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Social Cost of Carbon in Environmental Impact Assessment

David V. Wright

Meinhard Doelle

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SOCIAL COST OF CARBON IN ENVIRONMENTAL IMPACT ASSESSMENT

David V. Wright[*] & Meinhard Doelle [**]

Abstract

While the social cost of carbon (SCC) has played a prominent role in regulatory decision-making in recent years, use in the environmental impact assessment (EIA) realm has been minimal. This article explores potential roles for SCC in EIA. Using Canada's proposed new federal impact assessment (IA) regime as a basis, the analysis examines how a jurisdiction could employ SCC to integrate climate change considerations into project-level assessment and decision-making. Potential roles are first discussed in relation to the broad purposes of IA, before focusing on key assessment factors such as consideration of economic costs and benefits, cumulative effects, climate change commitments and sustainability. Notwithstanding important SCC critiques and limitations, this article identifies several ways in which SCC could be incorporated into IA, finding a particularly strong fit where an assessment deals with a project's economic costs and benefits. Additionally, as a metric that links project emissions to climate change damages, as opposed to project impacts on emission reduction targets, SCC could be used to complement more traditional carbon emission calculations. This article is the first to provide detailed consideration of the potential roles of SCC in IA in Canada. The analysis has broad international relevance as jurisdictions work to put in place policies and tools - including carbon pricing mechanisms - to achieve commitments under the Paris Agreement.

INTRODUCTION

Avoiding dangerous climate change requires significant greenhouse gas emission reductions driven by a mix of tools.[1] One such tool is environmental impact assessment (EIA).[2] Recently, calls for

[*] Assistant Professor of Law, University of Calgary

[**] Professor of Law, Schulich School of Law, Dalhousie University

[1] See Rajendra K. Pachauri and Leo A. Meyer eds., *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, UK: Cambridge University Press, 2014) at 79-86, online: <https://ar5-syr.ipcc.ch/ipcc/ipcc/resources/pdf/IPCC_SynthesisReport.pdf> [IPCC AR5]. See also Valeria Masson-Delmotte *et al.*, *Summary for Policymakers* in: *Global warming of 1.5°C An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, (Geneva, Switzerland: World Meteorological Organization, 2018), online: https://www.ipcc.ch/site/assets/uploads/sites/2/2018/07/SR15_SPM_High_Res.pdf [IPCC 1.5° SPM]. See also, Benjamin J. DeAngelo, et al. eds. *Reducing Risks Through Emissions Mitigation. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*, (Washington, DC: U.S. Global Change Research Program, 2018) at 1346–1386, online: <https://nca2018.globalchange.gov/chapter/29/>

[2] EIA is one of several ways to characterize assessment of environmental and other impacts. Other common articulations are "environmental assessment", "impact assessment" and "Environmental Impact Statement". Given the proposed changes at the federal level in Canada, we use "Impact Assessment" (IA) throughout, unless referring to the specific report typically generated through EIA and IA, which is referred to herein as an Environmental Impact Statement (EIS). See Bram Noble, *Introduction to Environmental Impact Assessment: A Guide to Principles and Practice*, 3rd ed (Toronto: Oxford University Press, 2015) at 2 (explaining terms being used interchangeably) [Noble, *Intro to EIA*].

integration of climate change considerations into EIA have been intensifying. In Canada, changes to the federal EIA regime are now imminent, with climate change considerations figuring prominently in the draft "impact assessment" (IA) legislation.[3]

Integrating climate change considerations into IA is not a straightforward exercise.[4] To make analysis of climate change considerations a meaningful part of IA, governments must choose from a range of approaches and frameworks such as carbon budgeting and decarbonization pathways.[5] Such approaches are means of contextualizing the climate change considerations in a way that can assist in fulfilling the traditional EIA purposes of informed decision-making and planning.

This article explores whether the social cost of carbon (SCC) may have a roles to play as a tool to integrate climate change considerations into IA. SCC is a dollar figure representing the estimated value of damages avoided per unit of carbon emissions reductions.[6] It provides an economic valuation of the impacts of climate change.[7] For example, SCC could be deployed to contribute to understanding of the merits and drawbacks of proposed projects, particularly in relation to economic dimensions and international climate change commitments. Using SCC as a way to understand climate considerations in IA could improve consistency and coherence between project-level decisions, national emission reduction targets and international commitments. It may contribute to understanding how project-level decisions relate to the overarching international objective to mitigate the worst effects of climate change, as agreed to in the United Nations Framework Convention on Climate Change.

This paper is the first to provide detailed consideration of the potential roles of SCC in IA in Canada. Our primary inquiry asks whether SCC holds promise as a part of IA, and how it could be most effectively used. Part I introduces impact assessment, including the goals, components, and evolution of the tool. Part II introduces SCC, explaining what it is, how it has been used to date, and

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[3] Bill C-69, *An Act to enact the Impact Assessment Act and the Canadian Energy Regulator Act, to amend the Navigation Protection Act, and to make consequential amendments to other Acts*, 1st Sess, 42nd Parl, 2018 (third reading 20 June 2018) [Bill C-69].

[4] See Robert Gibson et al., "The Paris to Projects Research Initiative: Discussion Paper" (February 2018), online: https://uwaterloo.ca/paris-to-projects/sites/ca.paris-to-projects/files/uploads/files/p2p_cc_in_asmt_law.pdf [Gibson et al. "Paris to Projects Discussion Paper"]. See also Environment and Climate Change Canada, *Discussion Paper: Developing a strategic assessment of climate change* (September 2018) [ECCC, "Discussion Paper"]. See also Meinhard Doelle, "Integrating Climate Change into Environmental Impact Assessments: Key Design Elements", October 2018, online: <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3273499>

[5] Gibson et al., "Form Paris to Projects: Clarifying the implications of Canada's climate change mitigation commitments for the planning and assessment of projects and strategic undertakings", Summary Report, January 2019, at 11-18; online: <https://uwaterloo.ca/paris-to-projects/sites/ca.paris-to-projects/files/uploads/files/p2p_summary_report_23jan19.pdf> [Gibson et al, "Paris to Projects Summary Report]". See also Gibson, Paris to Projects Discussion Paper *supra* note 4. See also Andrew Gage, *A Carbon Budget for Canada: A collaborative framework for federal and provincial climate leadership* (Vancouver: WCEL, December 2015), at iii, online: https://www.wcel.org/sites/default/files/publications/CarbonBudget%20(Web)_0.pdf

[6] See William Pizer et al, "Using and improving the social cost of carbon: (2014) 346:6214 Science 1189; Richard Revesz et al, "Improve Economic Models of Climate Change" (2014) 508:7495 Nature 173; Arden Rowell, "Foreign Impacts and Climate Change" (2015) 39 Harv Envtl L Rev 371; William Nordhaus, "Estimates of the Social Cost of Carbon: Background and Results from the Rice-2011 Model" (2011) National Bureau of Economic Research Working Paper 17540, online: < http://www.nber.org/papers/w17540>. See also Environment and Climate Change Canada, "Technical Update to ECCC's Social Cost of Greenhouse Gas Estimates" (March 2016) at 1, [ECCC, "Technical Update"].

[7] See National Academies of Sciences, Engineering, and Medicine. *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide*, (Washington, DC: The National Academies Press, 2017) [NAS, *Valuing Climate Damages*].

several critiques and limitations. Part III goes on to discuss what roles SCC could have in integrating climate change considerations into IA. These potential roles are discussed in relation to the purposes of IA, the assessment and decision-making phases of IA, strategic assessment, and associated limitations and challenges. The paper concludes with final reflections and starting points for further research.

While a small amount of literature and litigation has surfaced in the United States,[8] to date there has been no similar work in the Canadian context. This paper is particularly timely given the comprehensive reform of the Canadian IA regime that is currently underway. Bill C-69,[9] which contains the proposed new Canadian *Impact Assessment Act*, passed third reading in the House of Commons in June 2018; it includes the first ever explicit requirement to factor climate change considerations into IA in Canada. More broadly, this paper has relevance internationally as countries work to put in place policies and tools - including carbon pricing mechanisms - to achieve targets under the *Paris Agreement*. Analysis in this paper may also contribute to reconciling unexplained differences between SCC values and different emerging carbon price benchmarks,[10] and to improving shortcomings in SCC practices in Canada and the U.S.[11]

PART I - INTRODUCING ENVIRONMENTAL IMPACT ASSESSMENT

Impact assessment plays a unique role in the overall effort to manage the impact of human activities in the natural world. Whereas most environmental protection tools seek to regulate the environmental impacts of existing, ongoing human activities, IA seeks to predict the impact of proposed activities before they are allowed to proceed. The primary goal of IAs is to inform decisions on whether and under what conditions to approve proposed new activities.[12]

IA processes vary from jurisdiction to jurisdiction. Some are broader in scope, some apply to a broader range of proposed activities, and some offer a greater range of process options to suit a range of different types of proposed activities. However, the basic elements of most IA processes are remarkably similar. IA processes tend to be triggered by a combination of a list of activities to be assessed (or not to be assessed) and some discretion to deviate from the list.[13] Planning of the IA process tends to involve a review of the proposed activity to see whether or how thoroughly it needs to be assessed, a decision on what process is most suitable for the assessment, and determinations

[8] See e.g. Anthony Radauzo, "The CO^2 Monetization Gap: Integrating the Social Cost of Carbon into NEPA", (2018) Colum L Rev, Vol. 118, No.2.
[9] *Supra* note 3.
[10] David V Wright, "Dissonance in Federal Carbon Pricing Regime(s)" (26 January 2018), *ABlawg* (blog), online: <https://ablawg.ca/2018/01/26/dissonance-in-federal-carbon-pricing-regimes/>.
[11] See David Wright, "Carbonated Fodder: The Social Cost of Carbon in Canadian and US Regulatory Decision-Making" (2017) 29 Georgetown Environmental L Rev 513 [Wright, "Carbonated Fodder"]
[12] See e.g. Government of Canada, "Basics of Environmental Assessment" (18 July 2018), online: <https://www.canada.ca/en/environmental-assessment-agency/services/environmental-assessments/basics-environmental-assessment.html#gen01> for more information on environmental assessments in Canada.
[13] Of course, there are other triggers, such as the so called 'law list' trigger under the original Canadian Environmental Assessment (CEAA). See Meinhard Doelle, *The Federal Environmental Assessment Process: A Guide and Critique* (Markham, Ontario: LexisNexis Butterworths, 2008).

on the scope of the activity to be assessed and the scope of the issues to be considered in the assessment.

The planning phase of an IA process is usually followed by the preparation of an Environmental Impact Statement (EIS) either by or on behalf of the proponent. The EIS is then reviewed by government officials and intervenors, resulting in a consideration of the issues or concerns associated with the proposed activity, ultimately resulting in a decision as to whether, and under what conditions the proposed activity should or can be approved. Most IA processes include some form of follow-up, often designed narrowly to ensure compliance with terms and conditions rather than more broadly to ensure appropriate adaptation of the approved project in case impacts were underestimated or to ensure learning for the benefit of relevant future IAs.[14]

When IA was first introduced in the 1970s and 1980s,[15] the focus was largely on biophysical impacts of proposed activities, and on identifying economically viable mitigation measures to reduce these impacts as much as practically possible. Only in rare cases of predicted large scale environmental effects that could not be mitigated were assessed activities not approved at all.[16] Over time, IA has become more ambitious in its objectives, to considering whether the proposed activity contributes to sustainability and whether it is the preferred way to meet the stated need, purpose and rational of a proposed activity.

This evolution of IA has, of course, not been linear, with significant instances of retreat.[17] A notable example was the repeal and replacement of Canada's federal assessment legislation in 2012, which significantly weakened the regime and narrowed its application.[18] Notwithstanding uneven practice and implementation, key elements have evolved over the past 40 years, including the following:

- A transition from a focus on biophysical impacts to a broader range of impacts, benefits, risks and uncertainties associated with a proposal.
- A transition from assessing the proposal in isolation to assessing it in the context of a range of alternatives.
- A shift from a focus on project assessments to the integration of strategic and regional assessments, creating a tiered overall assessment and decision-making process.[19]
- An increased role for the public as an important source of information and as an active and interested participant in the process of determining whether a proposed activity is a good way to meet the states need, purpose and rational.

