

Low-Carbon Procurement

Abstract

Government procurement is an important tool that Ontario should use to help build a low-carbon economy.

The Ontario government buys billions of dollars of goods, services and infrastructure every year, and has a large greenhouse gas (GHG) footprint to shrink. The government is a critical early market for low-carbon innovations in product and infrastructure design, and can pave the way for them to spread across the economy.

The Ontario government has made some efforts to green what it buys and builds, but there is much more to do. For example, the government tracks GHGs from the energy it uses directly, but ignores the embodied emissions of products and infrastructure.

The Ontario government has pledged to ensure low-carbon procurement and become carbon neutral. To reduce its GHG footprint from procurement, it must:

1. Insist on the disclosure of the total GHG footprint of each product or project subject to procurement, specifically where the procurement categories are known to be GHG intensive;
2. Give that footprint significant weight in procurement decisions;
3. Set a specific emissions-reduction target for procurement; and
4. Report annually on the effectiveness of low-carbon procurement initiatives.

“Government procurement policies and practices should be aimed at reducing GHG emissions, with best practices applied at all levels of government.”

Conference Board of Canada, 2017¹



Contents

8.0 Government Procurement is Important	238
8.0.1 Whose Procurement?	238
8.0.2 What is Low-Carbon Procurement?	239
8.1 Why Does it Matter?	240
8.1.1 The Government’s Large GHG Footprint	240
8.1.2 A Critical Early Market for Low-Carbon Innovations	240
8.1.3 An On-Ramp for the Rest of the Economy	241
8.2 Procurement With One Eye Open	241
8.2.1 A Good Start	241
8.2.2 Carbon Neutral Government?	244
8.2.3 Total (Life-Cycle) GHGs	244
8.3 Procurement with Both Eyes Open	247
8.3.1 Disclosing the Total GHG Footprint of High-Emission Products and Materials	247
8.3.2 Making the GHG Footprint Matter in Procurement Decisions	249
8.4 ECO Conclusions and Recommendations	251

8.0 Government Procurement is Important

Due to their considerable spending power, governments can play an important role in shaping demand for goods, services and infrastructure. Every year the Ontario government alone purchases about \$1.9 billion in goods and services.² Examples include office supplies, furniture, food, clothing, vehicles, fuel, electricity, travel services, information technology and waste management. In addition, Ontario has committed to spend about \$190 billion on infrastructure over 13 years.³ This public procurement makes up about 2% of the province's annual \$798 billion Gross Domestic Product (2016).⁴

GOVERNMENTS CAN PLAY AN IMPORTANT ROLE IN SHAPING DEMAND FOR GOODS, SERVICES AND INFRASTRUCTURE

8.0.1 Whose Procurement?

This chapter focuses on goods and services that the Ontario government buys, as well as the infrastructure that it builds and maintains.⁵

In particular, it concentrates on procurement decisions that are governed by two provincial procurement directives, one for the Ontario Public Sector (OPS) and one for the Broader Public Sector (BPS).⁶ These directives are issued by the Treasury Board Secretariat, with support from the Ministry of Government and Consumer Services. They spell out responsibilities at

each stage of the procurement process (see Appendix F, Section F1, available online only at eco.on.ca).

By *government procurement* we mean:

1. All procurement by the ministries, agencies and other institutions to which the OPS Procurement Directive applies; and
2. Infrastructure procurement by the OPS and BPS (see Table 8.1).

In this chapter, procurement does not include other forms of government spending such as grants, entitlement agreements and shared cost agreements. Nevertheless, the ECO believes that a climate lens should be used in these spending areas as well (see Chapter 7).

Table 8.1. The Ontario Public Service (OPS) and the Broader Public Sector (BPS)⁷.

Ontario Public Service (OPS)

All ministries
All provincial agencies
Independent Electricity System Operator (IESO)
Ontario Power Generation (OPG)

Broader Public Sector (BPS)*

Hospitals
School boards
Colleges
Universities
Community Access Corporations
Children's Aid Society

**Publicly funded organizations that received public funds of \$10 million or more in the previous fiscal year are also considered a part of the BPS.*



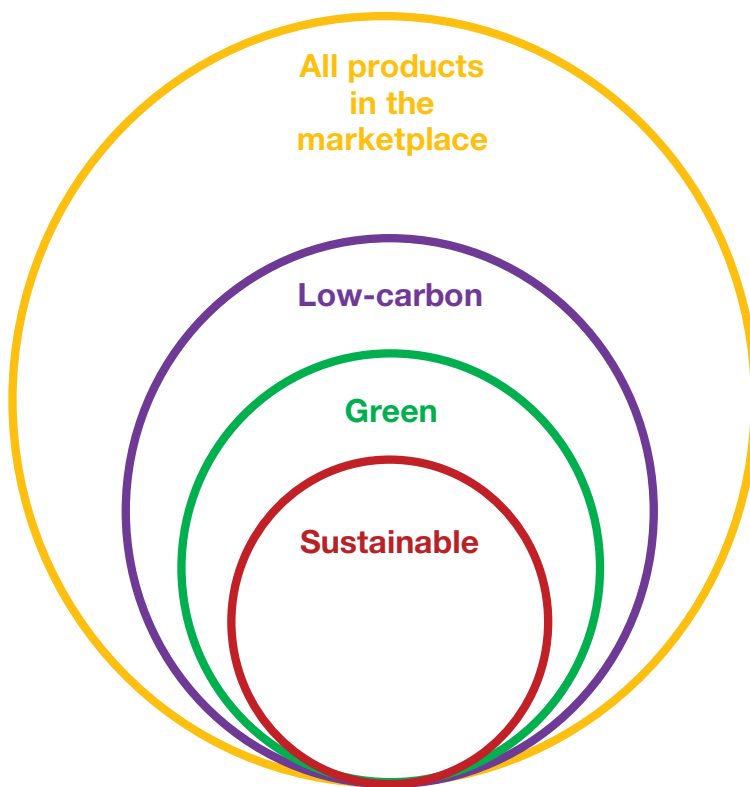
8.0.2 What is Low-Carbon Procurement?

