.

Companies that install green walls in London area:

- Nedlaw Living Walls
- Urban Green



Sustainable Transportation

Commuting:

Consider employee commuting when you are evaluating your organization's total environmental impact. Supporting employee carpooling, initiating flex hours, participating in public transit incentive programs, or providing your employees with the option to telecommute are viable options when it comes to reducing commuting-related GHGs.

The average Canadian spends approximately [twelve full days](#) a year commuting between home and work. This not only affects employees' happiness (impacting efficiency at work) but is also a significant contributor to your organization's carbon footprint.

This sustainable transportation section focuses on initiatives related to reducing your organization's commuting carbon footprint.



Bike Racks:

Consider installing bike racks which can help your employees switch to bicycle commuting. The installation of bike lockers can provide secure bike parking options for those who cycle to work.

Bike racks can be purchased in a variety of sizes and configurations. They are typically made of steel in order to withstand the elements and tamper with potential thieves. Select a bike rack appropriate to the size of your workforce and their potential enthusiasm for biking. They also communicate to employees that your business values their choice to adopt a more active and lower-impact commuting method.

Bike racks can cost anywhere from \$10 to \$80 per bicycle space (total cost \$120 - \$900).



Carpooling:

Encourage your employees to investigate carpooling options to your employees. You can also set a commuting challenge within your office and set incentives to spark interest or enthusiasm. GHG emissions resulting from your workforce commuting to and from the office count toward your business' total emissions for reporting purposes.

Sharing a ride to work can reduce costs for employees and cut commuting-related emissions by up to **50%** if done regularly. The [Commuter Challenge](#) is a friendly, national competition to encourage employees to leave their vehicles at home.



EV Charging Station:

Install an EV (electric vehicle) charging station at your business to help increase the availability of localized charging opportunities at workplaces. Transportation accounts for a quarter of Canada's GHG emissions, half of which comes from passenger cars and light trucks. A charging station in the parking lot promotes environmental awareness amongst employees and visitors to your facility. The benefits include generating revenue, raising your public profile, reducing carbon emissions, getting ahead of the curve, and helping to accelerate Canada's low-carbon transition.

Member Projects:

- In 2021, Heeman's installed a solar panel array which generates 57% of their annual power needs, generating over 128,000 kWh/year. Most recently, Heeman's installed three Level 2 EV charging stations, leveraging power from their solar panels to charge the EVs.
- London & District Construction Association installed two Level 2 EV chargers as part of their strategy to reduce Scope 3 GHG emissions and encourage their customers and others in the sector to use electric vehicles.



Public Transportation Incentives:

A significant value-added initiative for your employees' benefit is to subsidize their public transit passes. Either paying full price or offering some percentage of reimbursement for employees who purchase bus passes. Public transit greatly reduces air emissions related to personal vehicle use, including GHGs and precursors to particulate matter and ground-level ozone.

Implement a policy for public transit reimbursement. Talk to employees to gauge interest in implementing a program. This kind of initiative is a great way to increase enthusiasm for your company's sustainability goals as it demonstrates comprehensive consideration of your business' emissions.



Funding Resources:

The following section provides information on different types of financial programs and incentives available (as of Winter 2023). Use these resources to implement emissions reduction projects mentioned throughout this guidebook.

Incentive Information

Type of Project

SaveON Energy: Retrofit Program

Helps organizations install and benefit from energy-efficient solutions. Incentives are available for retrofits like lighting, occupancy sensors, demand control ventilation units and installing controls to improve building efficiency.

Further Information: [Retrofit Project](#)

Electricity

Space/water heating

Equipment/lighting

SaveON Energy: Lighting

Qualifying organizations can get a free lighting assessment of their facility, \$2000 in light upgrades and installation.

Further Information: [Business Lighting Program](#)

Electricity

Equipment/lighting

Incentives for Zero-Emissions Vehicles Program

Allows for a rebate of up to \$5,000 on EVs purchased on or after May 1st, 2019. List of eligible vehicles and rebates [here](#).

Further Information: [Light-duty zero-emissions vehicles](#)

Transportation

Funding Resources:

Incentive Information

Type of Project

Commercial Equipment Incentives

Various incentives for different commercial equipment. Includes: space heating, water heating and food service.

Further Information: [Business Incentives](#)
[Enbridge Gas](#)

Electricity

Space/water heating

Meters to Monitor Energy Use

Install a natural gas, steam or hot-water meter to measure or monitor energy usage. Industrial customers: 50% of meter cost, up to \$3,500.

Further Information: [Meters to Monitor Energy Use](#)

Equipment/lighting

Space/water heating

Electric Vehicle Charger Incentive Program

Reimburses up to 50% of the total eligible project costs of installing EV charging stations at your workplace. Total funding available is up to \$100,000 per applicant.

Further Information: [EVIP](#)

Transportation

Thank You to our Supporters!



THE
READY
COMMITMENT

Canada



Together, we're demonstrating a sustainable economy is possible.

For more information on any of these projects, or to get started on your sustainability journey, visit greeneconomylondon.ca or contact kaitlin@londonenvironment.net

