

January 31, 2018

**Before the Public Utilities Commission of the State of Colorado**

Proceeding No. 17M-0694E

In the Matter of the Commission's Review of its Rules Governing Electric Resource Planning, Implementing Colorado's Renewable Energy Standard, and Enabling New Technology Integration

**Comments from the Institute for Policy Integrity at New York University School of Law:  
Proposed Changes to ERP Rules 3604 & 3611**

The Institute for Policy Integrity at New York University School of Law<sup>1</sup> submits these comments on integrating the social cost of greenhouse gases into Colorado's electric resource planning process. Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy. Policy Integrity has written extensively on the general need to monetize the externalities of greenhouse gases,<sup>2</sup> and the specific role of the social cost of greenhouse gases in state electricity policy.<sup>3</sup>

In Decision No. C17-0316, the Colorado Public Utilities Commission rationally concluded that it had authority to include externalities in resource planning considerations;<sup>4</sup> that the Social Cost of Carbon (SCC) estimates published by the federal Interagency Working Group were "a reasonable quantification of the potential cost of externalities" from greenhouse gas emissions;<sup>5</sup> and that using the SCC in portfolio modeling will allow the Commission to "test the robustness of the portfolios and assess the impact to customers of a broader range of costs from carbon emissions."<sup>6</sup>

In its review of rules governing electric resource planning, the Commission should now enshrine those rational conclusions in its regulations. Specifically, the Commission should require utilities to value greenhouse gas emissions using estimates that quantify, to the extent possible, the full social and environmental externalities, based on the best available data and best economic practices. The Commission should require this analysis in the resource plans developed under Rule 3604 and the associated assessment of the "costs and benefits" of alternatives,<sup>7</sup> as well as in the utility plans under Rule 3611 and the associated "criteria for evaluating the costs and benefits."<sup>8</sup> Such requirements to fully monetize the externalities of emissions changes will point analysts toward the estimates of the social cost of greenhouse gases published by the federal Interagency Working Group in 2016, since those estimates represents the best and most rigorous efforts of the U.S. government to date to realistically monetize the externalities of greenhouse gases.

Policy Integrity proposes the Commission amend Rules 3604 and 3611 as follows:

***At the end of Rule 3604(k), and also at the end of Rule 3611(g), add: The full costs and benefits of emissions changes shall be quantified, to the extent possible, based on the best available data, best economic practices, peer-reviewed methodologies, and consensus-driven inputs.***

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<sup>1</sup> No part of these comments purports to present the views, if any, of New York University. Note that while Policy Integrity is based at New York University, our legal director, Jason Schwartz, lives and works in Denver, Colorado.

<sup>2</sup> See, e.g., Joint Comments to FERC on Failure to Use the SCC (Nov. 20, 2017), [http://policyintegrity.org/documents/Joint\\_SCC\\_Comments\\_to\\_FERC\\_on\\_SEIS.pdf](http://policyintegrity.org/documents/Joint_SCC_Comments_to_FERC_on_SEIS.pdf).

<sup>3</sup> See, e.g., Joint Comments to Nevada PUC on Using the SCC (Oct. 11, 2017), [http://policyintegrity.org/documents/2017-10-11\\_Joint\\_Comments\\_on\\_NV\\_SB65.pdf](http://policyintegrity.org/documents/2017-10-11_Joint_Comments_on_NV_SB65.pdf).

<sup>4</sup> Decision No. C17-0316 ¶86.

<sup>5</sup> *Id.* ¶87; see also *id.* n.33 (citing to the Interagency Working Group's 2015 Technical Support Update on the Social Cost of Carbon).

<sup>6</sup> *Id.* ¶87.

<sup>7</sup> 4 CCR 723-3, rule 3604(k).

<sup>8</sup> 4 CCR 723-3, rule 3611(g).

These comments first overview the policy rationales for monetizing the externalities of pollutants like greenhouse gases in electric resource planning. Specifically, using the social cost of greenhouse gases to assess resource portfolios serves the interests of Colorado’s citizens and ratepayers. By monetizing externalities, the social cost of greenhouse gases allows the Commission to compare all significant costs and benefits of alternative portfolios in apples-to-apples dollars, helping the Commission identify the most efficient option that advances social welfare for Colorado. Furthermore, the social cost of greenhouse gas metric will help ratepayers better understand the environmental effects of the portfolios chosen. Finally, Colorado’s use of the social cost of greenhouse gases will encourage reciprocal use by other states and other countries; since greenhouse gases are global pollutants, anytime another jurisdiction reduces its emissions, Colorado will directly benefit.

