Public Services and Procurement Canada
Services publics et Approvisionnement Canada
Canada

Guideline - Project GHG Options Analysis Methodology

www.pspc-spac.gc.ca

June 12, 2017

New commitments and targets in the Federal Sustainable Development Strategy (FSDS) 2016-19 and in PSPC's Real Property Service 2016-19 Business Plan have emphasized reductions in greenhouse gas (GHG) emissions. Therefore, some additions must be made to the existing approach used by PSPC to evaluate project options. This guideline provides a methodology to evaluate real estate investment project options based on their GHG emission reductions opportunity. The methodology was developed to incorporate greenhouse gas emissions reduction and their financial impact into Real Property Investment Decisions. It was approved for full application by the Real Property Operations Committee in March 2017.

As part of the FSDS, the Government of Canada committed to reducing GHG emissions by 17% by 2020, and 40% by 2030 when compared to the 2005-06 baseline. In addition, the Real Property Services Branch of PSPC has committed to initiating measures to achieve a carbon neutral portfolio by 2030. All other sustainability commitments and targets, at this time, are unchanged. If and when other sustainability commitments change, this options and analysis methodology may require adjustments.

Scope

This guideline is to be followed for projects in crown-owned buildings. It currently does not apply to leases, sale-lease-back and built-to-leases as PSPC does not have operational control of this space. It does not apply to infrastructure projects.

Energy Modelling and Simulation

This methodology relies on building energy modelling and simulation to quantify the energy savings, energy cost savings and GHG emission reductions of energy conservation measures. This section provides a background on building energy modelling and simulation.

A building can be considered as a whole system composed of elements that interact with one another. These elements include: building envelope, mechanical systems, lighting, people, plug and other equipment loads and the external environment, including weather and site.

Energy modelling and simulation of a building takes into account the interaction of the building elements and considers the building as a whole system. It takes into account the energy, air and moisture flows into and out of the building and between the building elements, thus predicting the building's energy requirements in a holistic manner.

Major projects are defined as projects that are multi-disciplinary in nature (impacting more than one of the building elements defined above), newly constructed buildings, acquisitions and major renovations. Major projects will require building energy modeling and simulation. It is the only accepted tool that is capable of accounting for the interaction between different building elements and of analyzing multiple energy conservation measures simultaneously. Energy modelling and simulation promotes the application of an integrated design process among building professionals: architects designing the building envelope, mechanical and electrical engineers designing the HVAC and lighting systems and other members of the design and project teams.

Simple projects do not necessarily require whole building energy modeling and are defined as projects that are single-disciplinary (affect one building element in isolation) and non-complex in nature. An example can be the replacement of a pump, small chiller, small boiler or a window replacement project.

Carbon Neutral – Definition

Carbon neutral for the Department is defined as a highly energy efficient portfolio that produces on-site, or procures enough clean energy (in part through carbon offset purchases), to meet the portfolio's annual energy needs. The Department will focus primarily on reducing GHG emissions from its facilities, in order to reduce the number of carbon offsets and renewable energy credits that will be required to achieve a carbon neutral portfolio.

Clean energy for the Government of Canada is defined as energy from non-GHG emitting sources, including hydro, nuclear, wind, solar, geothermal, biomass, tidal, etc.

Strategy/approach for single disciplinary projects (affect one building element in isolation) and non-complex in nature

This approach will apply to projects in Tier 1, Tier 2 or Tier 3 buildings that are single disciplinary and that have an impact on GHG emissions. For example, the replacement of HVAC equipment (boilers, chillers, etc). In this case, the consultant will evaluate the energy savings, associated GHG savings and net present value (NPV) over 25 years for each option, compared to the baseline (status quo) option. Among the options that have returns on investment within 25 years, i.e. a positive incremental NPV over the 25 years, the option that generates the largest GHG emission savings compared to the baseline option will be selected. For options where the incremental NPV is slightly negative and GHG emission reductions are significant, the option should not be automatically discarded. An energy manager must be consulted to review the options and evaluate which option makes the most financial sense in comparison to GHG emission savings. For example, if there is an option that results in a return on investment that is close to cost-neutral (NPV not positive for all 25 years) but that generates a significant amount of GHG emission savings, it may still be recommended. This recommendation will be based on the importance of the asset for PSPC to meet its goal of a carbon neutral portfolio.

It is requested that projects in which the capital cost of the recommended option is 20% greater than the capital cost of the baseline option (option that would have normally been recommended before the implementation of this methodology) be flagged and reviewed by the National Centre of Expertise. This request is to determine the impact of the methodology on the capital cost investment required for single disciplinary projects. This requirement may be adjusted or removed in the future once sufficient data is collected to better understand the financial impact these greener options have on funding.

Strategy/approach for multi-disciplinary projects or for new buildings, acquisitions and major renovations

The application of this approach is mandatory to multi-disciplinary projects in Tier 2 and Tier 3 assets. It is to be applied to the recommended procurement option and to any other option within 10% of the lifecycle cost of the recommended one.

