Date: 06/10/2024
From: Jared Duval, Collin Smythe, and Breck Bowden
To: Science & Data Subcommittee of the Vermont Climate Council
Subject: Draft recommendation re: updates to the Social Cost of Greenhouse Gases

Background: As part of the Initial Vermont Climate Action Plan (CAP) adopted by the Vermont Climate Council (VCC) in December of 2021, estimates of the Social Cost of Carbon (SCC) and of other greenhouse gases were recommended for use in Vermont.[1] Specifically, the CAP included the VCC-adopted recommendation that Vermont should:

> 1) Value greenhouse gas emissions costs (and avoided costs) by utilizing a global damage-based estimation of the Social Cost of Carbon, based on models developed for the New York Department of Environmental Conservation (NYDEC) by Resources for the Future.
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> 2) Recognize that the estimation of the Social Cost of Carbon is highly dependent on how costs and savings that occur in the future are valued in the present, as represented in a "discount rate", and that the NYDEC guidelines offer a range of possible discount rates that value future damages and cost of those. Based on literature review conducted in the report, polling of the Science and Data Subcommittee and meeting attendees, as well as discussion of the whole Council, the Council determined it is reasonable to utilize the Social Cost of Carbon developed using the central discount rate of 2%. Because the value of the Social Cost of Carbon is highly dependent on the assumption for a discount rate, it was agreed that sensitivities to the economic analysis using Social Cost of Carbon's developed using discount rates of 1%-3% should be completed, illustrating a range of possible economic outcomes associated with different valuations of future costs and benefits of mitigation measures.
>
> 3) Plan for updating of the Social Cost of Carbon and discount rate on a regular basis, taking into account new research that may be published that impact Social Cost of Carbon and application of the discount rate.

Update: When the Initial Vermont Climate Action Plan was adopted in December of 2021 the U.S. federal government was still in the midst of a comprehensive update to Social Cost of Greenhouse Gases (SC-GHG) estimates, in response to the National Academies of Sciences, Engineering, and Medicine (NASEM) recommendations to update SC-GHG estimates to reflect the latest science.

In 2022, the Agency of Natural Resources (ANR) utilized the SC-GHG values as adopted in the Initial CAP to inform its Advanced Clean Cars II (ACCII), Advanced Clean Trucks (ACT), Heavy Duty Omnibus (HDO), and the Phase 2 GHG rules for Trucks and Trailers rulemaking.[2]

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[1] See pages 52-55. Initial Vermont Climate Action Plan, Vermont Climate Council, December 2021

[2] See: https://legislature.vermont.gov/Documents/2022/WorkGroups/LCAR/22-P21%20-%20Vermont%20Low%20Emission%20Vehicle%20and%20Zero%20Emission%20Vehicle%20Rules/W~none~22-P21%20-%20VT%20Low%20Emission%20Vehicle%20and%20Zero%20Emission%20Vehicle%20Rules~11-2-2022.pdf

In November 2023, as part of the SC-GHG review process recommended by NASEM, the Environmental Protection Agency (EPA) released updated SC-GHG estimates.

At the April 24, 2024 meeting of the VCC Science & Data Subcommittee, a presentation was provided by Dr. Elizabeth Kopits, Senior Economist at the National Center for Environmental Economics at the US EPA. Dr. Kopits led the development of the Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances that was published by the EPA in November 2023.[3]

The first paragraph of the Executive Summary of the report is provided here, in full:

> This report presents new estimates of the social cost of carbon (SC-CO_2), social cost of methane (SC-CH_4), and social cost of nitrous oxide (SC-N_2O), collectively referred to as the "social cost of greenhouse gases" (SC-GHG). These estimates reflect recent advances in the scientific literature on climate change and its economic impacts and incorporate recommendations made by the National Academies of Science, Engineering, and Medicine (National Academies 2017). The SC-GHG allows analysts to incorporate the net social benefits of reducing emissions of greenhouse gases (GHG), or the net social costs of increasing GHG emissions, in benefit-cost analysis and, when appropriate, in decision-making and other contexts. The SC- GHG is the monetary value of the net harm to society from emitting a metric ton of that GHG into the atmosphere in a given year. In principle, the SC-GHG is a comprehensive metric that includes the value of all future climate change impacts (both negative and positive), including changes in net agricultural productivity, human health effects, property damage from increased flood risk, changes in the frequency and severity of natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. The SC-GHG, therefore, also reflects the societal net benefit of reducing emissions of the GHG by a metric ton. The SC-GHG is the theoretically appropriate value to use when conducting benefit-cost analyses of policies that affect GHG emissions. In practice, data and modeling limitations restrain the ability of SC-GHG estimates to include all physical, ecological, and economic impacts of climate change, implicitly assigning a value of zero to the omitted climate damages. The estimates are, therefore, a partial accounting of climate change impacts and likely underestimate the marginal benefits of abatement.

Draft recommendation:

Based on the EPA's updated estimates incorporating the latest science and consistent with the 2021 Initial CAP recommendation to "update[e] the Social Cost of Carbon and discount rate on a regular basis, taking into account new research", the Science & Data Subcommittee recommends that the Vermont Climate Council adopt the following recommendation:

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[3] Slides from Dr. Kopits' presentation can be found here and a video recording of her presentation here.

1) Vermont should utilize the EPA's updated SC-GHG estimates as provided in the Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances from November, 2023[4] for benefit cost analysis of activities that impact greenhouse gas (GHG) emissions and for GHG emissions-related rules adopted or amended pursuant to 10 V.S.A. chapter 24 and the Climate Action Plan.

2) The EPA's Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances from November, 2023 shares SC-GHG estimates calculated with 1.5%, 2%, and 2.5% discount rates, with 2% selected as the central discount rate. For clarity, we recommend a central discount rate of 2%, as used by the EPA and recommended by a leading panel of economists in the United States.[5]

3) The Science & Data Subcommittee of the VCC should continue to track the latest and most relevant scientific literature regarding social cost of greenhouse gas estimates, including any updates released by the federal Interagency Working Group on the Social Cost of Greenhouse Gases or its successors. What Vermont uses for SC-GHG should continue to be based on best available science.

   Given the 5-year federal SC-GHG update schedule suggested by the NASEM, the Science & Data Subcommittee and the Vermont Climate Council should plan to review and, if appropriate, update its recommendations regarding SC-GHG estimates in advance of the July 2029 update to Vermont's Climate Action Plan. If there is a change to the EPA's SC-GHG prior to the five-year update, the SDSC and the VCC should review and, if appropriate, update its recommendation based on best available science at the time.

[4] https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf

[5] Rennert, K., Errickson, F., Prest, B.C. *et al.* Comprehensive evidence implies a higher social cost of CO2. *Nature* 610, 687–692 (2022). https://doi.org/10.1038/s41586-022-05224-9