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An Important Number You've Likely Heard About: Recent Social Cost of Carbon Developments in the United States and Canada

By: David V Wright

Matter Commented On: Biden Administration Executive Order 13990, "[Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis](#)"

More than ten years ago, American economist Frank Ackerman called the social cost of carbon (SCC) "[the most important number you've never heard of.](#)" Times have changed. Today, the SCC figures prominently in climate policy discussions and analyses, and recent developments in Canada and the US are sure to reach any late adopters out there. That's because the social cost of carbon (SCC) is a cornerstone in the Biden Administration's ambitious climate action, and this comes at a time when Canada is showing a rejuvenated commitment to this important tool.

In this post, I present and comment on recent SCC developments at the federal levels in the US and Canada. There has been a flurry of climate law and policy activity on both sides of the border in recent weeks and months; this post helps make sense of it by focusing on the SCC specifically. In particular, I comment on Canada's [new federal climate change plan](#), the [proposed Clean Fuel Standard regulations](#), and the all-important direction set out in President Biden's [executive order on climate change](#). I also touch on Canada's new proposed climate change accountability regime, tabled as [Bill C-12](#); the new federal impact assessment regime; and the federal carbon pricing regime. Overall, the Canadian federal government has taken significant steps on addressing climate change in recent years, though much critically important work remains to implement new law and policy levers in service of emissions reductions and decarbonization. My comments here really only scratch the surface of all that is going on in the climate and energy policy space these days. For more on many other topics, including interesting developments in Alberta (think coal, Allen inquiry, orphaned wells, clean tech) check out posts by my colleagues such as those [here](#), [here](#), [here](#), [here](#) and [here](#).

Social Cost of Carbon: A Brief Introduction

Social cost of carbon is an estimated dollar value that represents the net effects associated with incremental changes in carbon emissions. It is typically expressed in dollars per metric ton of carbon dioxide, and it is typically used in calculating the benefits of government action that is expected to reduce emissions. The concept emerged from recognition that climate change impacts have costs on society (e.g. impacts on health, property, biodiversity, etc.), and that these damages ought to be calculated in monetary terms and then incorporated into regulation-making and decision-making processes. Put in simple terms by this excellent [explainer](#), SCC "tries to add up all the quantifiable costs and benefits of emitting one additional tonne of CO₂, in monetary terms." In applied contexts, the most common example is in the cost-benefit analysis required as

part of regulatory rule-making in both Canada and the US (see [here](#) for detailed analysis of such).

The SCC emerged from the US context following a 2008 decision by the US Court of Appeals for the Ninth Circuit in *Center for Biological Diversity v National Highway Traffic Safety Administration* (538 F.3d 1172) where the court ruled that the cost-benefit analysis underpinning new fuel economy standards ought to have incorporated a monetary value for carbon emissions – “while the record shows that there is a range of values, the value of carbon emissions reduction is certainly not zero” (at 19). This led the Obama Administration to develop the SCC using “[Integrated Assessment Models](#)” that draw on key inputs such as climate sensitivity, socio-economic and emissions trajectories, and discount rates. While many rightly point to limitations in generating and relying on such models (see e.g. [here](#) and [here](#)), and work continues to improve methodologies (including [this perspective by Nicholas Stern and Joseph Stiglitz](#) released just days ago), the SCC is widely regarded as a defensible and useful tool, particularly given the absence of better ones. For a comprehensive, independent, critical review, see this [2017 report from the US National Academies of Sciences, Engineering, and Medicine](#) (NAS Report). It should be noted that similar metrics are used for other greenhouse gases, including for example the social cost of methane and the social cost of nitrous oxide, resulting in the catch-all term of “social cost of greenhouse gases.” For simplicity, this post will carry on primarily using the SCC.

During the Obama years, Canada and the US both established inter-agency working groups to develop, refine and update SCC modeling and values. The US working group issued periodic updates in 2010, 2013, 2015 and [2016](#). Canada did similar in 2011 and [2016](#), relying on US methodologies and adopting similar dollar figures. In 2016, for example, Canada’s central SCC value issued by Environment and Climate Change Canada (ECCC) was \$40.70/t. Unfortunately, in early 2017 the Trump administration issued a very low revised SCC value (primarily by using an unsound and much disputed discount rate) and disbanded the US working group, effectively reversing advances in development and use of the SCC up to that point (see [here](#) for a succinct account and [here](#) for more detail). In spite of this rollback at the federal level, a number of states carried on with SCC practices (see [here](#) and [here](#), and see also this [recent example from New York](#)). Meanwhile, Canada continued using its 2016 values, for example in assessing benefits of amendments to the *Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations*, [SOR/2018-263](#) and amendments to the *Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations*, [SOR/2018-98](#). After four years that saw a patchwork of sporadic activity across North America, the federal context in the US and Canada is now set to change very rapidly.