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[14] *See e.g. Canadian* Environmental Assessment Act 2012, SC 2012, c 19, s 53(4).
[15] See Noble, *Intro to EIA supra* note 2 at 7.
[16] See e.g. *Kemess North Copper-Gold Mine Project*, Joint Review Panel Summary Report (September 17, 2007), online: https://www.ceaa.gc.ca/050/documents/23469/23469E.pdf
[17] See Meinhard Doelle, "CEAA 2012: The End of Federal EA As We Know It?" (2012) 24 J Envtl L & Prac 1. See also, Robert B Gibson, "In Full Retreat: The Canadian Government's New Environmental Assessment Law Undoes Decades of Progress" (2012) 30:3 Impact Assessment & Project Appraisal 179.
[18] *Ibid.*
[19] See John Sinclair, Meinhard Doelle & Peter Duinker, "Looking Up, Down, and Sideways: Reconceiving Cumulative Effects Assessment as a Mindset" (2017) 62 Environmental Impact Assessment Rev 183 (For a more detailed discussion of the respective roles of regional, strategic and project level assessments in an integrated IA process that effectively deals with cumulative effects).

- A shift toward more cooperation among affected jurisdictions, including indigenous governments, in carrying out IA processes.

Efforts to improve IA have resulted in recent years in discussions both in the literature and in the context of law reform efforts in Canada about the concept of next generation IA. Next generation IA is based on the idea that for IA to become an effective tool for sustainability, what is needed is a more comprehensive and integrated approach to addressing the multiple shortcomings of the IA experience to date. Only an integrated approach, it is suggested, will take IA from its current state toward a truly effective tool for sustainability-based decision making, with the goal of ensuring new activities actually make a net contribution to the elusive goal of sustainability.[20]

Among the key elements of a transition to next generation IA is the consideration of need, purpose and rationale from a societal rather than proponent's perspective, the consideration of a range of promising alternatives to the proposed activity, the integration of regional, strategic and project level assessments, particularly with respect to future development scenarios and cumulative effects, implementation of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)[21], the design of engagement processes to maximize mutual learning opportunities for proponents, government officials, Indigenous peoples and interested members of the public, and better direction to decision makers on how to ensure approved projects will contribute to sustainability.[22] These elements are thought to be interdependent if IA is to become a truly effective decision making tool.[23]

The federal IA process in Canada has gone through a number of significant transitions since its introduction in the 1970s. It first became legally binding in the 1980s in the form of the Environmental Assessment Review Process (EARP) Guidelines Order. It was first legislated in 1992 in the form of the Canadian Environmental Assessment Act (CEAA).[24] It was then fundamentally changed in 2012,[25] and is currently going through another significant reform.[26] The end product of the most recent effort, a new federal Impact Assessment Act (IAA), [27] has made considerable strides in seeking to implement core elements of next generation IA. In particular, the IAA broadens the scope of the federal assessment to include all environmental, social, economic and health impacts and benefits of proposed activities and to make project decisions based on a proposed activities' contribution to sustainability. It seeks to bring regional and strategic assessments into the overall assessment process. It encourages cooperative approaches with

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[20] See Robert Gibson, Meinhard Doelle & John Sinclair, "Fulfilling the Promise: Basic Components of Next Generation Environmental Assessment" (2016) 29 J Envtl L & Prac 257 [Gibson et al., "Fulfilling the Promise"].
[21] *UN Declaration on the Rights of Indigenous Peoples (UNDRIP)*, GA Res, UNGA, 61st Sess, Supp No 49, UN Doc A/RES?61/295 (2007).
[22] See generally Gibson et al., "Fulfilling the Promise" *supra* note 20 (detailing elements of "next generation" IA).
[23] See Gibson et al, "Fulfilling the Promise" *supra* note 19.
[24] See Canadian Environmental Assessment Act, S.C. 1992, c. 37
[25] See Doelle, *supra* note 16.
[26] Meinhard Doelle & John Sinclair, "Post-Assessment Approval (Follow-Up) Processes under the Proposed Federal Impact Assessment Act (IAA)" (18 March 2018), *Marine and Environmental Law News* (blog), online: < https://blogs.dal.ca/melaw/2018/03/18/post-assessment-approval-follow-up-processes-under-the-proposed-federal-impact-assessment-act-iaa/>.
[27] *Supra* note 3. Royal Assent is expected in spring 2019 with proclamation expected to follow in late 2019.

interested provincial and indigenous jurisdictions and it seeks to implement the process in a manner more consistent with Canada's obligations to its Indigenous population, including UNDRIP. Notably, particularly in relation to SCC, the IAA specifically includes positive and negative consequences of a project on "economic conditions" as a factor to be considered.[28] Finally, and of primary relevance for purposes of this article, the IAA specifically requires that every assessment and final decision under the Act considers the impact of a proposed project on Canada's climate commitments.[29]

A project assessment under the IAA is triggered by way of a designated project list to be developed by regulations, in combination with discretion to assess projects not listed[30] and to not require an assessment of a designated project.[31] The first phase of an assessment under the IAA consists of early planning. The basic concept is to encourage proponents to initiate the assessment early with an initial project description on the basis of which government officials at federal and other levels of government as well as interested members of the public can engage in discussions about the appropriate scope of the assessment, opportunities for a cooperative assessment with other jurisdictions, selection of an appropriate assessment process, appropriate forms of public engagement and information requirements for the assessment phase. The IAA is clear that subject to decisions about the relevance and focus for a particular project, the scope of the assessment includes the full range of impacts and benefits of a proposed project. The early planning phase then concludes with direction to the proponent on the information it needs to gather for the assessment phase, along with a decision on whether to proceed by way of a standard assessment run by the responsible federal Impact Assessment Agency, or by way of an independent Review Panel.

The planning phase is followed by the information gathering phase, where proponents and others (such as federal departments, other jurisdictions and intervenors) take time to gather the information needed for the assessment phase. The assessment is then triggered by the proponent's filing of the required information and is carried out either by the Agency or by a Review Panel. The results of the assessment are shared with federal decision makers to make two key determinations. First, a determination is made about the project's impact on areas of federal responsibilities. Assuming there are sufficient impacts on areas of federal jurisdiction to warrant federal involvement in the project decision, the decision making then turns to the broader question whether the project is in the public interest in light of the information gathered.[32] There are a number of elements to the public interest determination, but key among them for the purposes of this article are the project's contribution to sustainability, and the question whether the project will contribute to or hinder Canada's efforts to meet its climate commitments and environmental obligations. Beyond the assessment and decision-making phases, the IAA requires a follow-up program for each project,

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[28] Bill C-69, *supra* note 3 s.22(1)(a)
[29] Bill C-69, *supra* note 3 s.22(1)(i); s.63(e).
[30] Bill C-69, *supra* note 3 s.9(1) (Ministerial power to designate a project not on the designated project list).
[31] Bill C-69, *supra* note 3 s.16(1) (Agency authority to decided whether an impact assessment of the designated project is required).
[32] Bill C-69, s*upra* note 3 s.60(1)(a). It should be noted, however, that federal jurisdiction in IA is subject to constitutional constraints. For a succinct overview, see Brenda Heelan Powell, "Environmental Assessment & the Canadian Constitution", Environmental Law Centre (2014), online: http://elc.ab.ca/media/94543/EAConstitutionBriefFinal.pdf.

and provides extensive enforcement and oversight powers, but without clear allocation of responsibility to effectively implement follow-up and enforcement, and without adequate provisions to ensure public access to data gathered.

In parallel with the passage of the IAA by the House of Commons, the federal government committed, in the fall of 2018, to a strategic impact assessment process to consider how climate change can be effectively integrated into the new federal assessment process. At the time of writing, a discussion paper has been released for feedback,[33] but the actual assessment has not been formally launched. The process is expected to answer some basic questions about the role of climate change in deciding what projects should be assessed, what information needs to be gathered about the GHG emissions of the proposed project and alternatives, and how to take the information gathered about the project's GHG emissions and feed that information into a project decision. Key elements of the project decision from a climate perspective include how to determine whether the project will contribute to or hinder Canada's climate mitigation efforts, and how the project's GHG emissions feed into an overall determination about the project's contribution to sustainability. The following are key questions the strategic assessment will be challenged to address:[34]

- Which projects ought to be assessed in light of direct and indirect GHG emissions associated with proposed projects?
- What information should be gathered about the potential climate change impacts of a proposed activity?
- What information should be gathered about the GHG emissions associated with alternatives to the project and alternative means of carrying out the project?
- How should direct, indirect GHG emissions be considered in the assessment and decision making phases of the IA?
- How could climate change impacts be quantified or measured in a way that can be used in IA analyses, recommendations and determination of significance of environmental effects?
- How should local versus regional or global GHG emissions impacts of proposed projects be factored into decision making, such as the project's contribution to sustainability?
- What weight ought climate change impacts be given in final project decision-making (i.e. approval or rejection)?

Many of these issues have been explored in a recent project funded by the Metcalf Foundation.[35] The resulting report deals in some detail with many of the challenges associated with integrating climate change considerations into impact assessment processes, including how to define Canada's climate commitments, and how to translate those commitments into a standard against which individual projects can be measured. Among the options explored are jurisdictional budgets, sectoral budgets, efforts to decarbonize the Canadian economy by a set date, and the use of social

[33] Government of Canada, *Strategic Assessment on Climate Change - Discussion Paper* (June 2018) online: <https://www.strategicassessmentclimatechange.ca/discussion-paper>

[34] See Gibson et al. "Paris to Projects Summary Report" *supra* note 5 (detailing key issues arising when determining how to incorporate climate change considerations into IA).

[35] *Ibid.*

cost of carbon or other economic measures to assess the project's impact on climate change and on sustainability.[36] The rest of this paper explores potential role of social cost of carbon in impact assessment in more detail.

PART II: INTRODUCING THE SOCIAL COST OF CARBON

The Social Cost of Carbon (SCC) is a dollar figure representing the estimated cost of damages that result from an additional ton of carbon dioxide (CO_2) emitted into the atmosphere.[37] Specifically, this estimate is expressed in dollar amounts of the present discounted value of the future damage that would be caused at a global level by releasing one metric ton into the atmosphere.[38] Put in more colloquial terms, SCC "tries to add up all the quantifiable costs and benefits of emitting one additional tonne of CO2, in monetary terms".[39]

The SCC concept emerged from recognition that climate change impacts have costs on society, and the cost of such damages ought to be calculated in monetary terms. These damages include, but are not limited to, sea level rise, severe weather, melting permafrost, ocean acidification, crop failure, and ecosystems shifts.[40] In economic terms, assigning a monetary value to these emissions and their costs is a step toward quantifying the market externality that is carbon pollution.[41]

While methods for calculating SCC values continue to evolve,[42] practice to date has been a product of pooling estimates generated by three integrated assessment models (IAMs): PAGE (Policy Analysis of the Greenhouse Effect), FUND (Framework for Uncertainty, Negotiation and Distribution) and DICE (Dynamic Integrated Climate-Economy) models.[43] Each IAM employs a different approach for estimating economic damage resulting from CO_2 emissions.[44] SCC values are derived by running the IAMs 10000 times using different inputs and scenarios for key modelling inputs such as climate sensitivity, socio-economic and emissions trajectories, and discount rate.[45]

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[36] Gibson et al, "Paris to Projects Summary Report" *supra* note 5.
[37] ECCC "Technical Update" *supra* note 6 at 1.
[38] NAS, *Valuing Climate Damages supra* note 7 at 1.
[39] Simon Evans et al., "The Social Cost of Carbon" (February 2017) The Carbon Brief, online: <https://www.carbonbrief.org/qa-social-cost-carbon>.
[40] *Supra* note 1.
[41] High-*Level Commission on Carbon Prices: Report of the High-Level Commission on Carbon Prices* (Washington, DC: World Bank, 2017) at 3, online: <https://static1.squarespace.com/static/54ff9c5ce4b0a53decccfb4c/t/59b7f2409f8dce5316811916/1505227332748/Carbon Pricing_FullReport.pdf>. See also, Nicholas Stern, *The Economics of Climate Change: The Stern Review*, (Cambridge: Cambridge University Press, 2007).
[42] See generally, NAS, *Valuing Climate Damages supra* note 7 (featuring a comprehensive account of practices and recommendations for future updates to the SCC).
[43] See ECCC "Technical Update" at 5, *supra* note 6 (for a succinct description of each model). See also Interagency Working Group on Social Cost of Greenhouse Gas, " Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866", United States Government (August 2016) at 7-15, online: <https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf> [US WG "Technical Update 2016"]
[44] ECCC "Technical Update" *supra* note 6 at 5. See also *supra* Steven Rose et al., "Understanding the Social Cost of Carbon: A Model Diagnostic and Inter-Comparison Study" (2017) Climate Change Economics Vol. 8.
[45] ECCC Technical Update (2016) *supra* note 6 at 5-6. For a detailed account, see US WG "Technical Update" *supra* note 43 at 15-16.