There are many ways to make a product, and some produce more GHGs than others. Low-carbon procurement is designed to reduce the GHGs associated with products and materials purchased, and can succeed where carbon prices sometimes do not (see Appendix F, Section F2, available online only at eco.on.ca).

Low-carbon procurement is one type of green or sustainable purchasing, but green, sustainable and low-carbon purchasing policies are not always the same. Low-carbon policies focus narrowly on GHGs. Green product criteria commonly address GHGs,

resource conservation (e.g., water, energy, mined and harvested materials), biodiversity protection, and pollution reduction. Sustainable product criteria are even broader, adding local economic benefits, as well as health, safety and labour standards.⁸

Figure 8.1 illustrates how these categories overlap. Typically, more products meet low-carbon criteria than green criteria, and more products meet green criteria than sustainable criteria. A low-carbon product may not be a green product, e.g., due to toxic emissions or habitat loss. A green product may not be a sustainable product, e.g., due to health and safety violations associated with its production.



Low-carbon

Evaluation criteria are used to reduce GHG emissions relative to conventional procurement options

Green

Evaluation criteria include performance indicators beyond GHG mitigation (e.g., energy efficiency, habitat protection, material circularity, natural resource conservation, removal of toxins, waste prevention, water conservation)

Sustainable

Evaluation criteria include environmental, economic and social performance indicators

Figure 8.1. Comparing low-carbon, green, and sustainable procurement.



8

LOW-CARBON PROCUREMENT CAN SUCCEED WHERE CARBON PRICES SOMETIMES DO NOT

Policies to reduce the environmental footprint of government purchases are now common; over 50 national governments have sustainable public procurement policies.⁹ In Canada, the federal government, and some provinces and municipalities have green procurement policies, which may include GHG reduction and carbon neutrality targets. The Government of Canada has had a policy on green procurement since 2006. For some types of procurement by the federal government, procurement managers look at both the retail price and the evaluated price, which includes life-cycle costs (see Appendix F, Section F3, available online only at eco.on.ca).¹⁰ Green procurement targets are set in the *Federal Sustainable Development Strategy*, and progress is reported annually.

At the provincial level, public procurement in British Columbia has guidelines for environmentally responsible procurement, considering multiple types of environmental impacts.¹¹ These guidelines support B.C.'s target to become carbon neutral, as documented in annual progress reports.¹²

In the United States, some states such as California have adopted a different approach. This state sets a maximum acceptable GHG intensity for the procurement of certain materials known to have high emissions.¹³

The ECO believes that Ontario government purchases should be both green and sustainable, but this chapter focuses on the impact of procurement on GHGs.

8.1 Why Does it Matter?

8.1.1 The Government's Large GHG Footprint

As discussed in Chapter 7, the government has a large GHG footprint, which a low-carbon procurement policy can help to reduce. For example, green procurement in seven European countries produced an average GHG emissions reduction of 25% when compared to business-as-usual procurement practices, as well as a 1% reduction in costs.¹⁴

8.1.2 A Critical Early Market for Low-Carbon Innovations

Low-carbon procurement policies stimulate market demand for low-carbon products. For new Ontario businesses with innovative products, the government provides a vital early market. Without this support, Ontario clean tech companies often fall into the so-called 'valley of death' – the perilous interval between the early stage of research and development and market entry.¹⁵

GOVERNMENT USE OF LOW-CARBON PRODUCTS SETS A POWERFUL EXAMPLE FOR OTHERS TO FOLLOW

8.1.3 An On-Ramp for the Rest of the Economy

An OPS focus on low-carbon procurement can pave the way for the broader public sector and the rest of the economy. For example, methods implemented to support OPS procurement would facilitate low-carbon procurement by everyone else. Government use of low-carbon products sets a powerful example for others to follow, and demonstrates the effectiveness of these products to prospective buyers at home and abroad. Foreign buyers have more confidence when home jurisdictions use a product. Buyers tend to be hesitant about adopting innovative products and practices until they have seen them working.

A recent OECD report concludes that these indirect effects may be more important than the direct GHG impact of what the government buys.¹⁶

8.2 Procurement With One Eye Open

8.2.1 A Good Start

The provincial government has made a good start at reducing its GHG footprint, but there is much more to do.

In 2009, the OPS Green Office at the Treasury Board Secretariat introduced a *Green Transformation Strategy*. This strategy featured GHG-reduction targets and other initiatives to promote green business practices within the government's operations. Commendably, the OPS has already reached the GHG-reduction target set in 2009, which was to reduce emissions from OPS energy use 27% by 2020/2021, relative to a 2006 baseline. This accomplishment was speeded by Ontario's phase out of coal-fired power plants, which dramatically reduced the GHG footprint of Ontario electricity. Unfortunately, this GHG target does not include the emissions from non-energy procurement, which are likely the majority of OPS emissions (see Chapter 7).