Recent US Context: Biden Executive Order – Imminent SCC Updates and Beyond

On January 20th, President Biden introduced Executive Order 13990 “[Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis](#)” (Climate EO). Section 5, entitled “Accounting for the Benefits of Reducing Climate Pollution” is heavily focused on the SCC. In particular, this part of the EO re-establishes the abovementioned US working group, now to be called the Interagency Working Group on the Social Cost of Greenhouse Gases (US IWG), and directs this IWG to complete several tasks:

- Publish interim value for the SCC, as well as “social cost of nitrous oxide” (SCN), and “social cost of methane” (SCM), within 30 days of the EO, and publish final SCC, SCN and SCM values by January 2022;
- Recommend to the President by September 2021 “areas of decision-making, budgeting, and procurement by the Federal Government where the SCC, SCN, and SCM should be applied”;
- Recommend to the President by June 2022 “a process for reviewing, and, as appropriate, updating, the SCC, SCN, and SCM to ensure that these costs are based on the best available economics and science” and recommend to the President potential revisions to “methodologies for calculating the SCC, SCN, and SCM, to the extent that current methodologies do not adequately take account of climate risk, environmental justice, and intergenerational equity”.

The Climate EO also explicitly directs the IWG to consider the recommendations of the [NAS Report](#), as well as input from scientific literature, public and stakeholder input, advice of “ethics experts”, and interests of future generations. This is essentially the Biden Administration extinguishing the Trump changes and picking up where Obama left off, but doing so with urgency and ambition that exceeds the 2008-2016 period.

A few aspects of the new US context stand out as particularly relevant for Canada. First, the reconvened US IWG will provide renewed institutional might that was lacking for the last four years. In particular, this IWG can resume its leadership role in refining and improving SCC methodologies, and, for better or worse, Canada can comfortably resume its follow-the-leader approach (see [here](#) for a detailed account; more discussion on this below). Second, and related to the first point, the US is going to publish its new “interim” SCC values imminently (as well as SCM and SCN), so Canada will likely want to adopt similar revised values to ensure congruence across economies to the extent consistency is desired (which it typically is). Third, it would make sense for Canada to get to work in parallel or in collaboration with the US IWG on a similar timeline toward final revised SCC values by January 2022 (and, to be candid, this may well be happening already; I have not heard word). Fourth, by requiring the IWG to make recommendations on other federal “areas of decision-making, budgeting, and procurement... where SCC, SCN and SCM should be applied”, the Climate EO is signaling potential expansion of spheres where the SCC may be deployed. For example, this may build on emerging practices in the US of integrating the SCC into project-level approval decisions (see [this article](#) for discussion of such), something that has not happened in Canada to date (as discussed below, and see my and Meinhard Doelle’s discussion of this [here](#)). As such, Canada ought to be considering similar expanded options.

In practical terms, the Climate EO basically sets an agenda not only for the US IWG, but also for the work that Canada ought to undertake in lockstep. This relates to several significant developments in Canadian climate law and policy, as discussed below.

Recent Canada Context: Quiet SCC Updates and Potentially Much More to Come

The renewed US work on the SCC comes precisely when the Canadian federal government has rejuvenated its own efforts. There are two recent explicit indications of Canada’s renewed

activity, and then a number of initiatives where continued or expanded use of the SCC is foreseeable. On the explicit front, the new federal climate plan released in December 2020, entitled “[A Healthy Environment and a Healthy Economy](#)” (Canada Climate Plan), commits to “[i]mmediately begin updating the Government of Canada’s social cost of carbon estimates to ensure Canada’s methodology aligns with the best international climate science and economic modelling” (at 59), and the plan’s [carbon pricing annex](#) reiterates that commitment (at 2). Though slightly less prescriptive than the Climate EO, this provides a basis for the Canadian federal government to update SCC values in a way similar to the renewed efforts in the US, though the ambitious timelines will be challenging on both sides of the border.

The other explicit example is found in the proposed federal Clean Fuel Standard regulations [Regulatory Impact Analysis Statement](#) (RIAS), also released in December 2020, which quietly relied on updated SCC values. As required since 2010, the cost-benefit analysis included in the RIAS incorporated SCC values as a way to take into account the benefits of reduced carbon emissions attributable to the new regulation. However, this RIAS incorporated the 2016 SCC values (\$50/tCO₂ in 2019 dollars), and then compared them to “more recently published estimates of the SCC value found in the academic literature... between \$135 and \$440/tCO₂.” The RIAS provided its rationale as follows:

Recent academic literature published by the authors of the DICE model and the PAGE model indicate that the previous iterations of their models that the Department used to develop its 2016 estimate of the SCC are out of date. For example, the SCC estimate in the updated version of the DICE model has more than doubled compared to the iteration on which the Department’s current SCC estimate is based.

...

As a result, the current SCC values used for Canadian regulatory analysis likely underestimate climate change damages to society, and the social benefits of reducing GHG emissions. Therefore, updating the SCC based on the latest climatological and economic evidence would likely result in a higher SCC estimate. The Department is updating its SCC estimate, but results are not yet available.

Given the likelihood that an updated departmental SCC estimate would be considerably higher than its current value, an interim approach is being used for this analysis where the updated SCC estimates from the above literature are considered alongside the Department’s current SCC value.

On this basis, the RIAS concluded that “given the higher range of more recent SCC estimates, it is likely that the monetized benefits of the proposed Regulations would exceed its costs once the Department updates its SCC estimate.”