SCC is widely acknowledged to be imperfect,[46] though there are varying degrees and threads of critique. A full discussion of these limitations is beyond the scope of this article; however, it is important to set out key concerns, as any use of SCC in IA ought only proceed with transparent acknowledgement of these drawbacks. In general, most criticisms are centred on the assertion that SCC is too uncertain to be used in government decision-making.[47] More specifically, these critiques point to uncertainty in modelling parameters, lack of transparency in modelling practices, inadequate representation of climate damages, inadequate representation of catastrophic events, uneven capturing of inter-sector and inter-regional interactions, imperfect substitutability of environmental amenities (i.e. assumption that natural system losses can be compensated with non-climate goods), , and expression of SCC as global value (as opposed to using just domestic values).[48]

Generating SCC estimates require modelers to make critical choices that ultimately dictate the quality and reliability of the outputs.[49] As Heyes et al. has explained, the IAMs used in SCC modeling are "highly stylized and highly parameterized",[50] meaning there is a significant amount of uncertainty hidden behind SCC estimates.[51] This has resulted in a very large range of SCC estimates coming out of the modeling.[52] There is one modelling input that has a particularly dramatic effect in the SCC context: discount rate. Discount rate is a value given to money over time.[53] It represents the trade-off between what a dollar is worth today and what a dollar would be worth in the future. In the climate change context, this means "[m]ost of the climate-related benefits from current policy efforts would take the form of avoided damages many years from now, whereas many of the costs would be borne in the nearer term".[54] Choosing a discount rate for assessments of climate change policy has important implications because relatively small differences in the choice of this rate can make a very large difference in the policy assessment. In short, SCC estimates decrease as discount rates increase because a higher discount rate assumes increasing wealth in future generations and, as a corollary, suggests that today's less wealthy population should therefore not pay today.[55]

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[46] ECCC "Technical Update" *supra* note 6 at 16.
[47] Ruth Bell & Dianne Callan, *More than Meets the Eye: The Social Cost of Carbon in U.S. Climate Policy in Plain English*, World Resources Institute Policy Brief (2011). See also John Pezzey, "Why the social cost of carbon will always be disputed" (2018) WIREs Climate Change, online: <https://onlinelibrary.wiley.com/doi/full/10.1002/wcc.558>.
[48] ECCC "Technical Update" *supra* note 6 at 16-20. See also Arden Rowell, *Foreign Impacts and Climate Change*, (2015) 39 Harv. Envtl. L. Rev. 371.
[49] See Steven Rose et al., "Understanding the Social Cost of Carbon: A Model Diagnostic and Inter-Comparison Study", (2017) Climate Change Economics Vol. 8 (Comparing and assessing practices of the three IAMs used to generate SCC values).
[50] Heyes et al., "The Use of a Social Cost of Carbon in Canadian Cost-Benefit Analysis" (2013) Can Pub Pol'y at 70.
[51] *Ibid*. One might argue this is a more polite restatement of the well known George Box quote at the start of this article: "All Models are wrong, but some are useful". George Box and Norman Draper, *Empirical Model-Building and Response Surfaces* (New York: Wiley, 1987).
[52] See e.g. Ker Than, "Estimated Social Cost of Climate Change Not Accurate, Stanford Scientists Say", Stanford News (January 12, 2015), online: https://news.stanford.edu/2015/01/12/emissions-social-costs-011215/ [Tan]. See also, Frances Moore & Delvane Diaz, Temperature Impacts on Economic Growth Warrant Stringent Mitigation Policy", 5 Nature Climate Change 125 (2015). Note that the different SCC values were generated by modelers assuming substantially slower economic growth rates due to climate impacts.
[53] NAS, *Valuing Climate Damages supra* note 7 at 15-19 (detailing the concept of discount rate and its calculation).
[54] See Lawrence Goulder & Robert Williams, "The Choice of Discount Rate for Climate Change Policy Evaluation" (2012) National Bureau of Economic Research Working Paper No. 18301 at 1, online: <https://www.nber.org/papers/w18301.pdf>
[55] *Ibid* at 4.

Notwithstanding these critiques and disagreement on appropriate discount rates, it is now widely acknowledged that assigning no value at all to future harms from climate change is inappropriate.[56] Canada (and, until recently, the United States) has taken this view and has been actively using SCC in regulatory decision-making.[57]

The United States has led the work to develop and update SCC values.[58] Federal agencies in the U.S. began including estimates of the SCC following a decision by the U.S. Court of Appeals for the Ninth Circuit in the case of *Center for Biological Diversity v. National Highway Traffic Safety Administration*.[59] In that case, environmental groups challenged a final rule on fuel economy standards. In the required cost-benefit analysis underpinning the rule, the National Highway Traffic Safety Administration did not assign a monetary value to carbon emissions, instead stating that the monetary value of benefits of reduced CO2 emissions could not be determined because of a wide variation of estimates at that time. The Court ruled in favour of the petitioners, finding that, "while the record shows that there is a range of values, the value of carbon emissions reduction is certainly not zero".[60] The court directed the NHTSA to update the regulatory impact analysis for the regulation and to include a monetized value of carbon emissions when doing so. More recently, SCC was at issue in the case *of Zero Zone, Inc. v. United States Department of Energy* in relation to energy efficiency standards.[61] The Seventh Circuit found that agency had the authority to factor SCC into its calculation of the rule's benefits.[62]

Beginning in 2009 shortly after the *Center for Biological Diversity* court decision, an Inter-agency working group (U.S. WG) began developing and generating SCC estimates, and U.S. government agencies began incorporating SCC into their cost-benefit analyses.[63] For example, the U.S. used SCC values in federal regulations for light-duty vehicle emissions[64] and the performance standards for GHG emissions from coal-fired power plants.[65] These analyses were part of Regulatory Impact

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[56] See Robert Pindyck and James Stock, "We don't know what climate change will cost – that doesn't mean we can ignore it" (09 May 2018) The Hill, online: <http://thehill.com/opinion/energy-environment/386952-we-dont-know-what-climate-change-will-cost-that-doesnt-mean-we-can>

[57] See Wright, "Carbonated Fodder" *supra* note 11.

[58] *Ibid.*

[59] *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172 (9thCir. 2008).

[60] *Ibid* at 1200.

[61] *Zero Zone, Inc. v. U.S. Dep't of Energy*, 832 F.3d 654, 677–80 (7th Cir. 2016).

[62] *Ibid.*

[63] See NAS, *Valuing Climate Damages supra* note 7 (providing a detailed description of development and use of SCC in the United States).

[64] Regulatory Impact Analysis: Final Rulemaking for 2017-2025 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards (2012) https://nepis.epa.gov/Exe/ZyPDF.cgi/P100EZI1.PDF?Dockey=P100EZI1.PDF

[65] Regulatory Impact Analysis for the Final Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (2015) http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100MWLE.TXT

Analyses for proposed regulatory actions in the U.S.[66] The U.S. WG issued periodic updates to SCC values, including technical updates in 2010, 2013, 2015 and 2016.[67]

More recently, the U.S. Working Group requested that the National Academies of Sciences, Engineering and Medicine, convene a committee of experts to research the modeling of economic aspects of climate change to further inform future revision to SCC estimates. That committee released its final report in January 2017.[68] This leadership and momentum from the U.S. has slowed significantly, however. Despite progress by the U.S. and case law upholding agencies' use of SCC, in March 2017 a Presidential Executive Order disbanded the U.S. WG and declared the working group's technical guidance as no longer operative.[69] In short, the future of SCC in the U.S. is uncertain,[70] though there continue to be pockets of application,[71] including in the EIA realm, which is discussed further below.

In parallel, and perhaps in part in response to uncertainty from the White House, use of SCC in IA has been litigated in U.S. courts. In *High Country Conservation Advocates v. United States Forest Service*, the U.S. District Court for the District of Colorado the court found an EIS inadequate owing to the inclusion of quantified project benefits but omission of quantified costs.[72] The court specifically identified SCC as an available tool.[73] In other cases, however, U.S. courts have been reluctant to rule

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[66] Cost-benefit analysis (CBA) has been part of regulatory development in the United States pursuant to a series of Executive Orders. Requirements today flow chiefly from Executive Order 12866 (1993) and Executive Order 13563 (2011), which requires U.S. government agencies to conduct a cost-benefit analysis for all proposed regulations. CBA is part of the "Regulatory Impact Analysis" ("RIA") that the responsible agency generates for regulatory proposals. Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Oct. 4, 1993); Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 18, 2011).

[67] Interagency Working Group on Social Cost of Carbon, "Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866" United States Government (February 2010), online: https://www.epa.gov/sites/production/files/2016-12/documents/scc_tsd_2010.pdf; Interagency Working Group on Social Cost of Carbon, "Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866", United States Government (May 2013); Interagency Working Group on Social Cost of Carbon, "Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis" (November 2013); US WG "Technical Update 2016" *supra* note 43.

[68] NAS, *Valuing Climate Damages supra* note 7.

[69] *Presidential Executive Order on Promoting Energy Independence and Economic Growth* (March 28, 2017) online: https://www.whitehouse.gov/presidential-actions/presidential-executive-order-promoting-energy-independence-economic-growth/

[70] See e.g. Hannah Hess, "Despite Trump executive order, social cost of carbon still studied by federal agency", (15 June 2017) E & E news, online: <http://www.sciencemag.org/news/2017/06/despite-trump-executive-order-social-cost-carbon-still-studied-federal-agency>.

[71] See Iliana Paul *et al*, "The Social Cost of Carbon and State Policy" (October 2017) Institute for Policy Integrity, online: https://policyintegrity.org/files/publications/SCC_State_Guidance.pdf. See also Environmental Protection Agency, "Regulatory Impact Analysis for the Proposed Emission Guidelines for Greenhouse gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program" (August 2018) at 7-1 – 7-9, online: https://www.epa.gov/sites/production/files/2018-08/documents/utilities_ria_proposed_ace_2018-08.pdf (Illustrating and example of the Trump Administration continuing to use SCC, but extremely low "interim" estimates in the repeal and replacement of the Clean Power Plan; estimates were as low as $1 per ton in the year 2030, compared to $60 from the US WG for the same year). See Harvard Law School Emmett Environmental Law & Policy Clinic, "Comments on Flawed Estimates of the Social Cost of Carbon in the Proposed Emission Guidelines for the Greenhouse Gas Emissions from Existing Electric Utility Generating Units" (31 Oct 2018), online: http://clinics.law.harvard.edu/environment/files/2018/11/ELPC-Comments-on-Proposed-ACE-Rule-Docket-No.-EPA-HQ-OAR-2017-0355.pdf (For a reaction to methods and changes employed by the Trump Administration).

[72] *High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174, 1192–93 (D. Colo. 2014).

[73] Id. at 1190

that SCC must be required in NEPA reviews.[74] For example, in *EarthReports, Inc. v. FERC* the D.C. circuit accepted the argument from the Federal Energy Regulatory Commission that SCC is too imprecise and entails too much uncertainty to warrant inclusion in NEPA review.[75]

In the Canadian context, the federal government has largely followed the U.S. lead on SCC.[76] In 2010, the federal government struck an interdepartmental working group (Canadian WG) to consider options for valuation of GHG emissions in regulatory decision-making.[77] The Canadian WG chose to use the U.S. SCC approach based on the rationale that it was well-suited to the Government of Canada's approach to cost-benefit analysis and the regulatory context.[78]

Similar to the U.S., all federal departments and agencies in Canada are required to conduct a cost-benefit analysis of proposed regulatory action.[79] Since the 2011 interdepartmental review, ECCC has used SCC in all RIAS that involve GHG emissions.[80] For example, similar to the U.S., ECCC has used SCC in RIAS for vehicle emissions and coal-fired power plants.[81] The most recent release of the Canadian WG was a technical update in March 2016.[82] That update set the SCC estimate at $40.7,[83] which was up from the 2011 estimate of $31.3.[84] The 2016 update indicated that the figure would rise to $45.1 in 2020 and $49.8 in 2025.[85] These figures are the "central" SCC estimates,[86] as opposed to the "95th percentile" estimates, which use a different discount rate to generate a high SCC value to represent low-probability, high-cost impacts of climate change.[87] Some experts have suggested that SCC figures ought to be significantly higher than those used by the U.S. WG and Canadian W.G.[88]

Notwithstanding progress in the development and deployment of SCC figures, Canada has not extended use of SCC beyond the regulatory decision-making cost-benefit sphere – in IA context or otherwise - and the experience in the U.S. has been limited with uneven rulings from the courts. To

