

IN THE MATTER OF THE APPLICATION OF PUBLIC SERVICE COMPANY OF  
COLORADO FOR APPROVAL OF ITS 2016 ELECTRIC RESOURCE PLAN

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**ANSWER TESTIMONY OF ROGER L FREEMAN ON BEHALF OF  
THE COLORADO SOLAR ENERGY INDUSTRIES ASSOCIATION**

**DECEMBER 9, 2016**

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## **SUMMARY OF THE ANSWER TESTIMONY OF ROGER L. FREEMAN**

I am an environmental and energy lawyer and policy expert, formerly with Davis Graham & Stubbs and now practicing as a solo practitioner. During my over 30 years of experience in this area, I have worked extensively on issues involving energy policy, climate change, renewable energy development and policy, and related areas relevant to this testimony. In this capacity, I have developed extensive experience in areas related to solar and renewable energy usage, utility planning, power purchase agreements and other subject matters addressed in the ERP. I am a Board member of the Colorado Solar Energy Industries Association (“COSEIA”), on whose behalf this testimony is submitted.

COSEIA has intervened in this ERP proceeding to provide specific input on behalf of its members and the solar industry in Colorado. My testimony covers the following points:

1. While Public Service Company of Colorado (“PSCo”) has made an effort to reference carbon and environmental considerations in certain sections of the ERP, COSEIA recommends that the actual price of carbon be much more directly and specifically incorporated in the development and implementation of the ERP, including in the Base Case scenarios, and in the RFP and PPA process to be used by PSCo to procure specific generation sources.
2. COSEIA advocates for more emphasis on acquiring utility-scale solar photovoltaic energy as a technology complement to wind generation in this ERP. While increased renewables are currently a part of PSCo’s ERP, and 450 MW of wind and 170 MW of utility-scale solar were acquired in the 2013 Phase II acquisition, in 2016 utility-scale solar costs have come down even further. With the full ITC in place, utility scale solar should be an even larger portion of PSCo’s future resource acquisitions.

- COSEIA recommends that the Company deploy additional utility-scale solar in higher proportion to its wind and fossil-fueled assets to help reduce emissions, decrease ratepayer costs, and increase overall system value.
3. COSEIA also advocates for the inclusion of utility-scale (greater than 2 MW) solar thermal energy generation projects as Section 123 resources. There is a large potential for solar thermal in Colorado, and PSCo, ratepayers, and the solar industry could benefit from innovative solar thermal advances in electric energy generation.
  4. COSEIA advocates for a change in the use of the after-tax Weighted Average Cost of Capital (“WACC”) as the discount rate when applied to fuel costs in resource comparison evaluations. A discount rate of 6.78% is too high when applied to fuel costs and skews the analysis too far toward conventional fuel sources by severely discounting their actual costs to the detriment of customers who bear 100% of the future fuel cost risk.

1 **I. INTRODUCTION**

2

3 **Q. PLEASE STATE YOUR NAME, AND BUSINESS ADDRESS.**

4 **A.** My name is Roger L. Freeman. My business address is 1225 Cody Street, Lakewood,  
5 Colorado 80215.

6 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT POSITION?**

7 **A.** I was an attorney and partner at Davis Graham & Stubbs LLP for 31 years and recently  
8 started an independent practice. Throughout these years, I have been employed as an  
9 environmental, energy and attorney and law professor, and have held numerous board  
10 and related positions in this capacity. My CV and list of experience is attached to my  
11 testimony as Appendix A.

12 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING?**

13 **A.** I am testifying on behalf of the Colorado Solar Energy Industries Association.

14 **Q. WHAT IS YOUR CURRENT ROLE WITHIN COSEIA?**

15 **A.** As an unpaid Board member of COSEIA, I am responsible for providing input on policy,  
16 legal, and related matters regarding the solar energy industry. I serve on several  
17 committees including the Policy Committee and regularly testify or speak on behalf of  
18 COSEIA before the Colorado General Assembly, various State governmental agencies,  
19 and in public forums. As a private attorney, I have also represented and/or been involved  
20 in numerous solar, renewable energy and other programs and initiatives and have  
21 commented and provided input on previous Colorado Public Utilities Commission  
22 (“PUC” or “Commission”) proceedings as a witness and/or member of the public.

23 **Q. CAN YOU BRIEFLY DESCRIBE COSEIA?**

1    **A.**    COSEIA is a 501(c)(6) nonprofit trade association established in 1989. For 27 years,  
2           COSEIA has been leading the Colorado solar industry by advocating for policies and  
3           programs that expand solar choice in our state. COSEIA’s membership is very diverse,  
4           comprised of about 200 solar-related businesses as members, ranging from installers  
5           located throughout the state, to community and utility scale developers, to large national  
6           and international manufacturers, distributors, financing firms and other solar companies.  
7           COSEIA’s broad membership base provides products and services to residential  
8           consumers, commercial businesses, utilities, and governmental entities. COSEIA holds  
9           regular policy calls to seek member input and has had numerous policy calls with  
10          members about issues addressed in this testimony.

11   **Q.    HAVE YOU INCLUDED A DESCRIPTION OF YOUR QUALIFICATIONS?**

12   **A.**    A description of my qualifications is included as Appendix A at the end of my testimony.

13   **II.    PURPOSE AND SUMMARY OF TESTIMONY**

14  
15   **Q.    WHAT IS THE PURPOSE OF YOUR ANSWER TESTIMONY?**

16   **A.**    The purpose of my answer testimony is to comment on aspects of the 2016 ERP that are  
17           relevant to the solar industry. COSEIA believes the impacts of carbon emissions on  
18           Colorado’s economy and environment necessitate a specific and substantial cost of  
19           carbon that should be included by PSCo in its base case or mandated by the PUC for use  
20           in the base case and all alternatives in the electric resource planning process.