The comments next detail the proposed new rule language and explain how it will support use of the 2016 estimates of the social cost of greenhouse gases published by the federal Interagency Working Group. The comments conclude by responding to objections that the Public Service Company of Colorado has already lodged against the continued use of the social cost of carbon in energy resource planning. Attached to these comments is a *Frequently Asked Questions Guide* to using the social cost of greenhouse gases in state energy policy. Policy Integrity is also available to provide further guidance on how the Commission can incorporate the social cost of greenhouse gases into its decisionmaking.

## I. Monetizing the Externalities of Emissions in Portfolio Modeling Will Advance the Interests of Colorado’s Citizens and Ratepayers

The Commission explained a key reason for monetizing the externalities of emissions changes: namely, to “test the robustness of the portfolios and assess the impact to customers of a broader range of costs.”<sup>9</sup> Though that alone is sufficient reason to require use of the social cost of greenhouse gases and other appropriate quantitative metrics of costs and benefits, it is not the only justification. In addition to informing the Commission’s decisionmaking and helping it select the portfolio that maximizes welfare for Colorado ratepayers, use of quantitative metrics will help the public better understand the benefits of the decisions made by the Commission. Finally, the social cost of greenhouse gases in particular presents a special case of reciprocity: by using the metric in decisions made in Colorado, the Commission can set a precedent for other states and signal to foreign countries that the United States remains committed to tackling global climate change. As Colorado helps encourage other jurisdictions to likewise base their decision on the social cost of greenhouse gases, Colorado will benefit as foreign emissions are reduced.

### Informing Rational Decisionmaking and Public Understanding

Monetizing the impacts of emissions changes facilitates comparison against other costs and benefits. Without such values, decisionmakers are faced with imperfect information; by contrast, when impacts are translated into the common metric of money, decisionmakers can more readily compare society’s preferences for competing priorities.

If an analysis only qualitatively discusses the externalities of emissions, decisionmakers and the public will both tend to overly discount the significance of the effects. In general, non-monetized effects are often irrationally treated as worthless.<sup>10</sup> This may be especially true with respect to climate change. As the Environmental Protection Agency’s website explains, “abstract measurements” of so many tons of greenhouse gases can be rather inscrutable for the public, unless “translat[ed] . . . into concrete terms

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<sup>9</sup> Decision No. C17-0316 ¶187

<sup>10</sup> Richard Revesz, *Quantifying Regulatory Benefits*, 102 Cal. L. Rev. 1424, 1434-35, 1442 (2014).

you can understand.”<sup>11</sup> After all, Colorado’s 37 million metric tons of carbon dioxide emitted per year from electric power production<sup>12</sup> may seem like a trivial 0.1% of global emissions.<sup>13</sup> A well-documented mental heuristic called “probability neglect” causes people to irrationally reduce small probability risks entirely down to zero.<sup>14</sup> In this case, for example, many decisionmakers and interested citizens would wrongly reduce down to zero the climate risks associated with 0.1% of global emissions, simply due to the leading zero before the decimal. Yet the monetized expected cost of the climate risks associated with those same emissions from Colorado’s electricity sector—\$1.89 billion per year in climate damages<sup>15</sup>—is less likely overlooked. Monetization contextualizes the significance of the additional tons of emissions.

Such context is helpful to the Commission not only in assessing portfolio alternatives, but also in explaining the chosen portfolio to Colorado ratepayers. For example, the social cost of greenhouse gases will allow the Commission to highlight the monetized benefits of a less carbon-intensive resource mix, helping the public understand the climate consequences of the decision.

### Reciprocity and the Social Cost of Greenhouse Gases

Because greenhouse gases are global pollutants, there is another strong justification for the Commission to incorporate the monetized social cost of greenhouse gases in energy resource planning: to encourage reciprocal actions by other states and countries, which will benefit Colorado.

Greenhouse gases do not stay within geographic borders, but rather mix in the earth’s atmosphere and affect climate worldwide. Greenhouse gases emitted in Colorado therefore contribute to climate damages around the world, just as, conversely, greenhouse gases emitted outside Colorado contribute to climate damages in Colorado.

Colorado is undeniably already experiencing the effects of climate change. The most recent National Climate Assessment grimly reported that “as a harbinger, the unusually low western U.S. snowpack of 2015 may become the norm”<sup>16</sup>—an outcome with devastating consequences to any economic sector dependent on snow or water.<sup>17</sup> Colorado will also experience damages from temperature increases and

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<sup>11</sup> EPA, Greenhouse Gas Equivalencies Calculator, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator> (last updated Sept. 2017).