Each Investment Analysis Report (IAR) will analyze the following four design options:

Option 1: Design to Meet Minimum Departmental Commitments (Baseline option)

This option will require the building design to meet the minimum departmental green building commitments. PSPC's diverse green building commitments are formalized in the Department's response to the FSDS, specific targets in past Sustainable Development Strategies (SDSs), input to the Report on Plans and Priorities (2012-2013), the Department's Sustainable Buildings Policy (Departmental Policy 100), and various Ministerial announcements. Table 1 presents the key sustainability and energy performance commitments approved by the Department.

Table 1: Project Design and Delivery

Building Project Type	Threshold[1] ($ or m^2)	Assessment Tool & Target	Energy Efficiency Target	Lifecycle Assessment
1. New office buildings	All projects	LEED Gold or 4 Green Globes	28% more energy efficient than NECB performance and/or 35% more energy efficient than the building being replaced.	Athena EIE/EC (>$5M, location restrictions)
2. Other types of newly constructed buildings[2]	All projects	LEED Silver or 3 Green Globes	24% more energy efficient than NECB performance and/or 35% more energy efficient than the building being replaced.	Athena EIE/EC (>$5M, location restrictions)
3. Long-term lease office buildings (including build-to-lease, lease-to-purchase, sale- leaseback)	All projects ≥500 m^2	LEED Gold or 4 Green Globes	24% more energy efficient than NECB performance and/or 35% more energy efficient than the building being replaced.	No
4. Building acquisition	All projects	LEED Silver or 3 Green Globes	24% more energy efficient than NECB performance.	No
5. Buildings undergoing Major Renovations[3]	All projects	LEED Silver or 3 Green Globes	24% more energy efficient than NECB performance.	Athena EIE/EC (>$5M, location restrictions)
6. Space Fit-Up and Retrofits	≥1000 m^2 (Office)	LEED Silver or 3 Green Globes		No

Every project team should reference and provide the design team the "PWGSC – Real Property Sustainability Framework".

Option 2: Design to Achieve Cost-neutral (25 years) GHG Emission Reductions

Option 2 will meet all of the Departmental commitments to sustainability, and environmental performance standards, as identified in Option 1.

In addition, the consultant will assess individual measures that improve energy performance and reduce the greenhouse gases emitted by the facility. Energy modeling and simulations will be performed on bundled measures until the best option is identified. The best option results in a positive NPV on the incremental cost (compared to option 1), when calculated over the life cycle of the project (usually 25 years). Priority should be given to energy conservation, before fuel switching alternatives are considered for reducing GHG emissions. For example, switching a building component's fuel source from natural gas to electricity in a

[1] This only includes buildings where PWGSC is the custodian or leases where PWGSC is the lease holder.

[2] This does not include special purpose buildings for which no appropriate green assessment tool is available.

[3] Heritage buildings undergoing major renovations are subject to the Sustainable Heritage Guide

province with a clean grid will reduce the facility's GHG emissions but will not necessarily improve the building's energy efficiency. The priority should be to reduce the building component's energy use, no matter its fuel source. Once the building energy performance has been optimized, fuel switching and on-site renewable energy generation should be evaluated.

As Option 2 will lead to a positive, or very close to positive, incremental NPV over the project's lifecycle, it should always be recommended over Option 1 if funding is available. Option 2 provides the crown the best option for deep GHG emission reductions at no additional cost over the investment horizon.

Option 3: Design to Achieve Maximum GHG Emission Reductions

Option 3 will meet all of the Departmental commitments to sustainability, and environmental performance standards, as identified in Option 1.

In addition, the consultant will evaluate the measures required for the project to reduce the carbon emissions footprint to as close to or beyond carbon neutral as possible, excluding the use of carbon offsets or renewable energy credits. The consultant should focus on reducing emissions through improved energy efficiency first, followed by the selection of non-emitting fuel sources. The production of on-site carbon-free renewable energy generation should be evaluated and presented.

This option will provide PSPC with two key pieces of information: (1) the maximum GHG reduction potential of the project, and (2) the cost associated with this Maximum GHG Emissions Reduction Design Option.

Option 4: Hybrid GHG Emissions Reduction Design

Using the information collected and calculated in the three defined options above, the consultant, in consultation with the PSPC project leader and Regional Centre of Expertise Specialists, will be asked to evaluate and propose an optimized recommended option. This option balances GHG emissions with construction and building operating costs. The recommended option may be one of the three options defined above, or may be a combination of individual measures that were investigated in Options 2 or 3. The individual measures themselves can be evaluated in terms of cost, cost avoidance, energy consumption and GHG emission reductions. The modeling and simulation of different energy/GHG measure combinations will be required to determine the recommended combination of measures that provides the best value for the Crown. In other words, the crown is requesting that the professional consortium use their expertise to determine a fiscally responsible option that takes GHG emission reductions into consideration.

Final Remarks

This methodology was developed with no hard energy/GHG performance targets. The project requirements, asset characteristics and its geographical location will dictate what must be included in each option to provide best value for the crown. The different options provide best financial, GHG emission reduction and combination value so PSPC can make an informed decision.