21           I emphasize that renewable generation, especially utility-scale solar, is  
22           underutilized, and much more utility-scale solar should be encouraged and selected given  
23           its numerous benefits, such as cost competitiveness, ability to work well with high levels

1 of wind power, and the fact that it is virtually fuel and emissions free. Furthermore, solar  
2 photovoltaic (“PV”) installations at all scales are showing a continued decline in soft and  
3 hard costs, and when juxtaposed with a continued potential for increase in fossil fuel  
4 costs, especially when the total cost of carbon and other fossil fuel emissions (including  
5 human health and the environment) are accounted for. The cost of carbon emissions is  
6 definitely not zero, but including no carbon cost in the base case is a zero cost  
7 assumption.

8 I also discuss how solar thermal projects should be emphasized and encouraged as  
9 potential “Section 123” resources. Finally, I urge the Company and the Commission to  
10 use a lower value for the discount rate applied to fuel costs in its resource acquisition  
11 analysis. The 6.78% after-tax WACC discount rate currently used is too high and has  
12 been skewing resource analyses for years.

13 **Q. WHAT INTERESTS OF COSEIA ARE RELATED TO THE ERP?**

14 **A.** The members of COSEIA consist of a range of private sector businesses and other  
15 entities that produce, develop, and deploy solar energy in Colorado. Much of the work of  
16 COSEIA members is within PSCo’s territory. Therefore, it is vital to the interests of  
17 COSEIA and its members that the ERP best reflect the full range of considerations  
18 relevant to the implementation and deployment of solar in the context of resource  
19 planning.

20 **III. CARBON PRICING IN THE ERP**  
21

1 **Q. WHAT IS THE POSITION OF COSEIA ON PSCO’S APPROACH TO CARBON**  
2 **AND ENVIRONMENTAL ISSUES REFLECTED IN THE ERP?**

3 **A.** COSEIA supports PSCo’s various references to the growing need to integrate clean  
4 energy and account for environmental considerations in the ERP process.<sup>1</sup> However  
5 COSEIA does not believe that PSCo has addressed carbon costs seriously enough. In  
6 particular, COSEIA supports PSCo’s decision to not accept any bids for coal resources in  
7 RFPs during the Resource Acquisition Period (“RAP”).<sup>2</sup> COSEIA also supports PSCo’s  
8 stated intent to anticipate certain carbon reduction goals reflected in the Clean Power  
9 Plan (“CPP”) and related initiatives, even when the current status of the CPP remains  
10 uncertain. PSCo witness Alice K. Jackson refers to various statutory and related  
11 initiatives that reflect the need to afford carbon and environmental considerations some  
12 weight in resource planning.<sup>3</sup>

13 Again, COSEIA acknowledges PSCo’s efforts to position itself to address future  
14 carbon regulations. Nevertheless, COSEIA believes that the ERP falls far short of efforts  
15 needed to combat climate change and account for carbon in its resource acquisition

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<sup>1</sup> See, e.g. Proceeding No. 16A-0396E, the Direct Testimony of PSCo witness, Alice K. Jackson (“Jackson Direct”) at 11:10-13. (Jackson quotes Commission Rule 3601 that states “[i]t is also the policy of the state of Colorado that the Commission give the fullest possible consideration to the cost-effective implementation of new clean energy and energy-efficient technologies.”); and at 12:4-6 (Jackson notes that “...Public Service will continue to provide the highly reliable service it has been known for in an increasingly clean and adaptable manner.”)

<sup>2</sup> *Id.* at 33:6-7.

<sup>3</sup> *Id.* at 23:19-22 (Jackson states that “While there is some expectation that [the CPP] will be reinstated with changes, even if it does not, we anticipate continued change and drive toward lower emitting generation resources.” Alice continues at 24:3-6 stating “these “no regrets” projects [e.g. Rush Creek] are expected to be given full credit in any future environmental regulation, and this coupled with favorable economics for our customers are why we want to pursue them.”)

1 planning. The Commission, in the last ERP decision (No. C13-1566) found “that  
2 additional analysis of all these issues [including carbon costs] is warranted.”<sup>4</sup>

3 COSEIA does not take issue with the idea of using a low and high case in its  
4 analysis, but COSEIA does take issue with the carbon cost proxy values used in PSCo’s  
5 analysis. They are much too low, and starting to implement carbon pricing in 2022 is too  
6 late. PSCo’s carbon proxy price values range from \$20.00 starting in 2022 to \$43.26 in  
7 2054 for the High Case, and \$1.86 to \$26.86 for the Low Case.<sup>5</sup> PSCo’s High Case  
8 comes in at only \$20 per ton (escalating for inflation), and this price fails to come close to  
9 current calculations of the cost of carbon.

10 **Q. WHAT OTHER RELIABLE AND VERIFIED CALCULATIONS FOR CARBON**  
11 **PROXY PRICES HAVE YOU FOUND?**

12 **A.** One such example is of the Social Cost of Carbon (“SSC”) that was originally developed  
13 by a U.S. Government working group under Executive Order 12866. It was originally  
14 developed in 2007 and updated most recently in 2015 and valued carbon emissions at \$36  
15 per ton in 2015 (in 2007 dollars).<sup>6</sup> Please see Attachment RLF-1, the Technical Support  
16 Document, which details the calculations and the range of costs determined by the group.  
17 This Social Cost of Carbon was used by the Department of Energy (“DOE”) in its  
18 analysis of its efficiency standards for commercial refrigeration equipment, and  
19 challenged in court by industry advocates. The DOE’s use of a Social Cost of Carbon in

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<sup>4</sup> Proceeding No. 11A-869E (Consolidated), Decision No. C13-1566, at page 14, paragraphs 41 and 40.

<sup>5</sup> See Jackson Direct, Att. AKJ-2, Table 2.11-4 Proposed High and Low Carbon Proxy Price Values. ()

<sup>6</sup> See Att. RLF-1 Technical Support Document Revised 2015. Table on page 3 showing the revised Social Cost of Carbon.