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[74] See *supra* note 8 at 618-622. See also Congressional Reports Service, "Courts Evaluate How Federal Agencies Put a Price on Carbon" (Nov 2016), online: <https://fas.org/sgp/crs/misc/carbon.pdf>
[75] 828 F.3d 949 (D.C. Cir. 2016).
[76] Wright "Carbonated Fodder", *supra* note 11.
[77] ECCC "Technical Update 2016" *supra* note 6 at 1.
[78] ECCC "Technical Update 2016" *supra* note 6 at i.
[79] Government of Canada, "Cabinet Directive on Regulatory Management" (2012), at (G), online: https://www.canada.ca/en/treasury-board-secretariat/services/federal-regulatory-management/guidelines-tools/cabinet-directive-regulatory-management.html#cha67. See also Treasury Board of Canada Secretariat, "Canadian cost-benefit analysis guide: regulatory proposals" (2007), online: <http://publications.gc.ca/collections/collection_2013/sct-tbs/BT58-5-2007-eng.pdf> (Setting out detailed guidance for cost-benefit analysis).
[80] ECCC Technical Update 2016, *supra* note 6 at 2.
[81] Regulatory Impact Analysis Statement, (2012) "Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations" C Gaz II, at 7.4, online: <http://www.gazette.gc.ca/rp-pr/p2/2012/2012-09-12/html/sor-dors167-eng.html>. Regulatory Impact Analysis Statement, (2012) Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations, C Gaz II, at 7.2.3, online: <http://www.gazette.gc.ca/rp-pr/p1/2012/2012-04-14/html/reg1-eng.html> .
[82] ECCC "Technical Update 2016" *supra* note 6.
[83] ECCC "Technical Update 2016" *supra* note 6 at 27.
[84] *Ibid.*
[85] *Ibid.*
[86] *Ibid* at ii, 13 (explaining that the central value uses a 3% discount rate, which is the rate recommended by Treasury Board Secretariat guidance and is also the rate recommended by the U.S. Office of Management and Budget).
[87] *Ibid* at 9.
[88] *See* Frances Moore & Delvane Diaz, *Temperature Impacts on Economic Growth Warrant Stringent Mitigation Policy*, 5 Nature Climate Change 125 (2015).

date, no litigation in Canada has focused on the SCC, nor has SCC been employed in an IA processes.

The climate change mitigation and carbon pricing context in Canada today is ripe for consideration of wider deployment of SCC in the sphere of impact assessment. As discussed in Part II, the overhaul of Canada's federal impact assessment regime presents an important juncture in this regard. While some commentary has emerged on this topic in the U.S. context in relation to SCC and NEPA,[89] there has been none in Canada to date beyond the preliminary discussion in the abovementioned Metcalf Foundation report. This paper begins that discussion.

PART III – SOCIAL COST OF CARBON IN ENVIRONMENTAL IMPACT ASSESSMENT

This Part considers the potential of SCC to contribute to the integration of climate considerations into IA. To do so, SCC is first considered in relation to the purposes of IA, and then discussed in relation to the assessment and decision-making phases of IA, with particular attention to the consideration of economic conditions, cumulative effects analysis, sustainability assessment, and international climate change commitments. To make this analysis as meaningful as possible, a hypothetical LNG project is presented initially and then referenced throughout the balance of the article.

SCC and the Purposes of IA

The basic purpose of IA, as stated above in Part I, is to inform decisions on whether and under what conditions to approve proposed activities. IA seeks to predict the impact of such activities *before* they are permitted to proceed. As described in the seminal Supreme Court of Canada case of *Oldman River Society v. Canada*, "[e]nvironmental impact assessment is, in its simplest form, a planning tool… As a planning tool it has both an information gathering and decision-making component which provide the decision-maker with an objective basis for granting or denying approval of a proposed development".[90]

Integrating climate change considerations into IA serves these broader objectives of gathering information to make informed decisions and plans for the future. The key challenge, however, is how to make information with respect to climate change contextualized and meaningful enough such that it can be used by the public and decision-makers in a practical way. As incorporation of climate change considerations into IA evolves and use of SCC expands, a key question is what roles *could* SCC play in IA? Once such options are understood, decisions can be made with respect to

[89] See e.g *supra* note 8. See also, Nathanial Shoaff and Marni Salmon, "Incorporating the Social Cost of Carbon into National Environmental Policy Act Reviews for Federal Coal Leasing Decisions" (April 2005) Sierra Club whitepaper, online: < https://content.sierraclub.org/environmentallaw/sites/content.sierraclub.org.environmentallaw/files/SCC%20White%20Paper%20FINAL.pdf>

[90] *Friends of the Oldman River Society v. Canada*, [1992] 1 SCR 3.

what roles *ought* SCC play. The focus here is on the former, leaving specific recommendations for policy-makers to determine based on various options.

Canada's proposed new *IAA* offers a useful example of an IA regime through which deployment of SCC in IA can be explored. With respect to IA objectives, the *IAA* enumerates a number of specific purposes, several of which are relevant to climate change and potential uses of SCC in IA. Relevant examples of *IAA* purposes are: fostering sustainability; protecting the environment and health, social, and economic conditions; taking into account positive and adverse effects of a proposed project; considering projects in a careful and precautionary manner; providing opportunities for public participation; and encouraging assessment of cumulative effects.[91] The new *IAA* also includes a mandate provision requiring the government to exercise its powers under the Act "in a manner that fosters sustainability… and applies the precautionary principle".[92]

The overarching objectives of IA and the specific purposes under the new *IAA* reveal a broad basis for use of SCC in IA. As has been noted in the U.S. context with respect to SCC and NEPA, there is a strong conceptual fit between IA and SCC.[93] As a tool that is inherently about generating information about the costs of climate change impacts on society, SCC may assist in the planning and decision-making that IA is designed to inform. Put conversely, IAs that do not integrate a monetary value of climate change damages that would result from a proposed project's emissions can lead to decisions based on incomplete information, particularly insofar as decisions are made based on economic costs and benefits of the proposed project.[94] Indeed, this is the very rationale that has underpinned use of SCC in regulatory decision-making in Canada and the United States, where SCC has had a prominent role in informing cost-benefit analyses.[95] This rationale has also been put forward in litigation in the U.S. in relation to SCC in IA under NEPA.[96] Practical application is emerging as well, with the World Bank incorporating a monetary value of carbon emissions in its economic analysis of project financing in recent years,[97] and more than 1200 firms now use an internal carbon price, or "shadow price", to evaluate investments and guide decision-making.[98]

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[91] Bill C-69, *supra* note 3, s.6(1)
[92] Bill C-69, *supra* note 3, s.6(2)
[93] *Supra* note 89.
[94] See Senator Edward Markey et al, Letter commenting on Comments on Docket No. PL18-1-100 (July 26, 2018), online: <https://www.whitehouse.senate.gov/imo/media/doc/2018-06-25-FERC%20Comments--Pipeline-Certification-SCC4_signed.pdf> (strongly asserting the point that assessments of projects should have a comprehensive and defensible estimate of the total costs of expected greenhouse gas emissions).
[95] David. Wright, Carbonated Fodder: The Social Cost of Carbon in Canadian and U.S. Regulatory Decision-Making, 29 Geo. Envtl. L. Rev. 513 (2017).
[96] Congressional Research Service Reports, "Courts Evaluate How Federal Agencies Put a Price on Carbon" CRS Legal Sidebar, (November 1, 2016), online: <https://fas.org/sgp/crs/misc/carbon.pdf>.
[97] World Bank, "Shadow price of carbon in economic analysis - Guidance note" (12 November 2017), online: <http://pubdocs.worldbank.org/en/911381516303509498/2017-Shadow-Price-of-Carbon-Guidance-Note-FINAL-CLEARED.pdf>.
[98] Manjyot Bhan Ahluwalie, "The Business of Pricing Carbon: How Companies are Pricing Carbon to Mitigate Risks and Prepare for a Low-Carbon Future", Center for Climate and Energy Solutions Brief (Sept 2017), online: <https://www.c2es.org/site/assets/uploads/2017/09/business-pricing-carbon.pdf>

To explore specific ways SCC could be used, the below sections consider the potential role and value of SCC in the assessment and decision-making phases of IA. The proposed *Impact Assessment Act*, of course, includes both of these phases, and it is in these two parts of the IA process where climate change considerations would be explicitly required under the new Act. As such, the specific requirements of the *IAA* are used below as a basis for considering what roles SCC could play. However, most of the concepts discussed here would also be relevant in national and sub-national IA regimes around the world.

SCC in the Assessment Phase

Substantive assessment of the potential impacts of a project is driven by the factors that must be taken into account during the course of the IA process (often referred to as "scope of assessment").[99] The new *IAA* expands the factors in Canada's federal assessment regime in a way that includes those that existed under the previous statute,[100] such as cumulative effects,[101] and adds new requirements such as "the extent to which the designated project contributes to sustainability",[102] and "the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change".[103] The IAA also includes, for the first time, an explicit requirement to assess a project's positive and negative impacts on "economic conditions".[104] In total, the *IAA* includes 16 factors for consideration in the assessment. While there are a number of factors that are relevant to carbon emissions, such as mitigation measures[105] and alternatives to the project,[106] the present discussion focuses on the four most relevant to using SCC: economic conditions, cumulative effects, climate commitments, and sustainability. Each of these are discussed in sequence below. However, a hypothetical example is first presented to illustrate how SCC values could be generated. This portion of any IA SCC analysis would be substantively similar; adjustments necessary for use in association with specific IA factors are discussed in relation to each further below.

Calculating SCC in relation to a specific project

Given that SCC is a monetary figure calculated on the basis of each additional tonne of carbon emitted, any use of SCC must begin with identifying the projected tonnes emissions associated with the activity being assessed. This initial question of calculating the megatonnes (MTs) associated with the activity raises fundamental questions about how to incorporate climate change considerations –

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[99] Though, of course, the "scope of project" is the most significant driver of what will be assessed. This is very true in the context of climate change considerations, where scoping a project narrowly could remove significant emission sources and amounts out of the assessment entirely. In the Canadian context, "scope of project" is done through the *Regulations Designating Physical Activities*, which list physical activities that are "designated projects" under the Act. These regulations will be modified under the new IAA regime.

[100] CEAA 2012, s.19.

[101] Bill C-69, *supra* note 3, s.22(1)(a)(ii).

[102] Bill C-69, *supra* note 3, s.22(1)(h)

[103] Bill C-69, *supra* note 3, s.22(1)(l)

[104] Bill C-69, *supra* note 3, s.22(1(a)

[105] Bill C-69, *supra* note 3, s.22(1)(b)

[106] Bill C-69, *supra* note 3, s.22(1)(f)

and GHG emissions specifically – into IA. Detailed discussion of these dimensions appears in detail in the abovementioned Metcalfe report and will not be fully restated here.[107] However, several points are important to note in relation to SCC, particularly with respect to calculating gross versus net carbon emissions. To illustrate these points, we present a hypothetical project, a liquefied natural gas (LNG) project. Other suitable examples include a mine, a hydro project, a pipeline, an oil sands project, among many other projects listed as requiring a federal IA.

With respect to the hypothetical LNG project, the critical threshold matter would be to determine which expected emissions should be attributed to the proposed project: direct, indirect (i.e. upstream and/or downstream), both, or some type of tailored approach. Only once this determination is made can an analysis using SCC begin. In terms of direct emissions, these calculations would include the emissions resulting from the construction, operational, decommissioning and reclamation phases of the processing facility, the marine terminal and likely nearby related infrastructure such as roads and power lines. This analysis would be relatively straightforward, calculating emissions that would result from these activities in each project phase using an appropriate methodology for GHG projections and accounting.

Indirect emissions are more complicated. For present purposes, these will be treated as "upstream" and "downstream" emissions. Regarding upstream, scoping determinations would have to be made with respect to which production activities are included. For example, it would have to be decided what emissions associated with the transmission pipeline will be considered (e.g. emissions associated with construction, operation, decommissioning and abandonment of that gas pipeline). Similarly, it would have to be decided what emissions associated with production and development of the resource will be scoped in (e.g. extraction, gathering, refining as well as any other emissions from construction, operations, decommissioning and reclamation). These are very consequential project scoping decisions as they will form the basis of total project emissions numbers used to generate total project costs using SCC.