The OPS Green Office supported and co-ordinated a number of excellent initiatives that reduced the environmental impacts of procurement (Table 8.2). As well, over 100 Green Teams in OPS ministries led projects with low-carbon benefits (e.g., Paperless Office Competition, Earth Day Battery Recycling Challenge).¹⁷

Table 8.2. Examples of OPS Initiatives that would reduce the GHGs associated with procurement.¹⁸

Focus of Initiative	Examples
Reducing fuel use in fleet vehicles	<p>In the OPS fleet of 5,500 vehicles, 26% are hybrids and 2% are electric. The number of hybrid/electric vehicles in the OPS fleet has increased by 15 times over ten years.</p> <p><i>Are these GHG reductions measured?</i> Yes</p> <p>Have GHGs decreased from the 2006 baseline? Yes</p>
Reducing energy consumption in buildings	<p>Leadership in Energy and Environmental Design (LEED®) certification is mandated for all government-procured new buildings and major renovation projects in Ontario. A ‘retro-commissioning’ program that reports on building operations and identifies opportunities for improvement has been implemented in 16 government facilities since 2012.</p> <p><i>Are these GHG reductions measured?</i> Yes</p> <p>Have GHGs decreased from the 2006 baseline? Yes</p>
Reducing business travel	<p>Training was provided for OPS employees to learn best practices for making web meetings interactive, engaging and collaborative.</p> <p>In 2015/2016, over 6,200 video conferences were held, replacing business travel. This represented a 55% growth in video conferences relative to the previous year.</p> <p><i>Are these GHG reductions measured?</i> Yes (air travel); No (all forms of transport other than OPS fleet – e.g., taxis and car rentals)</p> <p>Have GHGs decreased from the 2006 baseline? Yes (air travel)</p>
Cutting paper consumption	<p>Double-sided printing has been standardized throughout the OPS. A Central Forms Repository was set up to facilitate the download of online forms. An electronic submission process for procurement was initiated.</p> <p><i>Are these GHG reductions measured?</i> No</p>
Increasing waste diversion	<p>Annual waste audits are performed at all government-owned facilities over 10,000 m². In 2015/2016, the OPS:</p> <ul style="list-style-type: none"> - recycled over 4 million kg of office paper; - reused 17,160 surplus furniture items (redeployed to developing countries and other OPS offices); and - ensured that all of its electronic waste was recycled (almost 3,000 tonnes recycled since 2007/2008). <p><i>Are these GHG reductions measured?</i> No</p>



An example of a hybrid vehicle used in the OPS fleet.¹⁸

Photo Credit: Government of Ontario

In December 2014, the Treasury Board Secretariat issued an OPS Procurement Directive that contains some sustainability requirements. For example, reduction, reuse and recycling measures are to be considered in all procurements. Waste management plans must be submitted for procurements that include designated materials. Procurements valued at or over \$10,000 are supposed to meet environmental standards such as EcoLogo®.¹⁹

The OPS Directive requires some categories of products to meet specific environmental standards. For example, computers procured by the OPS must meet EPEAT® Silver or Gold standards.²⁰ However, similar products, such as touchscreen monitors, have no environmental criteria. And some products on OPS product ordering lists are clearly not sustainable, such as cleaning supplies with triclosan.²¹

Similarly, the Directive for Major Public Infrastructure Projects states that a major infrastructure project must demonstrate how it promotes the “achievement of the government’s other policy objectives or priorities,

such as climate change (including government targets for emissions reductions).”²² The Operational Policy for this Directive specifies that, for major infrastructure projects, the project sponsor will provide information about its strategies to reduce life-cycle GHG emissions. However, the means of taking this information into account in the procurement decision is left unspecified. The procurement of infrastructure remains tightly focused on minimizing capital cost and construction time, not on reducing GHGs.

Overall, there is a notable disconnect between the environmental promises of the Directives and the actual products and materials that the government buys. There is also a lack of accountability. The government produces an internal report of its GHG emissions from energy use every year. However, little information is made public about the GHG impacts of OPS procurement. The government does not even clearly disclose its procurement policies. For example, the OPS does not make public when EcoLogo® and EPEAT® environmental standards are required.

THERE IS A NOTABLE DISCONNECT BETWEEN THE ENVIRONMENTAL PROMISES OF THE DIRECTIVES AND THE ACTUAL PRODUCTS AND MATERIALS THAT THE GOVERNMENT BUYS

8.2.2 Carbon Neutral Government?

The Ontario Public Sector's GHG-reduction targets set in 2009 have now been superseded. The 2016 *Climate Change Action Plan* (CCAP) includes a more ambitious commitment: to have the OPS be carbon neutral by 2018. Will this pledge apply to the full GHG footprint of the OPS?

The CCAP states that the OPS Procurement Directive will be revised to include mandatory low-carbon criteria in procurement, "considering the full life cycle of products."²³ This promise has not yet been implemented.

8.2.3 Total (Life-Cycle) GHGs

The promise to include life-cycle GHGs in procurement is important. Today, the Ontario government acknowledges the GHGs from the energy it uses directly, but it largely ignores the upstream and downstream GHG impacts of what it buys and builds.