1 its analysis was upheld by an August 2016 U.S. Circuit Court decision.<sup>7</sup> On November  
2 7<sup>th</sup>, 2016, the Environmental Defense Fund, the Institute for Policy Integrity at New York  
3 University School of Law, the Natural Resources Defense Council, and the Union of  
4 Concerned Scientists submitted joint comments supporting and affirming the use of the  
5 Social Cost of Carbon methodology used by the DOE.<sup>8</sup> The full comments are attached  
6 to my testimony as Attachment RLF-2, and COSEIA supports the comments and  
7 highlights the following specific comment:

8 We strongly affirm that the current Social Cost Of Carbon (SCC) values are  
9 sufficiently robust and accurate to continue to be the basis for regulatory analysis  
10 going forward. We further encourage DOE to monetize the benefits of other  
11 greenhouse gas reductions, such as through the Social Cost of Methane (SCM)  
12 methodology. As demonstrated below, if anything, current values are significant  
13 underestimates of the SCC and SCM. As economic and scientific research  
14 continues to develop in the future, the values should be revised...<sup>9</sup>  
15

16 The reason to use a Social Cost of Carbon is clear - there is worldwide and  
17 national recognition that catastrophic climate change is caused largely by unchecked and  
18 growing greenhouse gas emissions from burning fossil fuels and *there is an economic*  
19 *cost associated with any future carbon emissions*. As discussed in Attachment RLF-1,  
20 and RLF-2, and further below, metrics are now available to quantify that cost, including  
21 those used by PSCo itself. A specific price on carbon should be integrated into all future  
22 decision-making on resource planning and related matters reflected in the ERP.

23 **Q. WHAT OTHER INFORMATION DO YOU HAVE TO SHARE THAT LENDS**  
24 **CREDENCE TO COSTS ASSOCIATED WITH BURNING FOSSIL FUELS?**

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<sup>7</sup> See, *Zero Zone v. Department of Energy*, 46 ELR 20137. No. 14-2147 et al., (7th Cir., 08/08/2016)) (Upholding the use of the Social Cost of Carbon and the regulations based on it.)

<sup>8</sup> Attachment RLF-2 Joint Comments regarding DOE's valuation of the benefits of its energy efficiency standards.

<sup>9</sup> *Id.* at 1.

1 **A.** As reflected by the Paris Climate Agreement in January, 2016 (“Paris Agreement”) and  
2 by supporting actions taken by nations, states, and the insurance industry, there is  
3 growing recognition that enormous economic costs – not to mention human,  
4 socioeconomic, and environmental impacts - will be incurred if increasing carbon levels  
5 are left unchecked. Ninety (90) independent governments submitted Intended Nationally  
6 Determined Contributions (“INDCs”) to the UN Framework Convention on Climate  
7 Change secretariat expressing their interest in using carbon markets to reach their  
8 emission reduction targets.<sup>10</sup> Notably, China will adopt a national carbon trading system  
9 beginning in 2017.<sup>11</sup>

10 The insurance industry has also responded to climate change. Major insurance  
11 companies are forecasting catastrophic losses if the destructive weather occurring on a  
12 more frequent basis continues. Major insurance companies are taking many steps to try  
13 to mitigate the causes of climate change, including putting a cost to carbon emissions.<sup>12</sup>

14 **Q. WHAT FIGURE FOR CARBON COSTS DOES COSEIA PROPOSE TO BE**  
15 **USED FOR PURPOSES OF THIS PROCEEDING?**

16 **A.** COSEIA does not have a specific carbon proxy price proposal to be used, but submits  
17 that the minimum or low case should start at least at or above the levels found in

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<sup>10</sup> See “Carbon Pricing: The Paris Agreement’s Key Ingredient”, Published by the Environmental Defense Fund in cooperation with the International Emissions Trading Association. April 2016. Available at: [http://www.ieta.org/resources/Resources/Reports/Carbon\\_Pricing\\_The\\_Paris\\_Agreements\\_Key\\_Ingredient.pdf](http://www.ieta.org/resources/Resources/Reports/Carbon_Pricing_The_Paris_Agreements_Key_Ingredient.pdf). Last viewed Dec. 6, 2016.

<sup>11</sup> *Id.* at 2.

<sup>12</sup> See, e.g. Dr. Evan Mills. Responding to Climate Change – The Insurance Industry Perspective. Lawrence Berkley National Laboratory. Available at: <http://evanmills.lbl.gov/pubs/pdf/climate-action-insurance.pdf>. And See, David Tuft. Climate Facts: Global Warming Heats Up the Insurance Industry. NRDC 2007. Available at: <https://www.nrdc.org/sites/default/files/insurance.pdf>. And See, Eugene Linden. How the Insurance Industry Sees Climate Change. Op-Ed in the LA Times published June 16, 2014. Available at: <http://www.latimes.com/opinion/op-ed/la-oe-linden-insurance-climate-change-20140617-story.html>. All last visited Dec. 6, 2016.

1 Attachment RLF-1. This would equate to a minimum of \$37.20 per ton starting in 2016  
2 based on the table on page 2 of Att. RLF-1 titled: Revised Social Cost of CO<sub>2</sub>, 2010 –  
3 2050 (In 2007 dollars per metric ton of CO<sub>2</sub>). There is credible evidence that the High  
4 Case should be set at a number substantially higher than \$20/ton. A 2015 letter published  
5 in Nature Climate Change by two professors, Frances C. Moore, and Delavane B. Diaz,  
6 calculated the Social Cost of Carbon to be \$220/ton using a gro-DICE model.<sup>13</sup> For  
7 details please see the full journal article submitted with my testimony as Attachment  
8 RLF-3.