Regarding downstream emissions, two lines of inquiry would be required: estimating gross emissions and estimating net emissions. Estimating gross emissions would be relatively straightforward. This would require using an appropriate methodology[108] for calculating the GHGs emitted from the ultimate consumption of the LNG produced by the Canadian project. While there would be important modelling inputs to clarify, on its face this would seem quite feasible. The second line of enquiry to determine downstream emissions would be more complex: calculating net emissions. This analysis would be focused on emissions reductions or increases in other jurisdictions that result from consumption of the LNG (e.g. avoided burning of coal and avoided construction of new coal-fired electricity generation plants, or replacing wind, solar or energy conservation). Any emission reductions achieved elsewhere as a result of the project could be applied to the project's total GHG figures, resulting in a lower net emissions number.[109] In the present context, how to go about this is

[107] Gibson et al., "Paris to Projects Summary Report" *supra* note 5.
[108] See e.g. World Resources Institute, "The GHG Protocol for Project Accounting" & World Resources Institute (2004), online: <https://ghgprotocol.org/sites/default/files/standards/ghg_project_accounting.pdf>
[109] This is, of course, premised on the reality that GHG emissions co-mingle in the atmosphere so the geographic location of emissions reductions does not matter.

an open question. There is a need to decide to what extent projected changes of foreign emissions would be considered in the downstream analysis and how to calculate this. For an LNG project in particular, it is often asserted that LNG projects in Canada result in displacing use of coal in Asia as a benefit associated with such projects.[110] Generating an empirical basis for this emissions displacement assertion, an assertion that is presently disputed,[111] and then incorporating those quantitative findings into the calculation of a project's net GHG emissions is a tremendously important step. Only once such a calculation is completed can the asserted avoided-emissions benefit be reliably included in the impact assessment.

Adding to this complexity are two important nuances in the downstream GHG emissions scoping and calculation context. First, the net impact of exporting Canadian LNG is likely to change over time. While LNG may replace coal in today's context, later in the life of this same project it is foreseeable that, depending on the destination country, the LNG could actually displace other energy sources such as wind or solar or geothermal.[112] Such changes over time must be incorporated in these downstream calculations to the extent possible (such appropriate methodologies would have to be identified or developed). Second, future energy scenarios in another jurisdiction are difficult to predict, and may depend on whether one is assuming a Paris-compliant or non-compliant world. For example, this LNG project may displace more coal-fired electricity generation if the context is a world of 3 or 4 degrees of warming where the destination country has no intention of integrating cleaner technologies. This variability and unpredictability cannot be completely eliminated; however, the GHG tabulation could use of different scenarios to provide a suite of net emissions projections.[113]

Only once such calculations of direct and indirect emissions are completed can SCC be engaged in assessment of specific IA factors. With the GHG scoping decisions and calculations described above complete, the application of SCC would be a relatively straightforward exercise. The total emissions amounts determined would be multiplied by the selected SCC estimate(s). For example, if the LNG project would result in annual additional emissions amounts of 1MT of direct emissions, 6

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[110] Jessica Jaganathan and Julie Gordon, "LNG Canada, nation's biggest private-sector project yet, wins go-ahead", Financial Post (02 October 2018), online: <https://business.financialpost.com/commodities/energy/update-3-massive-canada-lng-project-gets-green-light-as-asia-demand-for-fuel-booms>. See also B.C. Speech from the Throne, 2016 Legislative Session: 5th Session, 40th Parliament, https://www.leg.bc.ca/parliamentary-business/legislation-debates-proceedings/40th-parliament/5th-session/throne-speech

[111] Matt Horne, "Comments on the CEAA Pacific NorthWest LNG draft environmental assessment report", Pembina Institute (11 March 2019) at 10-11 online: https://www.pembina.org/reports/pnwlng-ceaa-2016.pdf (noting that LNG from BC may displace coal but it also may compete with energy efficiency and renewable energy, resulting in the delay of integrating those technologies). See also Matt Horne and Josha MacNab "Liquefied Natural Gas and Climate Change: The Global Context." Victoria, BC: Pacific Institute for Climate Solutions (October 2014), https://www.pembina.org/pub/lng-and-climate-change-the-global-context.

[112] *Ibid.* See also James Coleman and Sarah Marie Jordan, "Clearing the Air: How Canadian LNG Exports Could Help Meet World Greenhouse Gas Reduction Goals" C.D. Howe Institute E-Brief (24 August 2016), online: https://www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/e-brief_244.pdf. See also James Coleman et al, "Calibrating Liquefied Natural Gas Export Life Cycle Analysis: Accounting for Legal Boundaries & Post-Export Markets." Occasional Paper 49. Calgary: Canadian Institute of Resources Law (2015). https://prism.ucalgary.ca/bitstream/id/44157/LNG-OP49.pdf/;jsessionid=3417EFA334F57085419904EC16B9D064

[113] This could be in the likeness of the scenarios presented by the Intergovernmental Panel on Climate Change or the International Energy Agency.

MTs of upstream emissions, and *avoided* downstream emissions of 3MTs, then each of those volumes would be multiplied by the SCC estimates to generate a quantitative estimate of total gross and net social costs attributable to the specific project's direct, upstream and downstream emissions.

Applying the federal government's most recent SCC "central estimate" in relation to this LNG project,[114] the calculation of the annual cost of the direct emissions using today's figures would look like this: 1MT x $40.7/t = $40.7 million (cost). The calculation would be similar for upstream emissions: 6MTs x $40.7/t = $250.2 million (cost). Downstream emissions would also be similar = 3MTs x $40.7/t = $122.1 million (avoided costs; i.e. benefit). For this particular project, we can see a single year net benefit of $81.4 million if only direct and downstream emissions are incorporated, but a net cost of $168.8 million if direct, upstream and downstream are all incorporated.

There would, of course, be multiple ways to present this information in various sets of aggregated and disaggregated data.[115] At the very least, it is reasonable to expect the analysis to use the two SCC values that Canada currently uses in its cost-benefit analysis as part of assessing regulatory impact: $40.7 ("central" value) and $167 ("95th percentile" value).[116] The IA calculation of MTs might go a step further and use four SCC values based on the four different values (and three different discount rates) previously used in regulatory impact analyses in the United States.[117] These different values could also be applied separately to the project's direct, upstream and downstream emissions. And, as discussed above, the latter may include several scenarios, meaning the SCC analysis would apply multiple SCC values to several different downstream emissions projects in another jurisdiction. While calculations of this nature would generate a relatively large volume of complicated information, Canada and the U.S. have been doing similar in regulatory impact analyses for several years.[118] Further, generating volumes of such information in a transparent way is generally in line with the purposes of impact assessment, as discussed above. Ultimately, under Canada's new *IAA* regime, it would be up to the final decision-makers (i.e. federal Cabinet) to decide how much weight to accord these various costs projections in the final public interest determination.

With this general picture of employing SCC in relation to project emissions now set out, we turn to specific factors of consideration in IA and associated final decision-making.

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[114] ECCC "Technical Update 2016" *supra* note 6.
[115] For an example of how this could be done in relation to an oil sands project, see Branko Bošković and Andrew Leach, , "Leave It in the Ground? Incorporating the Social Cost of Carbon into Oil Sands Development" (December 24, 2017) University of Alberta School of Business Research Paper No. 2920341, online: <https://ssrn.com/abstract=2920341 or http://dx.doi.org/10.2139/ssrn.2920341>
[116] ECCC "Technical Update 2016" *supra* note 6 (both figures employ a discount rate of 3%; the latter is used by the Canadian Working Group to estimate the sensitivity of the results to higher SCC values)
[117] US WG Technical Update *supra* note 43.
[118] See e.g. Regulatory Impact Analysis: Final Rulemaking for 2017-2025 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards (2012) https://nepis.epa.gov/Exe/ZyPDF.cgi/P100EZI1.PDF?Dockey=P100EZI1.PDF. Regulatory Impact Analysis for the Final Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (2015) http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100MWLE.TXT coal-fired regs impact analysis.

Economic Conditions

Under the new IAA, assessment of a project's impacts on economic conditions is explicitly required. An impact assessment must take into account "the changes to the environment or to health, social or economic conditions and the positive and negative consequences of these changes that are likely to be caused" by the project.[119] This explicit reference to "economic conditions" and associated "positive and negative consequences" is new in Canadian IA. Unlike other jurisdictions,[120] federal assessment in Canada has traditionally not explicitly employed an economic cost-benefit analysis. Rather, costs and benefits have been presented in a more narrative way as part of recommendations on whether a projects is in the public interest.[121]

Notwithstanding the unusual wording of this new provision, it provides a basis for analysis that employs monetary figures to look at costs and benefits (i.e. "positive and negative consequences") of a project's impacts. SCC has a logical fit here: given the impact assessment is now concerned with economic impacts on society at large, then SCC could contribute to producing a more accurate economic picture. It could, for example, be used to compare expected positive consequences expressed in quantitative figures, such as jobs, royalties and other benefits, with negative consequences expected from carbon emissions impacts. A look at the Joint Review Panel Report for the Northern Gateway project illustrates this point. That report included a sub-section on "economic burdens and benefits", an "analysis of project costs and benefits,[122] and figures setting out expected economic benefits such as $312 billion increase in Canadian gross domestic product, $44 billion in federal government revenues, $54 billion to provincial or territorial governments, $70 billion in Canadian labour income.[123] Costs of carbon emissions were not included in the report, though it did present projected spill clean-up costs.[124] In a future assessment of such a project, these specific economic benefit figures could be better contextualized and better understood by the public and decision-makers if presented along side quantitative information carbon GHG emission impacts generated by using SCC.

For SCC to be used in this context, however, the above-described scope of MTs would have to be tailored to match the scope of the benefits to which the costs are compares. For example, if the calculation of project benefits does not include jobs or royalties associated with upstream development activities, then upstream MTs ought not be factored into the SCC calculations for purposes of the economic analysis. Additionally, government guidance (and perhaps review panel terms of reference) would have to set out the methodological parameters such as clarifying which

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[119] Bill C-69, *supra* note 3, s.22(1)(a)
[120] See e.g. Council on Environmental Quality, "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews" (2016) at 32-33, online: <https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf> (acknowledging that U.S. government agencies conducting NEPA reviews may engage in monetary cost benefit analysis).
[121] See e.g. National Energy Board, "Report of the Joint Review Panel for the Enbridge Northern Gateway Project, Volume 2" (2013) at 9-13, online: <http://publications.gc.ca/collections/collection_2014/one-neb/NE23-176-2013-2-eng.pdf>.
[122] *Ibid* at 9-13, 286.
[123] National Energy Board, "Report of the Joint Review Panel for the Enbridge Northern Gateway Project, Volume 1" (2013) at 31, online: <http://publications.gc.ca/collections/collection_2014/one-neb/NE23-176-2013-1-eng.pdf>.
[124] *Ibid* at 67.

SCC values (e.g. "central", "95th percentile", and others) to use in relation to project-related emissions. Again, it would be up to decision-makers to decide how much weight to accord these different representations of costs against the economic benefit figures.

One concern that may arise in using social cost of carbon in assessing positive and negative consequences of a project on economic conditions is that social cost of carbon, as is it currently concocted, is a global figure – it represents damages at a global level. To the extent that the assessment of economic conditions is focused on international dimensions (e.g. downstream benefits outside Canada), clearly a global cost of carbon would be appropriate. To the extent that the assessment is limited to the domestic context, some may suggest a global SCC value in inappropriate. However, given Canada's commitment under the Paris Agreement to contribute its "fair share" to addressing climate change, it is reasonable to proceed on the basis that any project emissions that are approved will increase Canada's obligation to assist with decarbonization, adaptation and loss and damage efforts outside Canada, so the social cost outside Canada will still be a cost to Canada. As such, despite project economic benefits typically be local and domestic in nature, it is tenable to assess these domestic benefits against the cost of climate change impacts that are felt both domestically and internationally. While some narrow circumstances may warrant use of a country-specific social cost of carbon to augment the analysis, such an approach has not yet been developed and would have to be examined through further research.

As a final comment in relation to economic considerations as an IA factor, it is important to note that this factor contemplates changes to the environment and changes to health, social and economic conditions. These dimensions are all included in the modeling that generates SCC values. As such, while, SCC figures may be useful in assessing changes to "economic conditions" by presenting monetary figures, the SCC figures also have relevance by representing a monetary value of changes (i.e. costs) to the environment and health and social conditions. On its face, this suggests a strong fit between SCC and this specific IA factor (notwithstanding inherent limitations in SCC, as discussed in Part II). Of course, it is critical to point out that such economic analysis would be just one part of the IA, which would ultimately be weighed against important non-monetized (and non-monetizable) impacts, such as impacts of a project on the rights of Indigenous peoples.[125]

Project Cumulative effects

Cumulative effects are changes to the environment caused by an action in combination with other past, present and future actions.[126] Climate change is inherently about cumulative effects: the atmospheric changes driving climate change are a product of past and present emissions building up cumulatively over time.[127] Traditionally, however, cumulative effects analysis (CEA) has been used to

[125] Bill C-69, *supra* note 3, s.22(1)(c) and s. 63(e).
[126] See Meinhard Doelle, *The Federal Environmental Assessment Process: A Guide and* Critique, LexisNexis (2008) at 27-28. See also Neil Craik, *The International Law of Environmental Impact Assessment* (Cambridge, UK: Cambridge University Press, 2008) at 141 [Craik].
[127] IPCC AR5, s*upra* note 1.

understand impacts in the geographic region of the proposed project.[128] For example, a typical CEA might examine cumulative impacts related to habitat fragmentation, water withdrawals, regional air pollution, nutrient loading, or land use changes.[129] At its core, CEA is a tool used to understand the true significance of a project's effects given what is taking place in the surrounding region and ecosystems.[130] Climate considerations have typically not been part of this analysis.