<sup>12</sup> Colorado Dept. of Public Health & Enviro., *Colorado Greenhouse Gas Inventory—2014 Update* (2014) at ES-3 <https://www.colorado.gov/pacific/sites/default/files/AP-COGHGInventory2014Update.pdf> (projecting carbon dioxide emissions from electric power generation at 37.05 million metric tons in 2020).

<sup>13</sup> Ctr. for Climate Change and Energy Solutions, *Global Emissions*, <https://www.c2es.org/content/international-emissions/> (last visited Jan. 31, 2018) (estimating global carbon dioxide emissions as approaching 35 billion metric tons per year by 2020).

<sup>14</sup> Cass R. Sunstein, *Probability Neglect: Emotions, Worst Cases, and Law*, 112 Yale L61, 63, 72 (2002) (drawing from the work of recent Nobel laureate economist Richard Thaler).

<sup>15</sup> The Interagency Working Group’s central estimate of the social cost of carbon for year 2020 emissions is \$42 in 2007\$. See IWG, *2016 Technical Update*. Using the CPI Inflation Calculator, that equals \$51.15 in 2017\$. Colorado’s carbon emissions from the electric sector are estimated at 37.05 million metric tons in the year 2020. \$51.15/ton \* 37.05 million tons=\$1.895 billion (undiscounted).

<sup>16</sup> U.S. Global Change Research Program, *Climate Science Special Report 236* (2017), [https://science2017.globalchange.gov/downloads/CSSR2017\\_FullReport.pdf](https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf).

<sup>17</sup> See R. Steiger et al., *A critical review of climate change risk for ski tourism*. *Current Issues in Tourism*, 1-37 (2017); C. Wobus et al., *Projected climate change impacts on skiing and snowmobiling: A case study of the United States*, *Global environmental change*, 45, 1-14 (2017).

spikes, more frequent and more dangerous wildfires,<sup>18</sup> more extreme weather events like the 2013 Boulder floods,<sup>19</sup> and myriad other impacts.

At the same time, Colorado is also undeniably already benefiting from the efforts of other jurisdictions to curb their greenhouse gas emissions. From Europe's Emissions Trading System to California's newly launched cap-and-trade program, every ton of emissions reduced abroad delivers some direct benefit to Colorado. Global actions on climate change have already helped the United States as a whole avoid more than \$200 billion in direct economic damages, with potentially hundreds of billions more at stake if other countries continue to take efficient actions on climate change.<sup>20</sup> As the 19<sup>th</sup> biggest economy in the United States,<sup>21</sup> Colorado earns a significant portion of those benefits.

Colorado stands to benefit greatly if every other U.S. state and every other country applied a global social cost of greenhouse gas value to their regulatory decisions and so weighed the externalities of their emissions that will fall on Colorado. It is therefore rational for Colorado to use the social cost of greenhouse gases in its own decisionmaking, because it will encourage other states and countries to follow suit. Indeed, several significant players—including the United Kingdom, Sweden, Germany, and Norway—have already developed their own estimates of the global social cost of greenhouse gases.<sup>22</sup> Canada and Mexico have explicitly borrowed the U.S. Interagency Working Group's estimates to set their own carbon emission standards.<sup>23</sup> Similarly, several U.S. states have begun to apply the federal Interagency Working Group's estimates to their electricity policy and regulatory decisions:<sup>24</sup> Illinois and New York both used the estimates in their "zero emissions credit" policies; Maine's PUC used the estimates to determine the value of distributed solar energy generation; Minnesota's PUC recently finalized standard values for the externalities of carbon emissions based on the Interagency Working Group's methodology;<sup>25</sup> California is using the estimates in its scoping plan for its updated climate policy; Washington's Energy Office uses the Interagency Working Group's estimate calculated at a 2.5% discount rate; and Nevada's PUC is currently considering applying the value as well.<sup>26</sup>

Colorado should join those states as a leader in climate policy by applying the social cost of greenhouse gases in its energy resource planning. Not only will it help continue to set a precedent for other states to follow suit, but it will be a strong signal to foreign countries that the United States remains committed to reducing the global externalities of our emissions. Such a signal is consistent with the pledge Colorado made when it joined the U.S. Climate Alliance.<sup>27</sup> As other states and other countries respond

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<sup>18</sup> Z. Liu et al., *Climate change and wildfire risk in an expanding wildland–urban interface: A case study from the Colorado Front Range Corridor*, *Landscape ecology*, 30(10), 1943-1957 (2015).

<sup>19</sup> See U.S. GCRP, *supra* note 16, at 413.

<sup>20</sup> Peter Howard & Jason Schwartz, *Foreign Action, Domestic Windfall: The U.S. Economy Stands to Gain Trillions from Foreign Climate Action* (Policy Integrity Report, 2015, <http://policyintegrity.org/publications/detail/foreign-action-domestic-windfall>).