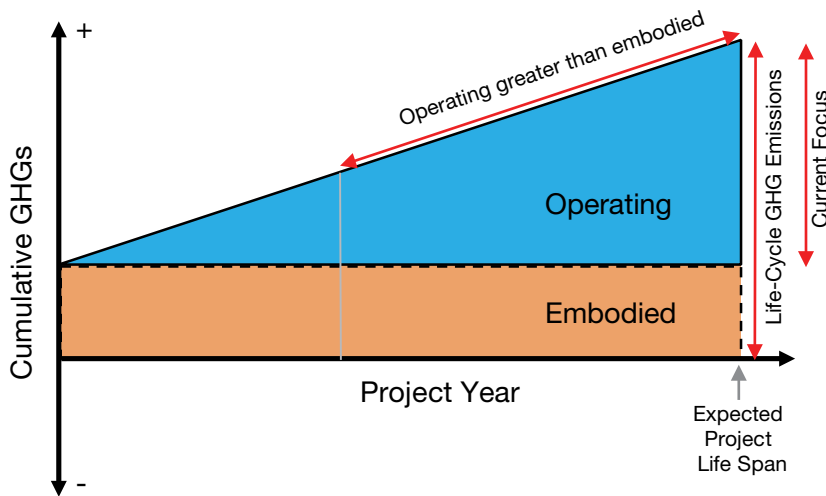
The government reports the GHG emissions from the energy it uses to operate its buildings. However, these assets also have substantial embodied emissions that take place during the material extraction, processing, transportation, installation and waste management stages of their life cycles. These embodied emissions are not trivial. For example, over 20% of a building's GHG impact is typically the embodied carbon in the structure.²⁴ Embodied emissions are not only relevant for infrastructure projects. For example, the embodied emissions associated with the computers and monitors used by the OPS likely exceed the emissions from all OPS air travel.²⁵



This upstream stage is important too.

Photo credit: Government of Ontario

Figure 8.2 illustrates the cumulative operating and embodied emissions of a hypothetical project over time and identifies the difference between the current government GHG emissions focus and the full life-cycle GHG emissions.



Operating emissions
Associated with the energy used by the asset. Take place over the life of the asset.

Embodied emissions
Associated with the manufacture, transportation, installation and disposal of an asset. Take place at the beginning and end of the asset life.

Figure 8.2. The cumulative GHG emissions of a hypothetical project, including operating and embodied emissions.²⁶ Note: additional embodied emissions take place at the end of life of the asset (end-of-life emissions were omitted to simplify the graph).

Under the current procurement directives, the government tends not to track, report and value embodied emissions. As a result, the government understates its GHG footprint, and may unwittingly make procurement decisions with unnecessarily high GHG impacts.

For example, steel and concrete have substantial embodied GHG emissions and are likely a large part of the government’s full GHG footprint (see Chapter 7).

Some steel and concrete production methods generate fewer emissions (e.g., embedding carbon dioxide into concrete²⁷ and increasing the recycled content of steel). Transportation emissions can also be significant. The government can therefore reduce its GHG footprint by purchasing lower-emission versions of steel and concrete. Yet the current procurement directives ignore the fact that apparently interchangeable materials may have different embodied emissions.



Examples of materials used in buildings and infrastructure.

Photo credit: Morguefile

Embodied emissions could be reduced through lightweighting/dematerialization, increased life-span/durability, as well as improved design to facilitate repair, upgrading, reuse, disassembly and recycling. But the government is unlikely to reduce embodied emissions if it does not measure and report them.

Durability – Paving for Tomorrow

GHG emissions can be reduced by putting an emphasis on durability when procuring products and infrastructure. This is an area where the government has a problematic record. For instance, the 2016 Auditor General’s report noted that some Ontario highways have life spans 50% to 60% shorter than the normal 15 years, due to cheaper materials mixed into their asphalt.²⁸ Recently, the Ministry of Transportation has started to phase in an “extended aging” test in its asphalt procurement, which is intended to ensure that asphalt reaches its expected life span.²⁹ Shorter road life spans increase embodied GHG emissions due to additional construction work and materials required.

Additionally, under the more extreme weather conditions predicted under a changing climate, infrastructure may become more vulnerable to damage and failure. For example, results from a recent U.S. study indicated that the failure to update pavement engineering policy and practice to adapt to changing climate conditions will result in considerable additional costs due to shorter life spans.³⁰



Six-year-old highway with premature cracks in Coldwater, Ontario.

Photo credit: Ministry of Transportation.



8.3 Procurement with Both Eyes Open

8.3.1 Disclosing the Total GHG Footprint of High-Emission Products and Materials

A significant obstacle to cost-effective low-carbon procurement has been the lack of credible comparable data on the total GHG footprint of competing products. The first step in procurement with both eyes open is for the government to know the total GHG footprint of the products and materials that it buys. The government can and should insist on its suppliers providing such information – especially for high GHG products and materials.

Vendors can supply this information using life-cycle assessment (LCA) and/or environmental product declarations (EPDs).

LCAs account for the total environmental impacts of products throughout their life cycles, from raw material extraction to end-of-life (Figure 8.3).³¹ An LCA can evaluate a product life cycle ‘cradle-to-grave,’ or preferably, ‘cradle-to-cradle’ (i.e., via reuse or recycling).

A SIGNIFICANT OBSTACLE TO COST-EFFECTIVE LOW-CARBON PROCUREMENT HAS BEEN THE LACK OF CREDIBLE COMPARABLE DATA

LCAs aim to include all GHG emissions, regardless of which organization controls the emissions; in other words, both direct and indirect. Direct emissions are from sources owned or controlled by an organization; indirect emissions result from an organization’s activities, but occur at sources owned or controlled by other organizations (i.e., those that are part of the procurement supply chain).

Detailed LCAs take time and resources to complete, but streamlined approaches are available, using LCA software and databases.

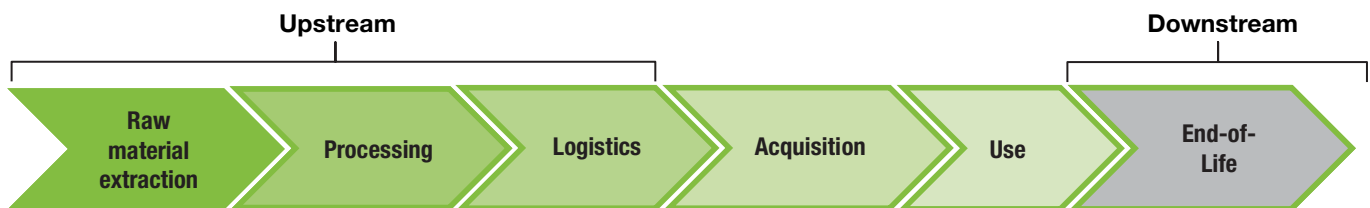


Figure 8.3. A typical ‘cradle-to-grave’ product life cycle for a procured asset.