While Canadian courts have held that cumulative effects must be assessed in accordance with legislative requirements,[131] the practice of CEA has been an ongoing challenge,[132] and IA has fallen short of its potential to use cumulative effects analysis (CEA) as a venue for considering a project's contribution to the wider impacts of climate change. Greenhouse gas emissions have been considered in some IAs,[133] perhaps owing in part to guidance issued in 2003;[134] however, given that such analysis was not an explicit requirement until the proposed *IAA*, consideration of GHG emissions and their impacts has been discretionary and uneven.[135]

Cumulative effects may be an appropriate venue for deployment of SCC. However the analysis would be distinctly different from traditional CEA. First, unlike traditional CEA, analysis of cumulative GHG emissions and associated costs would presumably not identify specific valued ecosystem components (VECs) in the vicinity of the proposed project. Rather, the VEC would essentially be the global climate system, and impacts on this VEC impacts would already be built into SCC as part of the globally-based modelling of impacts. Similarly, and again unlike traditional CEA, this analysis would not identify spatial boundaries in the geographic region of the project because the impacted geographic region is the entire globe (owing to the fact that carbon emissions co-mingle globally and SCC is expressed as a cost to society at a global level).

Relatedly, use of SCC in CEA would presumably deviate from conventional CEA geographic scoping (i.e. looking at projects and activities in the same geographic vicinity that have had an impact on environmental conditions). Instead, pre-determined carbon budgets or decarbonisation pathways would be substituted in the place of typical geographic parameters. These budgets or pathways would set the geographic or jurisdictional context in relation to which the project's emissions would

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128 Noble, *Intro to EA supra* note 2.
129 *Ibid.*
130 Noble, *Intro to EA supra* note 2 at 242.
131 *Alberta Wilderness v Cardinal River Coals Ltd.,* [1999] 3 FC 425; see also *Bow Valley Naturalists Society v Canada* [2001] 2 F.C. 461 (FCA).
132 See Office of the Auditor General of Canada, "Implementation of the *Canadian Environmental Assessment Act*, *2012*" Report of the Commissioner of the Environment and Sustainable Development (2014) at 4.62-4.72, online: < http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201410_04_e_39851.html>. See also Rod Northey, *Guide to the Canadian Environmental Assessment Act* (Markham, Ontario: LexisNexis, 2018) at 259-268 (stating that litigation has demonstrated persistent tension around what must be included in that assessment of cumulative effects).
133 See e.g. Environment and Climate Change Canada, "Trans Mountain Pipeline ULC - Trans Mountain Expansion Project: Review of Related Upstream Greenhouse Gas Emissions Estimates" (19 May 2016), online: <https://www.ceaa-acee.gc.ca/050/documents/p80061/114550E.pdf>
134 Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment, "Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners" (November 2003), online: <https://www.ceaa.gc.ca/Content/A/4/1/A41F45C5-1A79-44FA-9091-D251EEE18322/Incorporating_Climate_Change_Considerations_in_Environmental_Assessment.pdf>
135 See Mark Friedman , "Assessing Greenhouse Gas Emissions in the Oil Sands: Legislative or Administrative (in)Action?", (2016) 6:3 online: UWO J Leg Stud 5.

be assessed. Such budgets could be provincial, regional, national or sectoral in nature, or a mix. In effect, use of these budgets or decarbonisation pathways would substitute for the typical analysis conducted under CEA guidance calling for examination of physical activities that have been carried out and that will be carried out (i.e. activities that are "certain" and "reasonably foreseeable").[136] Framing this as a question, the CEA would ask how the costs from a project's emissions relate to the past, present and future emissions within this particular jurisdiction's or sector's carbon budget. The ensuing analysis would be based on whichever MTs are determined to be a result of the proposed project and whichever past and future activities are scoped into the CEA analysis.

That project's emissions figures (however delineated based on project scoping, as explained above) would then be used for the CEA. CEA scoping would require setting of temporal boundaries, i.e. which years of past and future emissions will be scoped into the CEA, as well as setting of carbon budget parameters – i.e. regional, provincial, national, or sectoral. For example, the CEA might be set such that the project's direct emissions will be assessed against cumulative national GHG emissions commencing in 1990, with further assessment in relation to the 2030 Paris Agreement target and Canada's current Canada's Mid Century Long-Term Low-Greenhouse Gas Development Strategy. To further contextualize the project's emissions, the CEA might also assess the project against any to-be-developed tailored sectoral emissions cap.[137] As such, built into this this analysis would be the temporal scoping (e.g. 1990 to key emission reduction target dates) and geographic scoping (e.g. national emissions), and possibly sectoral scoping (e.g. LNG, or oil and gas).

As discussed in relation to final decision-making below, this SCC portion of the CEA would ultimately be considered by federal Cabinet as part of the branch of the public interest determination under s.63 that requires consideration of "the extent to which adverse effects within federal jurisdiction and the adverse direct or incidental effects that are indicated in the impact assessment".[138] What weight such information is accorded would ultimately be up to federal Cabinet. To perhaps state the obvious, the SCC figures generated through this CEA analysis would be focused on the effects of the project as expressed in dollar figures. It is theoretically possible, of course, that the project has a net benefit by virtue of avoided emissions downstream. If the SCC analysis does indeed show net negative effects (i.e. adverse effects), then Federal Cabinet would essentially have to make a values-based judgement as to whether the total figure (or range of figures) exceeds any kind threshold that is unacceptable. Such thresholds could be set out in guidance or regulations to provide more certainty to proponents and the public. Ultimately, such decisions would also have to incorporate non-monetary findings of the IA such as the tremendously important matter of impacts on the rights of Indigenous peoples.

Project helping or hindering or contributing to meeting climate change commitments

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[136] Canadian Environmental Assessment Agency, "Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012" (March 2015) at 3, online: <https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=1DA9E048-1&pedisable=true>

[137] See e.g. *Oil Sands Emissions Limit Act*, Statutes of Alberta, 2016, Chapter O-7.5 (as an example of a hard emissions cap being imposed on a specific sector).

[138] Bill C-69, *supra* note 3 s.63(b)

The most obvious basis for using SCC in IA is under an explicit legislated requirement to consider climate change dimensions. While the practice of incorporating climate change considerations in IA is uneven internationally, Canada's new *IAA* contains such a provision as one of the factors to be taken into account in an assessment:

> [T]he extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change[139]

To date, inclusion of this provision has generated many questions,[140] which are expected to be answered, at least in part, in regulations and guidance yet to come. The terms "environmental obligations" and "commitments in respect of climate change" are not defined in the Act. In forthcoming regulations and guidance, it is likely that this provision will become the basis for a "climate test" or suite of climate tests that would be used to gather information about a project's expected emissions and assess the impact of such emissions in relation to Canada's climate change commitments and environmental obligations.

The utility of SCC in this part of an impact assessment would be driven by the specific aims of the climate-related assessment. For example, if the objective is to gather information and make a decision based on the project's contribution to climate change impacts and damages – what could be termed a 'damages-based assessment' – then SCC would be a strong conceptual fit. Put another way, SCC would be a useful tool if the focus is on assessing whether a project is in the public interest after taking into account the monetary cost of climate change impacts it would cause (including in relation to impacts- or damages-related commitments in the UNFCCC and Paris Agreement, as set out below). However, if the assessment is aimed exclusively at gathering information and making a decision based on how a project would impact Canada's ability to meet an emissions reduction target – what could be called a 'target-based assessment' – then SCC may have less of a role to play. In practice, it is foreseeable, if not advisable, that there will be multiple climate tests employed under the IAA, particularly given the broad framing of the climate-specific assessment factor under s.22 and public interest factor under s.63.[141] SCC-based analysis could inform one of these tests.

For the present analysis, it is assumed that the commitments and obligations referenced in the *IAA* will be linked to commitments under the Paris Agreement and the United Nations Framework Convention on Climate Change. Under any reasonable reading, "commitments in respect of climate change" would include the fundamental commitment in the UNFCCC to "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system",[142] This goal in the UNFCCC has, of course, now been quantified in the Paris Agreement with the goal of keeping global average temperature increases "well below" 2 degrees and the explicit ambitious acknowledgement of limiting the increase to 1.5 degrees. For Canada's part, quantitative emission reduction commitments take the

[139] Bill C-69, *supra* note 3, s. 22(1)(l). It is also a basis for final decisions on whether a project is in the public interest – s. 63(d).
[140] See Gibson et al "Paris to Projects Summary Report" *supra* note 5.
[141] See *Ibid* (for a description of climate tests that may be developed and employed under the IAA).
[142] Article 2, United Nations Framework Convention on Climate Change, 9 May 1992, 31 ILM 849 [UNFCCC].

form of Canada's NDC under the Paris Agreement,[143] along with a commitment to increase the ambition of its NDC to make a fair contribution to the global temperature goal.[144]

Relating these commitments to SCC in IA, one would expect that given the core commitment of avoiding dangerous climate change and the associated quantitative targets and commitments, Canada must understand costs from climate change-induced harm it would be authorizing by approving a proposed project. Further, and framed in a more pragmatic manner, target-based commitments are just a means to the ends of avoiding dangerous climate change, and SCC may therefore relate more directly to the primary UNFCCC objective.

Canada's "commitments in respect of climate change" would also include commitments beyond those dealing with emission reduction targets and climate change mitigation. Examples include the following:

- UNFCCC Article 4 (1)(f) – Taking into account climate change considerations in relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change;[145]
- UNFCCC Article 4 (1)(h) - Promoting and cooperating in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate system and climate change, and to the economic and social consequences of various response strategies;[146]
- Paris Agreement Article 2 (1)(a) - Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;
- Paris Agreement Article 7(9)(c) - Each Party shall, as appropriate, engage in adaptation planning processes and the implementation of actions, including the development or enhancement of relevant plans, policies and/or contributions, which may include:
  (c) The assessment of climate change impacts and vulnerability, with a view to formulating nationally determined prioritized actions, taking into account vulnerable people, places and ecosystems;
- Paris Agreement Article 8(1) - Parties recognize the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate change, including

[143] Government of Canada, "Canada's 2017 Nationally Determined Contribution to the United Nations Framework Conveniton on Climate Change, (2017), online: <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Canada%20First/Canada%20First%20NDC-Revised%20submission%202017-05-11.pdf>
[144] Article 4(3), *Paris Agreement*, CP DEC 1/CP.21, 21st Sess (2016) FCCC/CP/2015/10/Add.1.
[145] UNFCCC Article 4 (1)(f)
[146] UNFCCC Article 4 (1)(h)

extreme weather events and slow onset events, and the role of sustainable development in reducing the risk of loss and damage.

- Paris Agreement Article 9(3) - As part of a global effort, developed country Parties should continue to take the lead in mobilizing climate finance from a wide variety of sources, instruments and channels, noting the significant role of public funds, through a variety of actions, including supporting country-driven strategies, and taking into account the needs and priorities of developing country Parties. Such mobilization of climate finance should represent a progression beyond previous efforts.
- Paris Agreement Article 12 - Parties shall cooperate in taking measures, as appropriate, to enhance climate change education, training, public awareness, public participation and public access to information, recognizing the importance of these steps with respect to enhancing actions under this Agreement.

These provisions provide an ample basis for the use of SCC under the *IAA*, particularly if read in conjunction with the provisions of the UNFCCC, the Paris Agreement, and the *IAA* that emphasize precaution and transparency. These specific commitments are primarily impacts-oriented (as opposed to targets-oriented), which provides a basis – if not an imperative – for use of a damages-based assessment tool such as the SCC. Through relating government decisions and ensuing carbon emissions to the damage they cause, Parties can more comprehensively and diligently gauge whether they are fulfilling such commitments.

Outside the UNFCCC and Paris Agreement realm, one recent commitment is particularly salient. In September 2018, Canada endorsed a joint statement on North American Climate Leadership, which included explicit reference to social cost of carbon and a commitment to "promote opportunities to use the Social Cost of Carbon appropriately across a wide range of policy applications".[147] It should be noted, however, that neither Canada's Nationally Determined Contribution under the Paris Agreement,[148] nor the Pan-Canadian Framework on Clean Growth and Climate Change,[149] nor Canada's Mid Century Long-Term Low-Greenhouse Gas Development Strategy[150] discuss the social cost of carbon or the role of impact assessment in achieving stated commitments.