<sup>21</sup> U.S. Bureau of Economic Analysis, *Colorado*, at 3, <https://www.bea.gov/regional/bearfacts/pdf.cfm?fips=08000&areatype=STATE&geotype=3> (last published Sept. 26, 2017).

<sup>22</sup> Peter Howard & Jason Schwartz, *Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon*, 42 *Columb. J. Envtl. L.* 203 (2017).

<sup>23</sup> *Id.*

<sup>24</sup> See generally Iliana Paul, Peter Howard & Jason Schwartz, *The Social Cost of Greenhouse Gases and State Policy: A Frequently Asked Questions Guide* (Policy Integrity Report 2017, <http://policyintegrity.org/publications/detail/social-cost-of-ghgs-and-state-policy>).

<sup>25</sup> Minnesota PUC, Docket E-999/CI-14-643, Order Updating Environmental Cost Values (Jan. 3, 2018).

<sup>26</sup> See, e.g., Joint Comments to Nevada PUC on Using the SCC (Oct. 11, 2017), [http://policyintegrity.org/documents/2017-10-11\\_Joint\\_Comments\\_on\\_NV\\_SB65.pdf](http://policyintegrity.org/documents/2017-10-11_Joint_Comments_on_NV_SB65.pdf).

<sup>27</sup> Colorado Public Radio, *Colorado Joins States Upholding Paris Climate Accord*, July 11, 2017, <http://www.cpr.org/news/story/colorado-climate-alliance>.

by likewise applying the social cost of greenhouse gases and continuing to reduce their externalities as well, Colorado will benefit.

## II. Proposed New Rule Language

At the end of Rule 3604(k), and also at the end of Rule 3611(g), the Commission should add the following new language: **The full costs and benefits of emissions changes shall be quantified, to the extent possible, based on the best available data, best economic practices, peer-reviewed methodologies, and consensus-driven inputs.**

This new requirement has precedent in Rule 3604(l). That Rule discusses using “peer-reviewed studies” to assess the “costs and benefits” of integrating intermittent renewable energy resources in particular.<sup>28</sup> The proposed new language is a natural extension of that existing guidance on cost-benefit analysis.

### Notes on the proposed language

*“Emissions changes shall be quantified, to the extent possible”*—The public health, economic, environmental, and social costs and benefits of some emissions changes are more readily quantifiable than others. When the costs and benefits of emissions changes cannot be monetized for a given pollutant, the effects should be quantified in terms of natural units of various impacts (for example, incidence of morbidity) or, minimally, in tons of pollution. When accurate quantification tools do not exist, the magnitude and significance of impacts should be discussed qualitatively.

For some emissions, including hazardous air pollutants like mercury, the damages are notoriously difficult to monetize directly, though their reduction often carries significant and more easily monetized ancillary reductions of co-pollutants.<sup>29</sup> For other emissions, including criteria pollutants like particulate matter and sulfur dioxide, useful average regional or national estimates of monetized damages may be available.<sup>30</sup> Finally, for global pollutants like carbon dioxide and methane, the monetized damages are the same no matter the geographic origin of the emission, and monetized estimates are readily available. In particular, the federal Interagency Working Group’s 2016 estimates of the social costs of greenhouse gases are available for any government entity or analyst to use,<sup>31</sup> and the Commission should require their use in energy resource planning.

Even with the social cost of greenhouse gas metrics, some significant categories of damages—such as the risk of catastrophic climate outcomes—cannot currently be accurately modeled given available data and methodologies. Uncertainty around such omitted categories of damages should be treated with analytical rigor. For example, in addition to identifying as a central estimate the mean value averaged across the distribution, the federal Interagency Working Group also identified the 95<sup>th</sup> percentile value to use as a sensitivity analysis to reflect significant uncertainty around catastrophic damages.<sup>32</sup> Colorado should likewise incorporate such sensitivity analyses into its energy resource planning.

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<sup>28</sup> 4 CCR 723-3, rule 3604(l).

<sup>29</sup> See Amicus Brief of Institute for Policy Integrity in *Murray Energy Corp. v. EPA*, No. 16-1127, D.C. Cir. (filed Jan. 25, 2017), available at [http://policyintegrity.org/documents/MATS\\_Final\\_Brief.pdf](http://policyintegrity.org/documents/MATS_Final_Brief.pdf).

<sup>30</sup> See Jeffrey Shrader, Burcin Unel & Avi Zevin, *Valuing Air Pollutant Externality Benefits from Distributed Energy Resources*, slides 13-14, [http://policyintegrity.org/documents/Policy\\_Integrity\\_Valuing\\_Air\\_Pollution.pdf](http://policyintegrity.org/documents/Policy_Integrity_Valuing_Air_Pollution.pdf) (2018).