LCAs are typically bespoke. An even more streamlined method to communicate the total GHGs of a material or product is for the vendor to supply a standard environmental product declaration. An EPD is a registered, independently verified document that communicates the life-cycle environmental impact of a product.³² One can use EPDs to compare the life-cycle GHG emissions of one product with another, which makes it easier for a buyer to choose products with lower

emissions. However, ensuring credible and comparable GHG estimates is challenging (see text box below).

The Ontario government should require procurement bids to include EPDs and/or LCAs when the products/materials are traditionally GHG intensive. To ensure accuracy, credibility and comparability, EPDs and/or LCAs for major purchases should be coupled with rigorous auditing and verification procedures.

Ensuring Credible GHG Estimates

Credible EPDs and/or LCAs should, as much as possible, represent the conditions at a particular factory and/or work site, not industry-average conditions. Why is this important? The GHG intensity of a product is often highly dependent upon the location of production – e.g., the climate impact from producing an aluminum ingot in China is about five times higher than if it is produced in Quebec.³³

Product GHG intensity also depends on the type of technology used. For crude steel production, the basic oxygen furnace and electric arc furnace are the two main options used. The former, accounting for about three-quarters of global steel production, is far more GHG intensive (i.e., tonne of CO₂ / tonne

of crude steel) than the latter.³⁴ Other important methodological issues, such as the awarding of the recycling credit, also need to be addressed to ensure credible impact estimates.³⁵

Although EPDs must be independently verified, quality control and representativeness remains a very important issue. Both EPDs and LCAs can use inconsistent datasets, different system boundaries and modelling assumptions. Some jurisdictions such as the Netherlands, Germany, France and Belgium have addressed this issue by having their own EPD databases.³⁶ This could take some time to set up, and EPDs must be kept up to date to ensure that they remain representative. The ECO encourages the government to explore this option.

Ontario is beginning to take LCA seriously, especially in its infrastructure procurement. The Ministry of Infrastructure's *Long-Term Infrastructure Plan* outlines the Ontario government's intentions with LCA. Its plans include: (1) "Starting in 2019, the Province plans to roll out LCA broadly as a tool to support evidence-based infrastructure decisions"; and (2) "Ontario will work toward having a LCA for major infrastructure projects by mid-2020."³⁷



Beyond the Life Cycle: Induced Emissions

LCA and EPDs will, at best, show the total GHG emissions of a product, project or material. For infrastructure projects, these accounting tools omit possibly the biggest impact on GHG emissions: how the projects affect the communities that they serve. These *induced emissions* are made necessary as a result of the design and placement of a newly constructed asset. For example, locating a hospital in a difficult to access location may force patients and employees to have a lengthy daily commute by car. The additional emissions caused by this travel would almost certainly surpass the embodied and operational emissions of the hospital over its expected life span.

This potentially much larger impact is beyond the scope of this chapter.

8.3.2 Making the GHG Footprint Matter in Procurement Decisions

Once the government has credible information about the total GHG footprint of competing products and materials, how will it use that information? The government should set out a clear strategy in its procurement directives for giving GHGs weight. Options include:

1. Eco-labels and standards
2. Performance specifications
3. Points in a procurement evaluation
4. Social cost of carbon

These options can be complementary (i.e., 1 or 2 can be used in conjunction with 3 or 4) or mutually exclusive (i.e., 3 and 4). The first two options specify

THE GOVERNMENT SHOULD SET OUT A CLEAR STRATEGY FOR GIVING GREENHOUSE GASES WEIGHT

minimum GHG and/or environmental performance thresholds for products and projects under consideration. In contrast, options 3 and 4 address how GHGs are valued in procurement evaluations, and are mutually exclusive. Points in a procurement evaluation can be used to give GHGs a higher or lower value than a social cost of carbon.

Low-carbon procurement procedures could be quickly phased in for high GHG categories, beginning with demonstration procurements using revised bidding and evaluation criteria. This would help both the vendors and procurement managers gain expertise with the new system before a widespread roll-out.

1. Eco-labels and Standards

Eco-labels/certifications (e.g., EcoLogo®) can simplify the procurement process if only those products that bear the label may be procured. The OPS Directive mandates such labels/certifications for procurements above \$10,000. Unfortunately, it is not clear how rigorously this requirement is followed. In addition, the government does not disclose how many of its procurements are priced at less than \$10,000. These lower-cost purchases may, in total, have large GHG impacts. For example, office paper consumption, about 60 kg per OPS employee per year,³⁸ may create considerable emissions.

Eco-labels/certifications do have limitations. For example, innovation freeze can result if lists of accredited products are not kept up to date (i.e., recently introduced, innovative products may not be included).³⁹ Also, eco-labels/certifications may not differentiate between good,

better and best products. Therefore, eco-labels are imperfect tools, and some method of proving *equivalent or better* may be appropriate.