9 **Q. HOW IS COSEIA PROPOSING THIS CARBON PRICING TO BE**  
10 **INTEGRATED INTO THE ERP?**

11 **A.** COSEIA proposes that the PUC require as part of the ERP planning process, that PSCo  
12 go beyond general references to the Clean Power Plan and its desire to establish an  
13 “increasingly clean” energy base. A price of carbon should be included in the base case  
14 assumption and in all resource selection decisions. The specific price should be included  
15 in portfolio analyses in Phase II, based on the Commission's determination. PSCo would  
16 then implement this significant, but realistic, carbon proxy price in the RFP process to be  
17 used to procure specific energy sources in Phase 2 of the ERP. Proposals would be  
18 weighed not only on core economic factors outlined in the ERP, but by the amount of  
19 carbon generated, and attendant cost thereof.

20 **Q. DO YOU HAVE ANY CONCLUDING REMARKS ABOUT CARBON PRICING?**

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<sup>13</sup> Att. RLF-3, Frances Moore, and Delavane Diaz. Temperature Impacts on Economic Growth Warrant Stringent Mitigation Policy. Nature Climate Change, Vol. 5, Feb 2015. Page 3 (Page 128 in publication).

1 A. Yes. Sadly, Colorado’s unique resources – from its precious water supply to its ski and  
2 outdoor recreation industries – face some of the most severe threats from climate  
3 change.<sup>14</sup> Our state is feeling the effects of global warming today. Never was this  
4 concern more evident than when a unique consortium of companies, spurred by recent  
5 election results and projected rollback of climate initiatives launched by the Obama  
6 Administration, sent a joint letter to President-Elect Trump strongly advocating that the  
7 federal government move forward with placing a discrete price on carbon.<sup>15</sup>

8           Simply put, there is increased recognition that there should and can be placed on  
9 carbon a specific price – which in turn should be integrated into the cost of the various  
10 power sources to be acquired by PSCo through the future ERP processes, including at the  
11 RFP and PPA levels. Never has there been a more critical time for the PUC to step up  
12 and take responsibility for ensuring the true cost of carbon is integrated into ERP  
13 measures.

14           As a legal policy and business matter, other branches of State government (along  
15 with the private sector) are stepping up to ensure that carbon mitigation is at the forefront  
16 of State policy.<sup>16</sup> In fact, Chairman Epel in his PUC retirement announcement noted that  
17 “[u]nder the leadership of Governor Hickenlooper, Colorado has taken a more forward  
18 looking approach than any other state to intentionally and cost effectively de-carbonize  
19 the economy.” And the private sector is following suit. There can be no doubt that the

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<sup>14</sup> See, e.g. Proceeding No. 14M-0235E, Comments of the Colorado Solar Energy Industries Association Addressing Topics Pursuant to Decision No. C15-0158-I, at pages 3-6.

<sup>15</sup> See Hiroko Tabuchi. U.S. Companies to Trump: Don’t Abandon Global Climate Deal. NY Times. Nov. 16, 2016. Available at: [http://www.nytimes.com/2016/11/17/business/energy-environment/us-companies-to-trump-dont-abandon-global-climate-deal.html?\\_r=0](http://www.nytimes.com/2016/11/17/business/energy-environment/us-companies-to-trump-dont-abandon-global-climate-deal.html?_r=0). Last visited Dec. 7, 2016.

<sup>16</sup> See 2015 Colorado Climate Plan: State Level Policies and Strategies to Mitigate and Adapt. Available at: <http://cweb.state.co.us/environment/climate-change/Pages/main.aspx>. Last Visited: Dec. 7, 2016.

1 PUC stands in a unique position as the governmental authority uniquely positioned to  
2 spur significant energy resource planning initiatives that account for carbon costs. Any  
3 policy decision by the Commission that discourages rather than encourages broader  
4 deployment of solar and other renewable without weighing the price of carbon would be  
5 a serious miscarriage of public responsibility.

6 **IV. INCREASE SOLAR'S SHARE OF PSCO GENERATION MIX**

7

8 **Q. SHOULD THERE BE ANY SPECIAL EMPHASIS ON INCREASING SOLAR'S**  
9 **SHARE OF THE COMPANY'S GENERATION MIX?**

10 **A.** Yes. According to the Company's filing,<sup>17</sup> approximately 87% of the current renewable  
11 portfolio is comprised of wind resources. Since solar generates electricity during daytime  
12 hours and wind tends to generate more overnight and with seasonal fluctuation, "wind  
13 resource tends to compliment solar resource" according to Sarah Kurtz of NREL.<sup>18</sup> The  
14 Company's Effective Load Carrying Capability Study of Existing and Incremental Solar  
15 Generation Resources helps analyze this correlation and concludes in part, "[t]he study  
16 did find a beneficial impact of including existing wind generation in the base generation  
17 portfolio when conducting the existing solar ELCC study. The ELCC for solar was  
18 found to be about 9% higher when wind is included in the base portfolio."<sup>19</sup>

19 A 2016 report by the International Energy Agency, a global energy think tank  
20 based in Europe, cites the integration of both solar and wind as a technology mix that

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<sup>17</sup> Direct Testimony of Kent L. Scholl ("Scholl Direct"), Att. KLS-2, Hearing Exhibit 103, at page 5.

<sup>18</sup> Ben Jervey. Want To Improve Wind and Solar Power? Bring them Together. November 2016. (Quoting Sarah Kurtz.) Available at: <https://ensia.com/articles/renewable-energy-wind-solar/>. Last visited: Dec. 7, 2016.

<sup>19</sup> Scholl Direct, Att. KLS-2, Hearing Exhibit 103 at page 2

1 enhances overall renewable portfolio System Value (SV). “The output of wind and solar  
2 is complimentary in many regions of the world. ... Deploying a mix of technologies can  
3 thus bring valuable synergies. For example, the current mix of wind and solar power in  
4 Germany leads to an overall more stable generation profile than each technology by  
5 itself, which raises the combined System Value.”<sup>20</sup>

6 COSEIA recommends that the Company deploy additional utility-scale<sup>21</sup> solar in  
7 higher proportion to its wind assets to help achieve improvements in the ELCC of its  
8 renewable portfolio.