<sup>31</sup> Interagency Working Group on the Social Cost of Greenhouse Gases, *Technical Update on the Social Cost of Carbon for Regulatory Impact Analysis* (2016), available at [https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/scc\\_tsd\\_final\\_clean\\_8\\_26\\_16.pdf](https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/scc_tsd_final_clean_8_26_16.pdf).

<sup>32</sup> See Joint Comments to FERC, *supra* note 2, at 25-27 (on use of 95<sup>th</sup> percentile estimate).

*“Full costs and benefits”*—Direct and indirect costs and benefits all deserve due consideration. Unregulated upstream emissions should be quantified and monetized.

For greenhouse gases, fully valuing the costs and benefits necessitates a global perspective on climate damages. Several reasons explain why a full accounting of climate costs requires a global estimate of the social cost of greenhouse gases. First, the principles of reciprocity discussed above dictate the need for a global perspective. Colorado cannot solve climate change on its own, and Colorado benefits tremendously when other states and other countries reduce their greenhouse gas emissions. To encourage other jurisdictions to continue to take account of the externalities of their emissions imposed on Colorado, Colorado must likewise take account of the externalities of its emissions that fall outside state borders.

Second, climate damages do not respect political borders. Coloradans have financial and personal interests in businesses and property located outside Colorado that may be affected by climate change. Colorado businesses depend on non-local economies to buy their exports, sell imports, and fill their supply chains. If rising temperatures and rising seas cause climate refugees or infectious disease vectors to migrate toward the United States, Colorado will feel the impacts along with the rest of the country. Colorado’s economy, public health, and security are all linked to globally interconnected systems. Because climate damages occurring outside Colorado borders can spill over and affect Coloradans, a global perspective on the social cost of greenhouse gases is required.<sup>33</sup>

Finally, no existing methodology can calculate accurately a domestic-only estimate. The models simply were not designed to produce such estimates: for example, the models do not account for any inter-regional spillover effects. Any approximate and speculative estimate based on factors like percentage of global GDP, or share of global coastline or landmass, will be inherently misleading, as they ignore inter-regional spillover effects and extraterritorial interests of citizens. Put quite simply, there is no Colorado-only estimate of the social cost of greenhouse gases; only global estimates.<sup>34</sup>

*“Best available data, best economic practices, peer-reviewed methodologies, and consensus-driven inputs”*—These terms together will ensure that the monetization of externalities will be as accurate, as transparent, and as complete as possible. The analysis should start with peer-reviewed methodologies that are widely accepted in the economic and scientific literature. When possible, more than one model should be used, with results averaged across the models, to balance out the limitations of any single tool. Assumptions like the discount rate should follow the general consensus in the economic and scientific communities. All assumptions and calculations should be transparent, with results reproducible. The valuations should be regularly updated to incorporate the latest peer-reviewed data. As detailed in the next section, these practices were all embodied by the Interagency Working Group on the Social Cost of Greenhouse Gases

### The 2016 Interagency Working Group Estimates Are Based on Best Available Data and Methods

In 2009, an Interagency Working Group assembled experts from a dozen federal agencies and White House offices to “estimate the monetized damages associated with an incremental increase in [greenhouse gas] emissions in a given year” based on “a defensible set of input assumptions that are

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<sup>33</sup> See *Think Global*, *supra* note 22.

<sup>34</sup> See Joint Comments to FERC, *supra* note 2, at 22-24; see also Joint Comments to U.S. Forest Service on Use of Social Cost of Carbon in Colorado Roadless Rule, at 11-14 (Jan. 15, 2016), available at [http://policyintegrity.org/documents/Forest\\_Service\\_SDEIS\\_comments.pdf](http://policyintegrity.org/documents/Forest_Service_SDEIS_comments.pdf) (explaining there is no national-, Colorado-, or forest-only estimate of the social cost of carbon).

grounded in the existing scientific and economic literature.”<sup>35</sup> The estimates are based on the three most cited, most peer-reviewed models built to link physical impacts to the economic damages of each additional ton of greenhouse gas emissions. (The models are DICE (the Dynamic Integrated Model of Climate and the Economy), FUND (the Climate Framework for Uncertainty, Negotiation, and Distribution), and PAGE (Policy Analysis of the Greenhouse Effect)). The Working Group ran these models using inputs and assumptions drawn from the peer-reviewed literature, and its estimates were updated every few years—most recently in 2016—to reflect the latest and best scientific and economic data.<sup>36</sup>