Due to the substantial emissions associated with the construction and use of buildings, various low-carbon or green building standards have been introduced. LEED® is the most well-known and widely-used green building rating system in North America⁴⁰ and LEED® Building Design + Construction Silver certification is mandatory for new government buildings and major renovations. There are 1,248 buildings in Ontario that have met the LEED® building criteria.⁴¹ Previous versions of LEED® did not consider the embodied GHG emissions of building materials/construction, although the current version does include relevant optional credits. Other environmental building standards relevant for Ontario include the recently introduced Canada Green Building Council Zero Carbon Building Standard⁴² and the Toronto Green Standard.⁴³ As with LEED®, embodied emissions reductions are optional credits under these alternative green building standards. Therefore, although green building standards tend to reduce GHG emissions, they are not sufficient to ensure that embodied emissions are low.⁴⁴

2. Performance Specifications

Buyers can set a maximum GHG intensity for high-emission products and materials, while leaving the vendor with flexibility to meet these specifications. Buyers should be able to set stringent performance requirements, even if only one or two suppliers can meet them.

For example, California law AB-262 requires a “maximum acceptable global warming potential” to be set for procuring four GHG intensive materials (“eligible materials”): structural steel, carbon steel rebar, flat glass and mineral wool board insulation.⁴⁵ These limits are to be reviewed every three years, and adjusted downwards as industry improves. Project bidders must

submit facility-specific EPDs of the projects’ eligible materials, demonstrating compliance with GHG limits.

Recycled Content Specifications as a Means of Reducing Procurement Emissions

The GHG emissions of procured products and infrastructure can also be reduced by specifying minimum recycled content levels for certain materials.

In our 2017 waste and environmental protection reports, the ECO looked at the environmental benefits of using procurement policies to increase demand for products that incorporate recycled content. The ECO recommended that the government prioritize the use of recycled aggregate in its infrastructure. Would adoption of this recommendation contribute to the government’s low-carbon procurement objective? Other jurisdictions have witnessed dramatic benefits from using recycled aggregates. For example, a recent LCA of aggregate use in Hong Kong found that coarse aggregate derived from construction and demolition waste produced about a third of the GHGs of mined aggregate.⁴⁷



Production of aggregate.

Photo credit: Morguefile.



3. Points in a Procurement Evaluation

The GHG footprint can be given considerable weight in procurement evaluation criteria. This works best in outcomes-based procurement, where the specific method to produce the outcome is left to the bidder.⁴⁸

For example, the *Future of the Fjords* ferry procurement in Norway⁴⁹ gave sustainability criteria a high weight (40% of the evaluation score), and demanded a minimum level of energy efficiency (a 15% reduction in mean energy use), but did not specify any particular technology. This resulted in the world's first electric ferry, and an 89% reduction in GHGs.⁵⁰

4. Social Cost of Carbon

Climate change is responsible for many types of present and future environmental damage that has economic implications, such as loss of infrastructure and reduced agricultural production. A social cost of carbon (SCC) is an attempt to quantify this damage in financial terms, so as to internalize it into economic decisions, such as procurement.⁵¹ In other words, an SCC puts a dollar figure on the predicted incremental damage from each tonne of GHG emissions. This cost can be deducted from the value of high-emission products and materials, levelling the playing field for lower GHG competitors.

The SCC indicator has been used in cost-benefit analyses of some U.S. and Canadian federal policy initiatives and regulations.⁵² The current Canadian federal SCC is \$41/t CO₂e.⁵³ This is higher than the carbon price in Ontario's most recent auction of GHG allowances (less than \$20/t CO₂e).

An SCC could simplify procurement by translating GHG impacts into a single dollar figure. However, there is a great deal of uncertainty associated with SCC estimates⁵⁴ and there are disadvantages to having more than one carbon price in a single economy (e.g., SCC vs. Ontario's carbon allowance price) (see

Appendix F, Section F4, available online only at eco.on.ca). Nevertheless, making procurement decisions without attaching *some* dollar figure to GHG emissions effectively treats the SCC as zero. Whatever the correct SCC may be, it is definitely not zero.

The Ministry of the Environment and Climate Change is evaluating the possible use of an SCC in government decision making, including procurement.

8.4 Conclusions and Recommendations

The Government of Ontario has taken some commendable first steps to reduce the carbon footprint of what it buys and builds. Leadership by the OPS Green Office and the enthusiasm of OPS employees were key in exceeding the OPS' 2009 GHG-reduction targets. Much greater focus on low-carbon procurement will be needed, however, to meet the government's ambitious goal of becoming carbon neutral, as promised under the CCAP. Adopting best practices and learning from leading jurisdictions will be essential.

The government should:

- **Insist on the disclosure of the total GHG footprint of each product or project subject to procurement, specifically where the procurement categories are known to be GHG intensive;**
- **Give that footprint significant weight in procurement decisions;**
- **Set a specific emissions-reduction target for procurement; and**
- **Report annually on the effectiveness of low-carbon procurement initiatives.**

Endnotes

1. The Conference Board of Canada, *Shaping the Canadian Low-Carbon Economy: A Discussion Paper* (Toronto: The Conference Board of Canada, 2017) at 21.
2. Ontario Ministry of Government and Consumer Services, information provided to the ECO in response to ECO inquiry (30 June, 2017). Estimate derived from 2014/2015 data.
3. This expenditure began in the fiscal year 2014-2015. "Ministry of Infrastructure", online: Ministry of Infrastructure, <www.ontario.ca/page/ministry-infrastructure>. [Accessed November 7, 2017]
4. "Ontario Factsheet July 2017", online: Ontario Ministry of Finance, <www.fin.gov.on.ca/en/economy/ecupdates/factsheet.html>. [Accessed August 14, 2017]
5. The Ontario government's infrastructure includes about 5,000 schools, 24 colleges, 140 hospitals, 17,000 km of highways, 2,800 bridges, transit networks, office buildings, and other buildings such as prisons. Ministry of Infrastructure, *BUILD ON 2017 Infrastructure Update* (Toronto: MOI, 2017) at 10.
6. Treasury Board Secretariat/Management Board of Cabinet, *OPS Procurement Directive* (Toronto: TBS, 2014). Treasury Board Secretariat/Management Board of Cabinet, *Broader Public Sector (BPS) Procurement Directive* (Toronto: TBS, 2011).
7. Definition of the Ontario Public Service - "Draft Public Service Procurement Directive", online: Treasury Board Secretariat (TBS) <www.ontario.ca/page/ontario-public-service-procurement-directive>. 19 December, 2017 update.