9 **V. SOLAR THERMAL AS A SECTION 123 RESOURCE**

10  
11 **Q. HAS THE COMPANY PROPOSED ANY SECTION 123 RESOURCES IN THEIR**  
12 **CURRENT ERP?**

13 **A.** No.

14 **Q. WHAT IS A “SECTION 123” RESOURCE?**

15 **A.** My understanding of a “Section 123” resource is a new energy technology or  
16 demonstration project as defined by the Colorado Revised Statutes in section 40-2-123.

17 It is worth quoting part 1(a) of “Section 123” as it states:

18 The commission shall give the fullest possible consideration to the cost-  
19 effective implementation of new clean energy and energy-efficient technologies  
20 in its consideration of generation acquisitions for electric utilities bearing in  
21 mind the beneficial contributions such technologies make to Colorado's energy  
22 security, economic prosperity, insulation from fuel price increases, and  
23 environmental protection, including risk mitigation in areas of high wildfire risk

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<sup>20</sup> Next Generation Wind and Solar Power, From Cost to Value; International Energy Agency, 2016, page 14.

<sup>21</sup> COSEIA is also a proponent of more distributed generation solar, but for purposes of this ERP, advocates for utility-scale solar.

1 as designated by the state forest service. The commission shall consider utility  
2 investments in energy efficiency to be an acceptable use of ratepayer moneys.  
3

4 The Commission also approved a three-step process through which the Company is to evaluate  
5 Phase II bids that claim Section 123 status.<sup>22</sup>

6 **Q. WHY DOES COSEIA BELIEVE SOLAR THERMAL WOULD BE WORTH**  
7 **PURSUING AS A SECTION 123 RESOURCE IN THIS ERP?**

8 **A.** Solar thermal technologies need to be explored as a possible Section 123 resource. PSCo  
9 touts Colorado as “uniquely located in an energy rich zone of the country.” And it adds,  
10 “we are located in one of the best wind zones of the country... and our solar resource is  
11 in the top ten of the U.S.”<sup>23</sup> However, Ms. Jackson does not mention that Colorado also  
12 has the best solar thermal resource in the country. The Colorado Solar Thermal  
13 Roadmap, released in 2012, and attached to my testimony as Attachment RLF-4,  
14 illustrates why Colorado is the number one place in the country for optimum solar  
15 thermal production: a high level of insolation (high solar energy hitting the state, due to  
16 many sunny days and high altitude); a large difference between daytime and nighttime  
17 temperatures; and cold groundwater coming into our occupied structures.<sup>24</sup> The research  
18 verifying this finding was conducted by Danny Parker of the Florida Solar Energy Center  
19 and Tim Merrigan of NREL. Their work established that solar thermal heating  
20 technologies perform better in Colorado than anywhere else in the country.

21 However, since the roadmap was released, little has been done to encourage this  
22 promising technology. Solar Thermal is excluded from the Renewable Portfolio Standard

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<sup>22</sup> Decision No. C13-0094, Paragraphs 161-163.

<sup>23</sup> Jackson Direct at 22:16-19.

<sup>24</sup> Attachment RLF-4 Solar Thermal Roadmap.

1 and other state programs and solar thermal technologies have received virtually no public  
2 support or utility encouragement. That's why we think it is past time for solar thermal  
3 technologies -- in their myriad forms -- to receive explicit attention and encouragement in  
4 this ERP process.

5 **VI. PROPER DISCOUNT RATE FOR RESOURCE ANALYSIS**

6  
7 **Q. PLEASE EXPLAIN THE CURRENT PRACTICE WITH RESPECT TO USING**  
8 **THE DISCOUNT RATE TO DETERMINE THE RESENT VALUE REVENUE**  
9 **REQUIREMENTS (PVRR).**

10 **A.** PSCo typically determines the PVRR of the various alternatives being considered using  
11 PSCo's after-tax Weighted Average Cost of Capital ("WACC"), which in this case is  
12 6.78%.<sup>25</sup>

13 PSCo has confirmed in discovery that it has only analyzed the proposed  
14 alternatives using its WACC of 6.78% as the discount rate to determine the PVRR that is  
15 being used to compare alternatives.<sup>26</sup> For confirmation that PSCo has only used its  
16 6.78% WACC to determine the PVRR of various alternatives, see the responses to  
17 OCC4-12 through OCC4-16, included as Attachment RLF-5.

18 **Q. WHY DOES PSCO USE ITS WEIGHTED AVERAGE COST OF CAPITAL TO**  
19 **DISCOUNT FUTURE COSTS AND TO DETERMINE THE PVRR?**

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<sup>25</sup> See Jackson Direct, Att. AKJ-2, p 2-181.

<sup>26</sup> See Jackson Direct, Att. AKJ-1, Vol. 1, PSCo 2016 ERP. Section 1.5 Alternative Plans, for a general discussion of PVRR.



1 A. PSCo typically responds that it uses its WACC to discount future costs because the  
2 WACC is the rate that makes PSCo indifferent to whether it spends a dollar now or a  
3 dollar in the future escalated by the discount rate (i.e. PSCo's WACC) in a later period.

4 **Q. WHAT IS COSEIA'S ISSUE WITH THE CURRENT DISCOUNT RATE USED IN**  
5 **THE COMPANY'S RESOURCE ANALYSIS?**

6 A. COSEIA believes that discounting future fuel costs while performing a resource analysis  
7 devalues real costs. These are costs for which the utility assumes no risk while ratepayers  
8 must pay, no matter the actual cost. PSCo uses a discount rate of 6.78% (its after-tax  
9 WACC) in its Present Value Revenue Requirements ("PVRR") analysis. The size of the  
10 PVRR will change as a result of the chosen discount rate. And, the choice of discount  
11 rate will affect whether a given alternative is seen as costing more or less than a baseline  
12 or reference scenario.