As an important example of a consensus-driven input, the Working Group chose a 3% discount rate for its central estimate. While it also considered a 2.5% rate and a 5% rate as sensitivity analyses, it specifically declined to use any rate as high as 7%, as such a rate is far outside the consensus in the economic community about the appropriate discount rate for intergenerational effects.<sup>37</sup> Recent efforts by certain<sup>38</sup>—though not all<sup>39</sup>—federal agencies under the Trump administration to apply a 7% discount rate to intergenerational climate effects are misguided. A “7% rate based on private capital returns is considered inappropriate because the risk profiles of climate effects differ from private investments.”<sup>40</sup> There is a strong consensus in the economic literature that a 3% or lower discount rate is appropriate for the social cost of greenhouse gases, and there is an emerging consensus that a declining discount rate is the best approach.<sup>41</sup>

The Working Group’s estimates have been repeatedly endorsed by reviewers. In 2014, the U.S. Government Accountability Office reviewed the Working Group’s methodology and concluded that it had followed a “consensus-based” approach, relied on peer-reviewed academic literature, disclosed relevant limitations, and adequately planned to incorporate new information via public comments and updated research.<sup>42</sup> In 2016, the U.S. Court of Appeals for the Seventh Circuit held that estimates of the social cost of carbon used to date by agencies were reasonable.<sup>43</sup> The U.S. District Courts for the Districts of Colorado and Montana have also chided agencies for their failure to use the Interagency Working Group’s estimates of the social cost of carbon.<sup>44</sup> In 2016 and 2017, the National Academies of Sciences issued two reports that, while recommending future improvements to the methodology,

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<sup>35</sup> Interagency Working Group on Social Cost of Carbon, Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866 (Feb. 2010), available at <https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/foragencies/Social-Cost-of-Carbon-for-RIA.pdf>.

<sup>36</sup> 2016 TSD, *supra* note 31.

<sup>37</sup> Interagency Working Group on the Social Cost of Carbon, Response to Comments: Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12,866 at 36 (July 2015) (“The use of 7 percent is not considered appropriate for intergenerational discounting. There is wide support for this view in the academic literature...”).

<sup>38</sup> For example, by EPA. See Joint Comments to EPA on Manipulation of the SCC in Emission Standards for Oil and Gas Sources, Dec. 8, 2017, [http://policyintegrity.org/documents/12.8.17\\_Joint\\_Comment\\_on\\_EPA\\_Oil\\_and\\_Gas\\_NODA-final.pdf](http://policyintegrity.org/documents/12.8.17_Joint_Comment_on_EPA_Oil_and_Gas_NODA-final.pdf).

<sup>39</sup> For example, the Bureau of Ocean Energy Management has continued to use the 2016 IWG estimates, as recently as August 2017. Draft Evtl. Impact Statement: Liberty Development Project at 3-129, 4-246 (Aug. 2017).

<sup>40</sup> Richard L. Revesz et al., Best Cost Estimate of Greenhouse Gases, 357 SCIENCE 6352 (2017); see also Joint Comments to EPA, *supra* note 38.

<sup>41</sup> See Joint Comments to EPA, *supra* note 38, at 25-26 & Technical Appendix: Discounting.

<sup>42</sup> Gov’t Accountability Office, *Regulatory Impact Analysis: Development of Social Cost of Carbon Estimates* 12-19 (2014).

<sup>43</sup> *Zero Zone, Inc. v. Dep’t of Energy*, 832 F.3d 654, 679 (7th Cir. 2016).

<sup>44</sup> *High Country Conservation Advocates v. Forest Service*, 52 F. Supp. 3d 1174, 1191 (D. Colo. 2014); *Montana Environmental Information Center v. Office of Surface Mining*, 15-106-M-DWM, at 40-46, Aug. 14, 2017.



supported the continued use of the existing Working Group estimates.<sup>45</sup> It is, therefore, unsurprising that scores of economists and climate policy experts have endorsed the Working Group's values as the best available estimates.<sup>46</sup>

In March 2017, President Trump's Executive Order 13,783 disbanded the Working Group.<sup>47</sup> But the Executive Order does not alter the fundamental legal and economic principles that support full and accurate monetization of externalities. In fact, the Executive Order presumes that agencies may continue "monetizing the value of changes in greenhouse gas emissions,"<sup>48</sup> and some agencies under the current administration have continued to use the Working Group's estimates. For example, in August 2017, the Bureau of Ocean Energy Management called the social cost of carbon "a useful measure" and applied it to analyze the consequences of offshore oil and gas drilling,<sup>49</sup> and in July 2017, the Department of Energy used the Interagency Working Group's 2016 estimates for carbon and methane emissions to analyze energy efficiency regulation, describing the social cost of methane as having "undergone multiple stages of peer review."<sup>50</sup>

Notwithstanding Executive Order 13,783, the Interagency Working Group's 2016 estimates still reflect the best science and economics, and the Commission should continue to rely on those estimates.