Definition of the Broader Public Sector - Treasury Board Secretariat/Management Board of Cabinet, *Broader Public Sector (BPS) Procurement Directive* (Toronto: TBS, 2011) at 3.
8. European Commission, *Buying Social. A Guide to Taking Account of Social Considerations in Public Procurement* (Luxembourg: Publications Office of the European Union, 2010) at 8.
9. OECD, *The Role of Public Procurement in Low-carbon Innovation*, (Paris: OECD, 2016) at 4.
10. OECD, *Going Green: Best Practices For Sustainable Procurement* (Paris: OECD, 2015) at 61.
11. "Guidelines for Environmentally Responsible Procurement", online: Government of British Columbia <www2.gov.bc.ca/gov/content/governments/services-for-government/bc-bid-resources/reference-resources/green-procurement/guidelines-for-environmentally-responsible-procurement>. [Accessed August 14, 2017]
12. The B.C. government, like Ontario, still limits its GHG accounting to those emissions from energy use of everyday operations, while ignoring upstream and downstream emissions.
13. "AB-262 Public contracts: bid specifications: Buy Clean California Act", online: California Legislative Information <leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB262> [Accessed October 23, 2017]
14. PWC Sustainability, *Collection of statistical information on Green Public Procurement in the EU. Report on data collection results findings* (PWC Sustainability, 2009) at 70.
15. Environmental Commissioner of Ontario, *Facing Climate Change*, (Toronto: ECO, 2017) at 115-116.
16. OECD, *The Role of Public Procurement in Low-carbon Innovation*, (Paris: OECD, 2016) at 20.
17. "Ontario Public Service (OPS) recognized as one of Canada's top 100 employers (2017)", online: MediaCorp Canada Inc. <content.eluta.ca/top-employer-ontario-government> [Accessed August 14, 2017]
18. Ministry of the Environment and Climate Change (MOECC), information provided to the ECO in response to ECO inquiry (4 July, 2017). Ministry of Infrastructure (MOI), information provided to the ECO in response to ECO inquiry (19 July, 2017).
19. EcoLogo®/Environmental Choice® is an eco-labeling standard that was first introduced in Canada and is now used by countries around the world. The Industry Canada website includes the claim that "EcoLogo standards are designed so that only the top 20% of products available on the market can achieve certification" ("Common Environmental Labels and Claims in Canada", online: Innovation, Science and Economic Development Canada <www.ic.gc.ca/eic/site/oca-bc.nsf/eng/ca02523.html>. [Accessed August 14, 2017]). However, the ECO has been unable to confirm the veracity of this claim, as it does not exist in the documentation for the standard.
20. Ontario Ministry of Government and Consumer Services, "IT Hardware VOR Number/Title: OSS-00466131 - Desktop Management Services and Products (DMSP-03). Appendix Q - Product Specifications Detailed Instructions."
21. Last year, an assessment report undertaken by Environment and Climate Change Canada and Health Canada claimed that the release of triclosan into the environment poses a risk to harm to organisms. Reference: Environment and Climate Change Canada; Health Canada, *Assessment Report: Triclosan: Chemical Abstracts Service Registry Number 3380-34-5* (2016), online: ECCC <www.ec.gc.ca/ese-ees/default.asp?lang=En&n=65584A12-1&offset=1&toc=show#toc00>.
22. Treasury Board Secretariat, *Directive for Major Public Infrastructure Projects* (2015) at 5.
23. Ministry of the Environment and Climate Change, *Ontario's Five Year Climate Change Action Plan 2016-2020* (Toronto: MOECC, 2016) at 49.
24. Julian M. Allwood & Jonathan M. Cullen, *Sustainable Materials With Both Eyes Open* (Cambridge, England: UIT Cambridge Ltd., 2012) at 230.
25. The embodied emissions of a desktop computer and one monitor is estimated at about 525 kg of CO₂e (IPCC AR5 method), based on the ecoinvent 3 LCA database. Assuming one computer and one monitor per OPS employee, and using the Treasury Board Secretariat's estimated life spans for these devices (four years for a desktop computer, six years for a monitor), the embodied emissions would amount to about 6.8 kt of CO₂e (OPS air travel was 5.2 kt CO₂e in 2015).
26. Adapted from a graph in O'Connor and Bowick 2016. J. O'Connor and M. Bowick, "Embodied Carbon of Buildings International Policy Review" (Ottawa: Athena Sustainable Materials Institute, 2016) at 11.
27. "Technology", online: Carbon Cure <carboncure.com/technology/>. [Accessed August 14, 2017]