13 **Q. PLEASE EXPLAIN WHY THE PVRR IS USED TO COMPARE RESOURCE**  
14 **ALTERNATIVES.**

15 A. The PVRR is used to compare various alternatives in an effort to provide PSCo's  
16 customers with the most cost-effective resources. As stated at the beginning of the  
17 Resource Plan rules in Colorado PUC Rule 3601:

18 It is the policy of the state of Colorado that a primary goal of electric utility  
19 resource planning is to minimize the net present value of revenue requirements.  
20 It is also the policy of the state of Colorado that the Commission gives the  
21 fullest possible consideration to the cost-effective implementation of new clean  
22 energy and energy-efficient technologies.

23  
24 In short, the PVRR is used to compare the cost effectiveness of alternatives  
25 because the PUC's Resource Planning Rules require it.

1 **Q. DO THE PUC RESOURCE PLANNING RULES SPECIFY THE DISCOUNT**  
2 **RATE THAT SHOULD BE USED TO DETERMINE THE PVRR?**

3 **A.** No. The discount rate used to determine the PVRR is not specified in the PUC's  
4 Resource Planning Rules. Rather the PUC Resource Planning rules just require that the  
5 PVRR be determined using "the appropriate discount rate." This requirement is found in  
6 the definition of PVRR in Colorado PUC Rule 3602 (j) which states:

7 (j) "Net present value of revenue requirements" means the current worth of the  
8 total expected future revenue requirements associated with a particular resource  
9 portfolio, expressed in dollars in the year the plan is filed as discounted by the  
10 appropriate discount rate.

11  
12 **Q. PLEASE EXPLAIN IN DETAIL HOW THE CHOICE OF DISCOUNT**  
13 **RATE WORKS WITH RESPECT TO THE ALTERNATIVES BEING**  
14 **CONSIDERED IN THIS PROCEEDING.**

15 **A.** To help explain how the choice of discount rate affects the alternatives being  
16 considered in this docket, I'm attaching four of the public version Strategist Output  
17 runs provided by PSCo for the four basic alternatives considered on pages 1-49  
18 through 1-61 in Volume 1 of PSCo's 2016 Electric Resource Plan (i.e. "AKJ-1").  
19 These files are attached in PDF format as RLF 6-RLF 9.<sup>27</sup>

20 The fuel costs for the four basic alternatives presented by Xcel on page 1-49  
21 in Volume 1 of the 2016 Resource Plan ("AKJ-1") can be found on the "Fuel Burn"  
22 sheet on page 4 in each of these Strategist Output files. These fuel costs can be  
23 summed for the 2016-2054 time frame and then that sum can be mathematically

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<sup>27</sup> Parties to the proceeding are able to access these Strategist Output files through the SharePoint site. Members of the public that are interested will be able to convert these PDFs to Excel files using online resources or executable versions that can be obtained from COSEIA.

1 discounted at various rates to show what happens when lower discount rates are  
2 used.

3 While the use of PSCo's WACC makes *PSCo* indifferent to whether it  
4 spends a dollar now or a dollar in the future escalated at *PSCo's* discount rate, fuel  
5 costs are not capital and they are not paid by PSCo since they are quickly passed  
6 through to PSCo ratepayers under the Electric Commodity Adjustment ("ECA")  
7 mechanism.

8 **Q. HAVE YOU ATTACHED A TECHNICAL REFERENCE ON DISCOUNT RATES**  
9 **SHOWING GUIDELINES FOR DISCOUNT RATES FOR FEDERAL AGENCIES**  
10 **EVALUATING PROJECTS?**

11 A: Yes. Attachment RLF-10 is a publication from the National Institute of Standards with  
12 the following title and location finder:

**NISTIR 85-3273-30**

**Energy Price Indices and Discount Factors  
for Life-Cycle Cost Analysis – 2015  
Annual Supplement to NIST Handbook 135**

Priya D. Lavappa  
Joshua D. Kneifel

This publication is available free of charge from:  
<http://dx.doi.org/10.6028/NIST.IR.85-3273-30>

13  
14 This publication makes it clear that federal government agencies use much lower  
15 discount rates than PSCo's WACC—often 3% or lower.

16

1 **Q. NEXT COULD YOU PLEASE EXPLAIN WHY THIS IS IMPORTANT IN THIS**  
2 **RESOURCE PLAN PROCEEDING?**

3 **A.** Yes. This proceeding will be looking at a number of possible alternatives for future  
4 resource selection and the costs of these alternatives will be compared using their  
5 respective PVRRs. In short, alternatives that have more fossil fuel resources are projected  
6 to have billions of dollars of future fuel costs. When these future fossil fuel costs are  
7 discounted at a relatively large discount rate (e.g. 6-7%), the future fossil fuel costs will  
8 be effectively “masked” in the PVRR determination. Using a lower discount rate will  
9 reflect more of those future fossil fuel costs in the PVRR determinations. This will help  
10 the parties and the Commission understand the importance of the choice of discount  
11 rate—and the very significant economic benefits that ratepayers will realize by decisions  
12 to invest in cost-effective renewable energy that will avoid large fossil fuel costs in the  
13 future.

14 **Q. WHAT IS COSEIA’S RECOMMENDATION FOR USE OF DISCOUNT RATES**  
15 **IN PSCO’S PVRR ANALYSIS?**

16 **A.** I recommend that at the very least that PSCo should be running sensitivity analyses using  
17 lower discount rates when analyzing the cost difference between different resource  
18 options. We believe a rate of 3% as the midpoint in the US SCC studies is an appropriate  
19 rate. But by running sensitivity analysis at different discount rates, the effect the discount  
20 rate has on the analysis becomes very clear – using a higher rate makes future fuel and  
21 other operating costs look much less significant than they actually are. PSCo ratepayers  
22 end up paying the full actual amount of these costs, not the discounted amount.