Setting aside a transparency issue here (which is hard to do given that transparency is critical in this realm), a key takeaway is that this could be viewed as Canada getting out ahead of the renewed US IWG’s SCC work because ECCC has already generated and applied interim SCC values. Soon it will be apparent the extent to which Canada’s interim values aligns with the new US interim values, which will be released imminently. Given that Canada is currently “updating its SCC estimate”, as indicated in the RIAS, the timing of US interim values appear to be quite

helpful, and Canada may even have a head start on the January 2022 timeline (i.e. when the Climate EO requires new final SCC values in the US context).

These two examples suggest that Canada will carry on with its past practices of incorporating SCC values into the regulatory rule-making process, and will do so by continually updating the SCC once again loosely in step with the US (or perhaps more closely this time around). This, however, represents quite limited deployment of the SCC in Canada. There are several Canadian climate policy developments that may also, in time, incorporate SCC and expand its use. These include the proposed federal climate accountability regime, the new(ish) federal impact assessment regime, and the federal carbon pricing regime. A detailed discussion of how the SCC could figure into these legal regimes is beyond the scope of this post, but a few initial thoughts are as follows.

In November 2020, the federal government tabled [Bill C-12](#), *Canadian Net-Zero Emissions Accountability Act*, 2nd Sess, 43rd Parl, 2020 (see my preliminary review [here](#)), which would introduce an accountability regime aimed at keeping Canada on track to meet or exceed its emissions reduction commitments, including net-zero emissions by 2050. A key part of the proposed regime is the requirement that government set national emissions reduction targets for every five years from 2030 to 2050 (s 7), and that each of those “milestones” be supported by a detailed emissions reduction plan (s 9). While not explicitly required, these plans could set out and clarify the role of the SCC in achieving emission reduction targets. This role could be limited to the current practice of informing regulatory rule-making, or it could be expanded. The latter route could be informed by work of the US IWG that the Climate EO requires by September 2021, as well as any similar analysis that ECCC undertakes in parallel.

One such expanded practice could be use of SCC in project-specific decision-making under the federal *Impact Assessment Act*, [SC 2019, c 28, s 1](#) (IAA). To date, the SCC has not been used in this way, and the recently released final guidance for implementing IAA climate change requirements (published as the final Strategic Assessment on Climate Change – see my commentary [here](#) and [here](#)) did not include any consideration of it. As such, while on its face the IAA includes legal authority for incorporating SCC values as part of the assessment phase (see detailed discussion [here](#)), it is currently not a recognized practice in implementing the requirements of the IAA, even though use of it has been proposed in at least one assessment under the previous federal assessment regime (see [this submission](#) to the Teck Frontier Joint Review Panel at 29, 31, 51). As IAA implementation evolves and as Canada and the US explore potential expansion of SCC applications, this may be an area to revisit.

Finally, there is the federal carbon pricing regime as enacted through the *Greenhouse Gas Pollution Pricing Act*, [SC 2018, c 12, s 186](#) (GGPPA). As I’ve commented on before (see [here](#)), there is a persisting dissonance between the federal SCC values and the federal carbon price under the GGPPA. While this may be explicable on the basis that the GGPPA carbon price is generated based on market signals required to meet (or contribute to meeting) Canada’s emission reduction targets, and SCC values are based on estimates of global climate change-induced damages, the tension between the two is uncomfortable and to date the government has done a poor job of explaining this incongruence. With time and further advances in understanding and modeling under both approaches, the gap may be bridged or at least better explained (this

assumes the federal carbon pricing side of that gap remains relevant by virtue of the Supreme Court of Canada confirming its constitutionality – see a short explainer [here](#)). Work to reconcile these different realms is already underway, the most prominent example of which is in the abovementioned recent paper from Stern and Stiglitz. At the risk of oversimplifying, they propose a way to identify an emissions target (based on a level of acceptable warming) and an associated acceptable extent of climate-induced damages associated with that warming, and then calculating the monetary value of greenhouse gas emissions on that basis. There is much more to this approach and to the sophisticated views of the esteemed authors, but the key point for now is that work is underway to better understand and potentially reconcile target-based carbon pricing and damages-based monetary carbon values, and this may eventually lead to convergence between the SCC and the federal carbon price. Indeed, the expected [future federal carbon price of \\$170/t in 2030](#) acknowledged in the new federal Climate Change Plan (at 26) appears to be closer to the SCC mark. Expect further developments on this front, especially given renewed efforts pursuant to the Climate EO.

SCC: The Important Number You’ll be Hearing More About

As the US ramps up its renewed climate leadership under the Biden Administration and Canada follows suit by implementing its new climate plan and associated legislative regimes, the SCC will figure prominently in an array of law and policy tools across North America. There remain good reasons to deploy the SCC (and SCN and SCM) with caution and with full recognition of methodological limitations; however, the methodologies are set to improve and the associated monetary values are poised to play increasing roles for the foreseeable future. While most federal climate policy folks in Canada have by now heard of the SCC, if that’s not the case, this would be the time to get acquainted. Further developments will be featured here on ABLawg.

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