28. Office of the Auditor General of Ontario, *2016 Annual Report - Office of the Auditor General of Ontario* (Toronto, Office of the Auditor General, 2016) at 529-531.
29. Office of the Auditor General of Ontario, *2016 Annual Report - Office of the Auditor General of Ontario* (Toronto, Office of the Auditor General, 2016) at 536.
30. B.S. Underwood et al. "Increased costs to U.S. pavement infrastructure from future temperature rise" (2017) 7 *Nature Climate Change*, 704 at 705.
31. "EPDs and PCRs", online: Canadian Standards Association Group <www.csaregistry.ca/epd/about_epd_pcrs_e.cfm>. [Accessed August 14, 2017]
32. "The International EPD Standard", online: EPD. The International EPD Standard <www.environdec.com/> [Accessed November 7, 2017]
33. Estimate based on IPCC AR5 GHG results using the ecoinvent LCA database for virgin aluminum ingot production (recycled content allocation method).
34. World Steel Association, *Steel Statistical Yearbook 2017*, (Brussels: World Steel Association, 2017) at 16. In comparing crude steel production in China, Germany, Mexico, and the U.S., production using the electric arc furnace is up to five times better in terms of GHG intensity (A. Hasanbeigi et al. "Comparison of carbon dioxide emissions intensity of steel production in China, Germany, Mexico and the United States" (2016) 113 *Resources, Conservation and Recycling*, 127 at 134).
35. One example - for infrastructure expected to have a long lifespan (i.e., several decades), LCAs and EPDs should not use the 'avoided burden' method to calculate net GHG impacts. This method permits a product producer to claim an immediate recycling credit for an impact reduction which may (or may not) take place 100 years from now. In 100 years, the production techniques for infrastructure materials will almost certainly differ, changing the magnitude of the actual impact credit. Moreover, the climate benefit of an immediate emissions reduction is far greater than one which may or may not take place decades from now.
36. R. Zizzo et al., *Embodied Carbon of Buildings and Infrastructure—International Policy Review* (Forestry Innovation Investment Ltd., 2017) at vi.
37. Ontario Ministry of Infrastructure, *Building Better Lives: Ontario's Long-Term Infrastructure Plan 2017* (Toronto: Ministry of Infrastructure, 2017) at 26.
38. Data on office paper recycling in 2015/2016 was provided to the ECO from the MOECC. The MOECC claims that over 4 million kg of office paper was recycled. Based on this claim, the ECO has assumed that 4 million kg of office paper are consumed by the OPS annually.
39. OECD, *The Role of Public Procurement in Low-carbon Innovation*, (Paris: OECD, 2016) at 19.
40. Athena Sustainable Materials Institute (ASMI), *Embodied Carbon of Buildings. International Policy Review* (Ottawa: ASMI, 2016) at 25.
41. "Green Building Map", online - Canada Green Building Council. Greater Toronto Chapter <www.cagbctoronto.org/initiatives/green-building-map>. [Accessed November 10, 2017]
42. Canada Green Building Council, *Zero Carbon Building Standard* (Vancouver, Canada Green Building Council, 2017) at 27.
43. "Toronto Green Standard Version 2.0 – Checklist", online: City of Toronto <www1.toronto.ca/City%20of%20Toronto/City%20Planning/Developing%20Toronto/Files/pdf/TGS/2017TGS_MidHiRise_Checklist.pdf>. [Accessed August 14, 2017]
44. For example, one of the LEED® optional credits for the urban heat island effect encourages the use of highly reflective roof materials. A recent study compared two commonly-used roof membranes (W.O. Collinge, C.L. Thiel, N.A. Campion, S.G. Al-Ghamdi, C.L. Woloschin, K. Soratana, A.E. Landis and M.M. Bilec, "Integrating life cycle assessment with green building and product rating systems: North American perspective" 118 *Procedia Engineering* (2015) 662 at 666-667). One product is white, highly reflective and would qualify to contribute to the LEED® credit. The other product, a black material with low reflectivity, would not be eligible to contribute to the credit. When compared across the product life cycle, the second product would result in lower total GHGs because it has lower emissions during manufacturing. In this particular case, the credit is unintentionally encouraging the use of a product that increases life-cycle emissions. This example shows of importance of considering embodied emissions and using a life-cycle approach in low-carbon procurement decision making.
45. "AB-262 Public Contracts: Bid specifications: Buy Clean California Act", online: California Legislative Information <leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB262>. [Accessed October 23, 2017]
46. Environmental Commissioner of Ontario, *Good Choices, Bad Choices* (Toronto: ECO, 2017) at 178.
47. M. Uzzal Hossain et al., "Comparative environmental evaluation of aggregate production from recycled waste materials and virgin sources by LCA" (2016) 109 *Resources, Conservation and Recycling* 67 at 67.
48. Clean Energy Canada, *The Power of Procurement: How governments can drive clean growth, cut carbon and create jobs* (Vancouver: Clean Energy Canada, 2017) at 5.
49. OECD, *The Role of Public Procurement in Low-carbon Innovation*, (Paris: OECD, 2016) at 17.
50. OECD, *The Role of Public Procurement in Low-carbon Innovation*, (Paris: OECD, 2016) at 17.
51. Environmental Defense Fund, the Institute for Policy Integrity, and the Natural Resources Defense Council, *Omitted Damages: What's Missing From the Social Cost of Carbon* by Peter Howard (2014), online: <costofcarbon.org/files/Omitted_Damages_Whats_Missing_From_the_Social_Cost_of_Carbon.pdf> at 1.
52. Environment and Climate Change Canada, *Technical Update to Environment and Climate Change Canada's Social Cost of Greenhouse Gas Estimates* (Ottawa: Environment and Climate Change Canada, 2016) at 1.
53. Environment and Climate Change Canada, *Technical Update to Environment and Climate Change Canada's Social Cost of Greenhouse Gas Estimates* (Ottawa: Environment and Climate Change Canada, 2016) at iii.
54. Environment and Climate Change Canada, *Technical Update to Environment and Climate Change Canada's Social Cost of Greenhouse Gas Estimates* (Ottawa: Environment and Climate Change Canada, 2016) at 2.