1           On the flip side, using a more appropriate lower rate makes solar - which has ZERO fuel  
2           costs - look even more attractive than we believe it already is.

3   **VII. CONCLUSION**

4

5   **Q.    DOES THIS CONCLUDE YOUR TESTIMONY?**

6   **A.    Yes.**

**APPENDIX A: Description of qualifications (CV and Representative Experience)**

for COSEIA witness Roger L. Freeman.

CURRICULUM VITAE  
**ROGER L. FREEMAN**

**PROFESSIONAL EXPERIENCE & EXPERTISE**

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**Davis Graham & Stubbs, LLP**, Denver, CO, 1985 - 2016 (Partner, 1992-2016)

- ❖ Multi-faceted practice involving extensive team leadership and management responsibilities on a wide spectrum of environmental and energy matters. Areas of emphasis include cleantech/renewable energy projects; environmental compliance; managing clean-up projects at Brownfields sites; oil and gas compliance and remediation efforts; and solid waste/recycling projects.
- ❖ Co-founder and ongoing leader in the firm's renewable energy practice; organizer and moderator of the longstanding series on renewable and alternative energy initiatives.
- ❖ Provide counseling on projects involving cleantech industries, renewable energy development and transmission lines, throughout the Rocky Mountain West and California.
- ❖ Extensive litigation experience, in both federal and state courts, including as lead counsel, strategist, and litigation director for major companies and other entities.
- ❖ Vast expertise in environmental and safety issues facing traditional energy sectors, such as oil and gas. In-depth understanding of the relationship between energy development and environmental protection. Firm grasp of technical/scientific issues based on prior education/training.
- ❖ Forge collaborative solutions to complex environmental problems (*e.g.*, voluntary clean-ups, such as at the Pepsi Center Arena in Denver), drawing upon extensive network of political and agency relationships.
- ❖ Extensive training and experience in media/community relations, including emergency response management.
- ❖ Held various DGS management positions, including Environmental Practice Group Leader. Initiator (and enforcer) of firm's energy conservation program.

**Current/Recent Leadership Roles**

- ❖ Commissioner, Colorado Solid and Hazardous Waste Commission (Appointed by Gov. Ritter in 2008; term expired in 2014). Creator and Chair of Commission

Subcommittee on climate mitigation and waste minimization issues, and to advance recycling and reduction policies.

- ❖ Conservation Colorado – Board Member and Former Nominating Chair, 2002-Present.
- ❖ Board of Directors, Colorado Solar Energy Industry Association, 2014- Present.
- ❖ Policy Committee Chair, Colorado Cleantech Industry Association, 2012-2016.
- ❖ Member, Policy Committee, Colorado Association for Recycling, 2011-present.

#### **Adjunct Professor, University of Denver, Sturm College of Law, 2002-2013**

- ❖ Taught courses in Brownfields and Renewable Energy/Environmental Law. Developed Capstone course on “Siting Renewable Energy On Contaminated Lands – Helping to Advance the New Frontier.” Frequent guest lecturer in other classes.

#### **Other Activities/Initiatives**

- ❖ Alliance Center: Actively work with the Alliance Center to develop better state-wide practices, improving energy conservation practices and other programs.
- ❖ Media Initiatives: Working with my daughter and videographer, created a video that won EPA first prize in a national contest on waste reduction, recycling and reuse (<http://www.youtube.com/watch?v=2tGg2reKz-Y>).
- ❖ Legislative Policy: Advance cleantech initiatives in Colorado by testifying and advising legislators on various bills, such as (1) creation of B-Corps structure for public purposes; and (2) electric and natural gas-powered vehicle expansion.
- ❖ Arbitrator/Mediator: Trained arbitrator and mediator specializing in environmental/energy matters (AAA Certified).

#### **EDUCATION**

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##### **University of Denver Sturm College of Law**

- ❖ J.D. 1985 (Order of St. Ives)

##### **University of Michigan**

- ❖ B.S. Botany 1981

##### **Cornell University, College of Arts and Sciences**

- ❖ 1977-1978

#### **PREVIOUS EMPLOYMENT EXPERIENCE**

- ❖ *U.S. Fish and Wildlife Service, Department of the Interior* – Researcher and Author, 1985. Drafted report for nationwide study on legal methods for protecting instream water resources.
- ❖ *National Wildlife Federation, Water Resources Program* – Legal Intern, 1984. Coordinated and drafted briefs on a variety of advocacy cases.
- ❖ *Hill & Robbins* – Law Clerk, 1983-1984. Drafted applications for Colorado water rights and decrees, analyzed water and antitrust law issues.
- ❖ *Environmental Defense Fund* – Legal Intern, 1983-1984. Prepared briefs and memoranda, filed comments on proposed EPA Clean Air Act regulations and reviewed scientific data.
- ❖ *Detroit Edison, Fermi Nuclear Power Plant* – Environmental Scientist, 1981-1982. Directed ecological inventory of surrounding area to lay foundation for an environmental education center and wildlife program.
- ❖ *University of Michigan* – Campus Broadcasting Network (WCBN-FM) – Radio Programmer, 1979-1982. Hosted a talk show on environmental issues, as well as a music and information program. Served on Board of Directors.
- ❖ *U.S. Environmental Protection Agency* – Intern, 1979-1980. Compiled scientific data from National Cancer Institute carcinogenicity studies. Assisted staff in drafting reports.