Recalling the LNG hypothetical project set out above, the actual quantitative analysis here would be driven by key project emissions scoping decisions, determination of direct and indirect project carbon emissions (including net and gross), and then use of SCC values to present a range of expected climate-related damages based on different SCC values. This SCC data would then be considered by federal Cabinet as part of the climate change commitments branch of the public interest determination under s.63. Presumably, this SCC dimension of the IA's analysis of climate change considerations would complement other target-based analyses such that the final IA report

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[147] Government of Canada, "Joint statement on North American Climate Leadership" (14 September 2018), online: <https://www.canada.ca/en/environment-climate-change/news/2018/09/joint-statement-on-north-american-climate-leadership1.html>

[148] *Supra* note 143.

[149] Online: <https://www.canada.ca/content/dam/themes/environment/documents/weather1/20170125-en.pdf>

[150] Government of Canada, "Canada's Mid Century Long-Term Low-Greenhouse Gas Development Strategy" (2016), online: <https://unfccc.int/files/focus/long-term_strategies/application/pdf/canadas_mid-century_long-term_strategy.pdf>

details how a project contributes to or hinders Canada fulfilling its target-based *and* impact-based commitments. As such, a target-based analysis would inform decision-makers as to the *amount* of GHGs expected from the project, and the SCC damages-based analysis would inform decision-makers as to the *impact* of those emissions, together generating a full picture.

It should be noted here that concerns regarding SCC being a global figure would be less of an obstacle under this part of the IAA. The new climate change provisions in the *IAA* are inherently about the global context and Canada's commitments in that realm. Further, this climate change IA factor explicitly refers to "effects", which is defined very broadly in the *IAA* to include "changes to the environment or to health, social or economic conditions and the positive and negative consequences of these changes".[151] There is no domestic contextual constraint imposed by this provision.[152]

Project Contribution to Sustainability

While there is a long-standing strong link between IA and sustainability,[153] the concept has heightened prominence in the new *IAA* regime. Sustainability is defined in the *IAA* to mean "the ability to protect the environment, contribute to the social and economic well-being of the people of Canada and preserve their health in a manner that benefits present and future generation".[154] Fostering sustainability is a core purpose of the Act[155] and sustainability features prominently as a factor to be considered in the assessment[156] as well as final decision-making.[157] As a factor to be considered, section 22 requires that the impact assessment of a proposed project takes into account "the extent to which the designated project contributes to sustainability".[158] This could serve as a basis for use of SCC in IA.

Much still needs to be fleshed out within the new IAA regime in terms of what the sustainability factor will require in the assessment and how it will be used. Presumably this will be included in to-be-developed regulations or guidance. As such, it is difficult at this stage to go beyond the basic acknowledgement that there is a strong conceptual fit between an assessing a project's contribution to sustainability and the SCC. However, at least two options are conceivable at this time. One option would be a stand-alone SCC analysis that would then be added to other analysis or analyses that are conducted to fulfill the s.22 requirement and inform consideration under s.63. Under this option, the stand-alone analysis would be very similar, if not identical, to the process outlined above in

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151 Bill C-69, *supra* note 3, s.2

152 Though it should be noted that IAA s.22(2) provides a discretionary basis to limit the scope of this and other impact assessment factors.

153 See Craik, *supra* note 216 at 77. See also Robert Gibson, Meinhard Doelle & John Sinclair, "Fulfilling the Promise: Basic Components of Next Generation Environmental Assessment" (2016) 29 J Envtl L & Prac 257 (for a detailed look at "sustainability assessment" and "next generation environmental assessment")

154 Bill C-69, *supra* note 3, s.2

155 Bill C-69, *supra* note 3, s.6(1)(a).

156 Bill C-69, *supra* note 3, s.22(1)(h)

157 Bill C-69, *supra* note 3, s.63(a)

158 Bill C-69, *supra* note 3, s.22(1)(h)

relation to economic conditions effects. That is, the project's total GHG emission costs, expressed in ranges based on net and gross GHG figures using a range of SCC values, would simply be placed into whatever broader set of sustainability analyses are conducted. In cases where a project may appear viable based in part on contributing positively to sustainability by virtue of net positive social and economic impacts, the SCC may offer an added lens through which all associated costs can be assessed, providing a more complete picture of a project's viability in monetary terms.

A second option would be to integrate SCC as one input in a broader sustainability assessment matrix conducted under s.22. Given the language of s.22(1)(h), this matrix would presumably include a suit of inputs compiled and calibrated to assess the explicitly described aspects of sustainability: "ability to protect the environment", "contribution to the social and economic well-being of the people of Canada", and preservation of Canadian's health, all in a manner that benefits present and future generations. Given the explicit reference to economic benefits of the project, SCC may be particularly well placed as a monetary-based tool to ensure comprehensive and balanced coverage of a project's expected economic benefits and costs (recognizing that the project may make a positive or negative contribution to social and economic well-being). Again, this would be substantively similar to the economic analysis described above with respect to the "economic conditions" impact factor. It is important to note, however, that this assessment of a project's contribution to sustainability would presumably include the calculation of the economic dimensions of a project's costs and benefits (including SCC) as well as effects that cannot be put into monetary terms (the latter would need to be identified, and this would have to be approached carefully such that such impacts are not already included in SCC modeling inputs). Canada may look to U.S. agencies' use of cost-benefit analysis in NEPA reviews as a model for conducting an assessment with monetized and non-monetized dimensions of a proposed project.[159]

A key challenge for use of SCC within an assessment of a project's contribution to sustainability under the Canadian IAA, however, is the global nature of SCC values. The IAA is explicit in confining sustainability to the domestic context. By referencing "social and economic well-being of the people of Canada" and "their health" the definition makes very clear that the emphasis is on sustainability with respect to Canada and Canadians. This could be addressed at in at least two ways. First, as suggested above and as explored in the Metcalfe report, one could reasonably conclude that any project emissions that are approved will increase Canada's obligation to assist with decarbonization, adaptation and loss and damage efforts outside Canada, so the social cost outside Canada will still be a cost to Canada. Alternatively, instead of using the SCC global values generated by the Canadian WG, Canada could generate a domestic-specific SCC. Developing such country country-level SCC values is, however, only at a very early stage,[160] and its potential use would be quite limited. Recent changes by the Trump Administration in this direction[161] has attracted sharp

[159] *Supra* note 120.
[160] See Katharine Ricke et al., "Country-level social cost of carbon", Nature Climate Change Vol. 8, p. 895–900 (2018).
[161] See Environmental Protection Agency, Regulatory Impact Analysis for the Proposed Emission Guidelines for Greenhouse gas Emissions from Existing Electric Utility Generating Units (August 2018) at 4-2 – 4-4, online: https://www.epa.gov/sites/production/files/2018-08/documents/utilities_ria_proposed_ace_2018-08.pdf (featuring most prominent example of the Trump Administration - the repeal and replacement of the Clean Power Plan, where "interim" SCC estimates were as low as $1 per ton in the year 2030, compared to $60 from the US WG for the same year).

criticism in part because of the risk that it will be used inappropriately to suggest the cost of GHG emissions is much lower than it actually is.[162]

Similar to assessment of other factors discussed above and the hypothetical example initially presented, the quantitative SCC analysis within the sustainability assessment would be an exercise of developing a methodology for calculating SCC data in relation to a proposed project (i.e. SCC values multiplied by project-related gross and net carbon emissions and then presented as range of expected climate-related damages based on differ emission scoping and SCC values). This output SCC data would then be considered by federal Cabinet as part of the sustainability branch of the public interest determination under s.63, as discussed below.

SCC in the Decision-Making Phase

In many IA regimes, including Canada's, once the assessment is complete, the process proceeds to a decision-making phase. Such decision-making is based on the final assessment report containing information gathered through the assessment phase, including information gathered under each of the factors referenced above such as cumulative effects, mitigation measures, public input and more (though scoping of factors is discretionary in most cases). Under current federal environmental assessment legislation, *CEAA, 2012*, and its predecessor, *CEAA*, the ultimate decision on a project turned on whether the project was "likely to cause significant adverse environmental effects",[163] and, if so, whether those effects are justified in the circumstances.[164]

The *IAA* will change this approach. Under the new regime, the final decision will be based on whether the project is in the "public interest".[165] This public interest determination must be based on the IA report,[166] which the Minister or Cabinet, as the case may be,[167] uses when considering the five factors explicitly set out in the Act. To summarize, these factors include: the project's contribution to sustainability, extent of adverse effects (subject to some jurisdictional parameters), mitigation measures, impact on the rights of Indigenous peoples, and the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change.[168]

It is at this decision-making stage of an IA that information gathered through the assessment phase and included in the final report would be put before decision-makers (i.e. federal Cabinet) for

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[162] See e.g. Harvard Law School Emmett Environmental Law & Policy Clinic, "Comments on Flawed Estimates of the Social Cost of Carbon in the Proposed Emission Guidelines for the Greenhouse Gas Emissions from Existing Electric Utility Generating Units" (31 Oct 2018), online: http://clinics.law.harvard.edu/environment/files/2018/11/ELPC-Comments-on-Proposed-ACE-Rule-Docket-No.-EPA-HQ-OAR-2017-0355.pdf

[163] CEAA 2012, s.52(1).

[164] CEAA 2012, s.52(2).

[165] Bill C-69, *supra* note 3, s.60(1), if it is the Minister making the decision. IAA s.62, if it is the Governor in Council making the determination.

[166] Bill C-69, *supra* note 3, s.63: ("Minister's determination … must be based on the report with respect to the impact assessment and a consideration of the following factors…" [emphasis added]).

[167] Bill C-69, *supra* note 3 s.60(1) and s.62 (the former refers to Minister, while the latter refers to Cabinet).

[168] Bill C-69, *supra* note 3, s.63.

consideration in service of the final determination as to whether (and under what conditions) the project is in the public interest. If SCC were used in the assessment phase to calculate damage that would be caused by a project's carbon emissions, for example, it is at this stage that decision-makers would be required to take SCC-generated damages figures into account and weigh it along with other public interest factors. The key question with respect to the potential role of SCC becomes: how would SCC values and project-related calculations be used to inform the weighing of public interest factors and, ultimately, the final public interest determination? While work continues toward fleshing out regulations and guidance for implementation of Canada's new IA regime, including with respect to final decision-making, it is possible at this early stage to consider how SCC-generated information could factor into final decisions.

The *IAA* is structured with relatively clear links between several of the s.22 assessment factors and the public interest determination factors. In terms of SCC in IA, the three most relevant public interest factors are the project's contribution to sustainability, extent of adverse effects, and the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change. Deliberation and determination on these factors would be informed by relevant parts of the requisite EIS, which would include analysis discussed above in relation to the s.22 factors to be considered. Analysis of GHG and SCC in relation to climate change commitments would inform consideration under s.63(e); such deliberations in relation to sustainability would inform consideration under s.63(a); and SCC analysis in relation to cumulative effects would inform consideration under s.63(b) (as part of considering "adverse effects"). Analysis of changes to "economic conditions" could reasonably be included under either s.63(b) or (e) It should be noted that while the Act does not provide explicit direction on how decision-makers will make trade-offs in formulating a final public interest determination, the Act does require detailed reasons that demonstration consideration of all s.63 factors.[169]

With respect to the climate change public interest factor, the basis for consideration in final decision-making is as follows:

> "the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change".[170]

Under this branch of the public interest considerations, the Minister or Cabinet, as the case may be, would have to consider the SCC-based damages figures included in the IA report as part of the "hinder or contribute" assessment.[171] In this context, SCC may be of significant complementary value to other climate tests that have been more frequently contemplated by organizations and commentators.[172] Where other climate tests would likely address how a project may affect Canada's

[169] Bill C-69, *supra* note 3 s.65(2).
[170] Bill C-69, *supra* note 3, s.63(e).
[171] Under IAA s.60-62 the Minister or Cabinet, as the case may be, must to take into account the content of the IA report, which, would include the SCC analysis based on the s.22 factors discussed above.
[172] See Gibson et al. "Paris to Projects Summary Report", *supra* note 5.

ability to meet emission reduction targets, SCC would complement such data by detailing the cost of the damages attributable to the project's emissions. For example, while a project may be shown to emit a quantitatively specific volume of per year, resulting in what decision-makers might view as a relatively insignificant hindering of Canada's ability to meet its climate commitments, SCC would allow decision-makers to see that the same MTs from the project would result in significant costs in climate damages. This would allow decision-makers to consider how the project affects Canada's ability to meet climate change commitments and environmental obligations that relate to *impacts* rather than targets (recalling that targets are just a means to avoiding the worst impacts). Of course, this analysis would be different if the project net and gross carbon emission calculations show a net reduction of emissions, such that the project 'help' Canada meet its climate commitments. To date, there is limited understanding of how to use SCC to assess *benefits*, as it is inherently focused on *costs* of carbon emissions.