### III. Public Service's Objections to the SCC are Meritless

In its May 2017 application for reconsideration of Decision C17-0316, Public Service acknowledges that the Commission has authority to require the quantification of externalities and concedes that the federal Interagency Working Group's SCC estimates will be used in the current ERP proceeding, but argues that those estimates should never again apply to future proceedings.<sup>51</sup> These meritless arguments against using the Interagency Working Group's estimates betray fundamental misunderstanding of the social cost of greenhouse gases.

First, Public Service implies that the range of estimates for the SCC is too wide to be useful, noting that the Interagency Working Group produced four different estimates. In fact, the Interagency Working Group identifies a single set of "central" estimates—namely, the set of estimates the PUC selected, with values starting at \$43 per ton in 2022 (in 2007\$; the value is \$52 in current dollars).<sup>52</sup> The other three estimates—which range from \$16 to \$157 (in current dollars)<sup>53</sup>—serve to explore the sensitivity of the

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<sup>45</sup> Nat'l Acad. Sci., Eng. & Medicine, *Valuing Climate Damages: Updating Estimates of the Social Cost of Carbon Dioxide* 3 (2017); Nat'l Acad. Sci., Eng. & Medicine, *Assessment of Approaches to Updating the Social Cost of Carbon: Phase 1 Report on a Near-Term Update* 1 (2016).

<sup>46</sup> See, e.g., Revesz et al., *supra* note 40; Michael Greenstone et al., *Developing a Social Cost of Carbon for U.S. Regulatory Analysis: A Methodology and Interpretation*, 7 *Rev. Envtl. Econ. & Pol'y* 23, 42 (2013); Richard L. Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, 508 *Nature* 173 (2014) (co-authored with Nobel Laureate Kenneth Arrow, among others); Decl. of Michael Hanemann ¶ 17, *Wyoming v. Interior*, No. 16-00285 (D. Wyo. Dec. 14, 2016), available at <https://www.edf.org/sites/default/files/content/69.1-2016.12.15-Dec-of-M-Hanemann.pdf> (The estimates that the Working Group prepared for the costs of methane are "the best available estimate of the environmental cost of an additional unit of methane emissions.").

<sup>47</sup> Exec. Order. No. 13,783 § 5(b), 82 *Fed. Reg.* 16,093 (Mar. 28, 2017).

<sup>48</sup> *Id.* § 5(c)

<sup>49</sup> Draft *Envtl. Impact Statement: Liberty Development Project* at 3-129, 4-246 (Aug. 2017).

<sup>50</sup> *Energy Conservation Program: Energy Conservation Standards for Walk-In Cooler and Freezer Refrigeration Systems*, 82 *Fed. Reg.* 31,808, 31,811, 31,857 (July 10, 2017).

<sup>51</sup> *Public Service Co. of Colorado, Application for Rehearing, Reargument, or Reconsideration of Decision No. C17-0316* ¶21 (May 18, 2017).

<sup>52</sup> 2016 TSD, *supra* note 31.

<sup>53</sup> *Id.* (adjusted using the CPI Inflation Calculator).



central estimate to the choice of discount rate and to uncertainty over catastrophic outcomes and other omitted factors.<sup>54</sup> A growing number of states has had no trouble either selecting the “central” estimate as its preferred metric, choosing to focus instead—as Washington has done—on the estimate calculated at a 2.5% discount rate, or giving some attention to the full range of estimates.<sup>55</sup> The assertion that the range is too wide to be useful is factually false. More than that, though, the assertion is pernicious: some degree of uncertainty does not excuse complete inaction. As the U.S. Court of Appeals for the Ninth Circuit explained, “while the record shows that there is a range of values, the value of carbon emissions reduction is certainly not zero.”<sup>56</sup> Nor would it burden Public Service with any great expense to simply run all four estimates—as the Commission already noted, according to Public Service’s own testimony, “sensitivities typically aren’t that difficult to run” and “[t]hey can be run fairly fast.”<sup>57</sup>

Next, Public Service argues that the social cost of greenhouse gases should not be used because there are a great number of complex and challenging questions to debate. Though the social cost of greenhouse gases may have complexities, they have already been “explicitly discussed and publicly debated” at great length, satisfying the standard Public Service proposes.<sup>58</sup> The Interagency Working Group developed its estimates over the course of eight years. During that time, its estimates were used in nearly 100 regulatory proceedings, and counting, each subject to a thorough public comment period.<sup>59</sup> Most notably, there was extensive debate over the use of the social cost of carbon and social cost of methane in assessing the Colorado Roadless Rule.<sup>60</sup> In 2014, in *High Country Conservation Advocates v. U.S. Forest Service*, the U.S. District Court for the District of Colorado ordered the Forest Service to use the social cost of greenhouse gases in a revised analysis.<sup>61</sup> That said, further public discussion of the use of the social cost of greenhouse gases in Colorado state policymaking would be most welcome, and this current proceeding provides the perfect forum for continued public debate.