Additionally, if one takes the view that SCC represents an estimate of liability that may eventually attach to Canada for its contribution to global GHG emissions causing climate change, then this SCC figure in IA decision-making would facilitate a better understanding of financial risks associated with approving the project. Relatedly, given Canada's commitments to climate finance, project-related SCC values could serve as a starting point to determine what emissions charge project proponents ought to pay for the privilege of emitting GHGs in a carbon constrained world. Such payments could be imposed through project approval conditions and then drawn on as a source of funds for Canada to use to fulfill climate finance and loss and damage commitments. Similarly, approval conditions could be used as a mechanism to allocate risk of emissions overages with proponents such that they are required to pay any costs associated with emissions that are above those projected during the project review stage. Of course, this dimension of the assessment and decision-making would need to ensure that there is no double-counting of (let alone double-paying for) emissions under any applicable federal or provincial, or, if considering downstream emissions, foreign, carbon pricing regime.

Within this climate change stream of public interest considerations, the decision-makers would have to make difficult decisions about how much weight to attribute to target-based and damages-based GHG emissions information in final decision-making. For example, it would be open to the government to state clearly whether there are any absolute or proportional SCC figures that are determinative – i.e. a threshold beyond which costs from climate change impacts attributed to the project make it not viable. Whether the federal government will develop a decision-making matrix to guide deliberations about trade-offs is unknown at the present time; though, as stated above, there is the legislated requirement in the IAA for detailed reasons to accompany any final determination.

With respect to sustainability, the "contribution to sustainability" public interest factor requires that the Minister or Cabinet's public interest determination consider "the extent to which the designated project contributes to sustainability".[173] The IAA definition of sustainability would apply in the

[173] Bill C-69, *supra* note 3, s.63(a)

operation of this provision, confining the concept to Canada and Canadians,[174] as discussed above. However, given that it is under this branch of the public interest factors that economic costs and benefits of the project would likely be weighed, it would be reasonable to include SCC damages figures here in the interest of incorporating the fullest amount of monetized costs and benefits in the analysis, notwithstanding the global nature of the SCC values. This is because despite the SCC values being global, any future responsibility or liability associated with paying those costs would foreseeably be attributed in some form to Canada. In this way, it relates directly to Canada and Canadians and is therefore within the intent of this s.63 public interest factor. The key assumptions here are that Canada intends to fulfill its Paris commitment to make a fair contribution to the global effort to address climate change, or that Canada will at some point be held liable for some degree of present and future emissions.[175]

Recalling the two preliminary options for use of SCC in a sustainability analysis in the assessment phase discussed above (stand-alone SCC analysis or SCC analysis integrated into a broader sustainability matrix and determination), both methods could make SCC a valuable tool in in the economic analysis of whether a project is economically viable and therefore in the public interest. The stand-alone assessment, substantively similar to the SCC calculations for assessing changes to "economic conditions", would generate a set of figures expressing a project's expected costs in the form of climate damages. Decision-makers would then need to decide how much weight to accord the SCC figures in relation to other costs and benefits of the project (including non-monetary dimensions), and to then explain this in the detailed reasons required under s.65(2). Under a method that uses SCC within a broader sustainability assessment, presumably the same SCC calculations would be conducted, but the weighting and interrelation between costs and benefits would be built into the assessment matrix. In either approach, the SCC would contribute to a more robust consideration of the sustainability public interest factor by providing important information about project costs in a monetized fashion.

Regarding adverse effects in final decision-making, s.63 requires consideration of "the extent to which the adverse effects within federal jurisdiction and the adverse direct or incidental effects that are indicated in the impact assessment report in respect of the designated project are adverse".[176] It is under this factor that use of SCC in analysis of cumulative effects would be before the Minister or Cabinet. Consideration of the SCC portion of the CEA under this branch of the public interest determination would involve looking at the impact of a project's emissions in relation to the pre-determined carbon budget or other frame of reference described above (i.e. scoped according to time-frame, jurisdiction, sector, etc, but not according commitments under the *Paris Agreement*). This would be separate and different from the question of the extent to which a project hinders or contributes to Canada's ability to meet its commitments in respect of climate change. In this way,

[174] Bill C-69, *supra* note 3 at s.2 (Sustainability means the ability to protect the environment, contribute to the social and economic well-being of the people of Canada and preserve their health in a manner that benefits present and future generations).
[175] See generally Richard Tol & Roda Verheyen, "State Responsibility and Compensation for Climate Change Damages—A Legal and Economic Assessment" (2004) 32 Energy Pol'y 1109.
[176] Bill C-69, *supra* note 3, s. 63(b)

decision-makers would have an additional piece of information that brings in dimensions that are not part of the analysis of whether a project helps or hinders Canada's efforts to meet its commitments. For example, the downstream emissions implications of using LNG in China are not relevant to the help or hinder analysis, but they could come in here.

How much weight SCC figures are given in relation to these other environmental effects under this branch of the public interest determination, let alone in relation to the other public interest factors, would have to be determined as part of forthcoming IAA implementation details. Again, any application of SCC in this part of the public interest determination would require at least some coverage in the detailed reasons required under s.65(2).

In the interest of full coverage of the IAA public interest factors in final decision-making, it should be noted that the s.63 requirement to consider mitigation measures would also be relevant (as would assessment thereof based on the assessment factor in s.22).[177] This factor requires consideration of "the implementation of the mitigation measures that the Minister or the Governor in Council, as the case may be, considers appropriate".[178] Consideration of information generated by SCC analysis under this factor would be relatively straightforward. Final decision-makers would simply be considering what mitigation measures (including those imposed through project approval conditions) have been or could be imposed to reduce the carbon emissions and therefore reduce the damage caused by the project's contribution to climate change. Similarly, a key consideration would be whether a project's emissions would be covered by a federal or provincial carbon pricing regime such that climate-related costs of the project are already accounted for – and collected – through another regulatory mechanism. Additionally, this analysis could factor in any measures Canada is taking to fund adaptation and mitigation activities outside Canada. Such consideration would likely be part of a broader analysis of climate change dimensions within the IA. Of the five public interest determination factors, mitigation measures is the most likely candidate to be coupled with another factor for full consideration of climate-related dimensions of an IA, including SCC.

Finally, it should be noted that the public interest factor pertaining to the impact of a project on the rights of Indigenous peoples is not discussed in detail here. This is, however, an extremely important part of the IA regime, and an important part of the federal government's stated commitment to reconciliation and the implementation of UNDRIP, as discussed in more detail by several commentators with respect to the new regime.[179] Regarding climate change impacts, IA and Indigenous peoples specifically, there is a clear need for research of this topic, especially from a damages-based analysis perspective. As is well documented, Indigenous peoples, particularly those in

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[177] Bill C-69, *supra* note 3 at s.63(c)

[178] *Ibid.*

[179] See David Laidlaw, "Bill C-69, the Impact Assessment Act, and Indigenous Process Considerations" (15 March 2018), *ABlawg* (blog), online: https://ablawg.ca/2018/03/15/bill-c-69-the-impact-assessment-act-and-indigenous-process-considerations/. See also Sara Mainville, "The Ghost of the Harper Omnibus Legislation Continues on with Bill C-69" (12 February 2018) *OKT* (blog), online: <https://www.oktlaw.com/ghost-harper-omnibus-legislation-continues-bill-c-69/>. See also David V Wright, "Indigenous Engagement and Consideration in the Newly Proposed Impact Assessment Act: The Fog Persists", (27 February 2018), *ABlawg* (blog), online: <https://ablawg.ca/2018/02/27/indigenous-engagement-and-consideration-in-the-newly-proposed-impact-assessment-act-the-fog-persists/>.

the far north, are disproportionately affected by climate change.[180] SCC may have a role to play in calculating monetary dimensions of the manner in which climate change impacts Indigenous individuals and communities; however, such analysis ought to be separate and apart from a rights-based analysis of impacts to the rights of Indigenous peoples. Further, any role for monetized figures would need to be approached with respect and sensitivity given the impossibility of quantifying such rights and impacts in monetary terms. Put more broadly, it is hard to see a tenable (nor respectful) basis for use of monetary cost-benefit analysis in consideration of the factor listed in s.63(d).

Strategic Assessment

It is important to note that SCC's potential role in the assessment and decision-making phases may also be shaped by the outcome of a strategic assessment (SA) conducted by the federal government under s. 95 of the IAA[181] or otherwise. The government has begun early steps in this regard, notwithstanding the IAA not yet providing a legislated basis.[182] In summer 2018, the government issued a discussion paper, *Developing a Strategic Assessment of Climate Change*,[183] that began the process and solicited views from stakeholders. The stated intention of the SA of climate change is to "provide guidance to proponents, stakeholders, Indigenous peoples and decision-makers on how climate change should be considered in federal impact assessments".[184] If this SA proceeds,[185] it is foreseeable that it will consider and recommend potential roles of SCC in EIA (and beyond, e.g. with respect to carbon pricing regimes), particularly given the discussion paper questions focused on how impacts from a project's GHG emissions ought to be assessed.[186] Such analysis of impacts is squarely within the realm of what SCC could contribute in an IA, as per the foregoing discussion in this article. Strategic Assessment outcomes may then shape use of SCC under the IAA by prescribing how the SCC ought to be used in a project-specific IA under the IAA. Pursuant to s.22(p) of the IAA, such a conclusion of the SA must be taken into account if the SA is conducted under s.95 of the Act.

As a final comment, it should be noted that the discussion in this article has been largely based on IAA assessment factors and consideration of such analysis in final decision-making. Another way to approach analysis of what roles SCC might play would be for government to begin constructing the

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[180] See Susan Hassol, *Arctic Climate Assessment* (Cambridge, UK: Cambridge University Press, 2004). See also IPCC 1.5° SPM, *supra* note 1 at 11, 13.
[181] Bill C-69, *supra* note 3, s.95.
[182] There is, however, the Federal Cabinet Directive. See Government of Canada, "Strategic Environmental Assessment: The Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals (2010), online: <https://www.canada.ca/content/dam/ceaa-acee/documents/strategic-environmental-assessment/cabinet-directive-environmental-assessment-policy-plan-program-proposals/cabinet_directive_on_environmental_assessment_of_policy_plan_and_program_proposals.pdf>
[183] *Supra* note 33.
[184] *Ibid* at p.3.
[185] At the time of writing, this process has stalled. The looming federal election has created uncertainty as to whether the full SA will proceed in the near future.
[186] *Supra* note 33 at 6.

IAA analytical and final decision-making frameworks (i.e. through regulations, guidance, analytical frameworks), then identify gaps where the SCC could be used to ensure better decisions. For example, it could be that once a decision-matrix is generated for the sustainability determination, it becomes apparent that more information is necessary in the form monetary quantification of societal costs. Similarly, it could be that as government develops a decision framework to assess the extent to which a project's emissions hinder or contribute to achievement of climate commitments it recognizes a need to assess impacts beyond emissions reduction targets, such as loss and damage or climate finance. Regardless of one's starting point for exploring potential roles of SCC, however, much of the analysis and discussion in this article remains informative.

CONCLUSION

As the foregoing discussion suggests, there are a number of ways SCC could be deployed in IA. An important conclusion at this conceptual stage, particularly in the Canadian context, is that there is a strong potential fit between high level purposes of IA and the type of information SCC offers, as well as a strong fit between the technical level requirements of a robust IA and the detailed data SCC can be used to generate. Overall, if one acknowledges the importance of going beyond a simple inventory of a project's carbon emissions and recognizes the importance of contextualizing those MT's beyond reference to emission reduction targets, then it is clear that SCC could make significant contributions to assessments and associated decisions.

How this *ought* to be done will depend in large part on how the rest of the assessment and decision-making regime is structured and calibrated, particularly with respect to integrating projected carbon emissions and their impacts. In the current Canadian context, the promised SA on climate change, and answers to questions regarding how to assess climate-related impacts of a project will shape this discussion in important ways. As the law and policy development proceeds, now is an important time for scrutinizing and improving SCC methodologies such that the tool is worthy of public confidence and can fulfill its purpose of representing costs of carbon emissions accurately and meaningfully. Any role SCC may play in EIA will only be as useful as the quality of SCC methodologies themselves. Poor SCC practices and or indefensible SCC values would, of course, be at odds with the purposes and requirements of any robust impact assessment regime.