Finally, Public Service cites President Trump’s Executive Order 13,783 as a reason for Colorado to abandon the Interagency Working Group’s estimates of the social cost of greenhouse gases. After all, Public Service argues, the Interagency Working Group has been disbanded and its estimates are “no longer endorsed by the federal government and will not be updated for the near term.”<sup>62</sup> Public Service is wrong on both counts. As explained above, though the Executive Order did unfortunately disband the Interagency Working Group, that action in no way puts into question the analytical rigor of its methodology. The Interagency Working Group’s estimates continue to reflect the most thorough effort of the federal government to use the best science and the best economic models to estimate the costs of carbon. The Executive Order does not cancel out the fact that the National Academies of Sciences, the Government Accountability Office, and several federal courts have endorsed the Interagency Working Group’s work. In fact, some federal agencies have continued, as recently as August 2017, to use the Interagency Working Group’s 2016 estimates.<sup>63</sup>

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<sup>54</sup> 2010 TSD, *supra* note 35.

<sup>55</sup> Paul et al., *supra* note 24, *The Social Cost of Greenhouse Gases and State Policy: A Frequently Asked Questions Guide*.

<sup>56</sup> *Center for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1200 (9<sup>th</sup> Cir. 2008).

<sup>57</sup> Decision No. C17-0316 ¶189.

<sup>58</sup> Public Service Application for Rehearing, *supra*, ¶120.

<sup>59</sup> See Howard & Schwartz, *Think Global*, *supra*, App. A (cataloguing uses of the social cost of greenhouse gases by federal agencies).

<sup>60</sup> See Joint Comments to Forest Service, *supra* note 34.

<sup>61</sup> 52 F. Supp. 3d at 1191.

<sup>62</sup> Public Service Application for Rehearing, *supra*, at 9, n.16.

<sup>63</sup> See Bureau of Ocean Energy Mgmt., Draft Env’tl. Impact Statement: Liberty Development Project, *supra* note 39.

As for the worry that the number will not be updated in the near term, the independent and nonprofit research institution Resources for the Future has launched an initiative to continue to update the Interagency Working Group's estimates by following the recommendations of the National Academies of Sciences.<sup>64</sup> The initiative is being led by some of the same people who served on the National Academies of Sciences panel that reviewed the social cost of greenhouse gas estimates,<sup>65</sup> and the initiative's staff are available as a resource to states interested in continuing to use the social cost of greenhouse gases. Moreover, even if the numbers are not updated in the near future, the 2016 values still provide a useful lower bound estimate. Because future updates will almost certainly increase the valuation—as currently omitted categories of damages become quantifiable and as consensus emerges around switching to a declining discount rate—the 2016 estimates can simply be applied as a conservative lower bound.<sup>66</sup>

## IV. Conclusion

The Commission should continue to be at the forefront of monetizing the externalities of emissions changes, including use of the social cost of greenhouse gases. Doing so will help the Commission make better informed decisions, will help Colorado ratepayers understand the climate consequences of different resource portfolios, and will directly benefit Colorado citizens by encouraging reciprocal action in other jurisdictions.

The Commission should add the proposed new language to its energy resource planning rules. On using the social cost of greenhouse gases specifically, in the future the Commission should advise utilities to refer to the Interagency Working Group's 2016 *Technical Support Update* (rather than the 2015 document cited in the Decision), and should clarify that utilities should adjust the Interagency Working Group's values from 2007\$ to current dollars.

Sincerely,

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Attachment: Iliana Paul, Peter Howard & Jason Schwartz, *The Social Cost of Greenhouse Gases and State Policy: A Frequently Asked Questions Guide* (Policy Integrity Report 2017)

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<sup>64</sup> Resources for the Future, Social Cost of Carbon Initiative, <http://www.rff.org/research/collection/rffs-social-cost-carbon-initiative> (last visited Jan. 30, 2018).

<sup>65</sup> Such as RFF president and NAS panel co-chair Richard Newell.

<sup>66</sup> See Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, 508 *Nature* 173, *supra* note 46 (making the case that the IWG estimates are almost certainly underestimates).