## **RECENT PUBLICATIONS AND SPEECHES** (Full list available upon request)

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### **Selected Publications**

- ❖ *Renewable Energy Standards: Building Blocks for our Nation's Future (2013)*
- ❖ *Siting Wind Energy Facilities on Private Land in Colorado: A Survey of Common Legal Issues (2010)*
- ❖ *Mile High Maglev: Development Trends in Colorado (2008)*
- ❖ *Application of Clean Water Act to Inactive Mine Sites (2005)*

### **Selected Speech Topics**

- ❖ October 2015 – *Solar Industry at a Crossroads*
- ❖ March 2014 – *Exploration & Production Wastes: "Cutting Edge" Legal/ Policy Issues* – SWANA Oil and Gas
- ❖ April 2013 - *"Navigable Waters" in a Nutshell* for COGA
- ❖ April 2013 – *"Developing Programs for Oilfield Safety at Multi-Party Sites: Avoiding the Legal Traps"*, D-J Basin & Niobrara Conference
- ❖ June 2012 – *Recycling Makes Dollars and Sense* at the 2012 Colorado Association for Recycling Summit



- ❖ March 2012 – *State Policies on Recycling and Waste Minimization: What’s the Best Landing Point?*, Rocky Mountain Land Use Institute Panel on Recycling/Land Use
- ❖ June 2010 – Presentations on *Wind Energy, Waste-to-Energy Facilities* at Colorado Renewable Energy Society’s Annual Conference
- ❖ May 2010 – *Finding the Right Fuel Mix: The Clean Air-Clean Jobs Act and Other Developments* (with then-Mayor Hickenlooper and other panelists)
- ❖ June 2009 – *The Road to Colorado’s Future: The Mass Transition to Alternative Transportation Technologies*
- ❖ May 2009 – *Climate Change Policy in Colorado*
- ❖ July 2008 – *The Challenges: Environmental Issues in Renewable Energy*
- ❖ April 2008 – *The Vision: Colorado at the Forefront of the Renewable Energy Industry*

## REFERENCES

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Personal letters of recommendation from various federal and state leaders, including Former Governor Ritter, Former Interior Secretary Ken Salazar, and Senators Udall and Bennet, available on request.

## Appendix A (Continued)

### Roger Freeman Representative Experience Climate Change/Renewable/Cleantech Sectors

#### Cleantech & Climate Law

- Renewable & Alternative Energy
  - Solar/Distributed Energy
    - Extensive advocacy/PUC/governmental relations work for COSEIA and its members (Board member).
    - Assistance in developing and negotiation PPA for distributed solar projects nationwide for Fortune 100 manufacturing company.
    - Led major briefing session for leading renewables company in Colorado on distributed energy/storage issues; continuing interactions with same.
    - Advised a solar energy company on significant solar and other renewable energy legislation passed in Colorado in recent years and the opportunities those laws created.
    - Assistance in tracking PUC proceedings and e-dockets on issues of interest to solar companies, including net metering and other current 2014 proceedings.
    - Assist municipalities and other entities involved in advancing opportunities to enhance solar in negotiations surrounding franchise agreements.

- Work with Cleantech industry representatives (including numerous solar companies), in various legislative initiatives designed to advance solar interests, including those involving the Colorado Renewable Energy Standard.
- Wind
  - Advised a wind power company on significant wind and other renewable energy legislation and the opportunities that those laws created for expansion.
  - Assistance on permitting and related advice on major transportation corridor project designed to advance wind projects in New Mexico.
  - Assist and represent emerging wind technology company in identifying project development opportunities and making connections to wind turbine manufacturers. Related tracking of legislation and other key developments.
  - Assisted wind turbine servicing and maintenance company in tracking key legislation and other developments and in making connections to project developers and other wind personnel.
  - Coordination with wind developer in Wyoming regarding potential permitting/public policy issues.
  - Assist renewable energy credit banking company in conceptualizing the development of a wind energy-based mitigation bank in Wyoming.
- Hydro
  - Assist landowner in vicinity of potential hydro project in fleshing out key project components and the possible impacts.
  - Assist in development in review of policies encouraging small hydro and work on advancing/analyzing related legislation.
- Waste to Energy
  - Advised a waste-to-energy company on significant Colorado legislative initiatives and the opportunities that those laws created.
  - Ongoing assistance on regulatory/policy issues involving waste tire-to-energy facility in Colorado.
  - Assistance in stakeholder and regulatory process surrounding application of waste-to-energy facilities to improve future recycling/waste minimization in Colorado.
  - Extensive speaking and interaction with policy making on waste-to-energy initiatives and means of continuing to advance same.
- Miscellaneous
  - Work with a broad consortium of CCIA representatives in advancing various Colorado legislation surrounding such topics as fueling stations for electric vehicles, and Combined Heat and Power (CHP).
- Green Building/Development
  - Brownfields
    - Extensive site development, teaching, speaking, and national Brownfields work

- Energy Efficiency
  - Assisted several hundred employee law firm in developing energy efficiency and conservation program, including implementation and development of policies and communications with employees.
  - Assisted state agency in development of energy efficiency policies and related initiatives.
- Transportation
  - Extensive work on state legislation for electric/natural gas vehicles
  - Representation of Mag-Lev developer; presentation on public transportation
  - Extensive Brownfields work on infrastructure/transportation development; creation of DU Law School course involving same
  - Working with SWEEP and other constituents on awareness of need for public transportation, electrification of system, and minimization of highway funding towards public transportation options.
- Climate Change
  - Policy Analysis
    - Assisted various entities (including governmental agencies, NGOs, and corporations) in analyzing policy impacts of climate change in areas such as public disclosures, insurance trends, and local and state policy trends.
  - New Technology
    - Advised clients on development of various technology improvements to meet climate change, ranging from use of renewables in oil and gas fields to development of advanced wind technology, improved water treatment, energy efficiency, and other technological advancements.
    - Assisted start-up company in assessing climate change trends and potential impacts on availability of funding and other start-up needs.
  - Government Relations
    - Utilize extensive governmental contacts to assist companies in advancing climate change-related agenda.
    - Served on various committees and panels designed to assist state government in planning for and developing climate change modifications, including Colorado's Governor's Energy Office.
    - Numerous direct interactions with Governor John Hickenlooper and staff regarding climate change policies, utilization of climate change coordinator, and other governmental policies involving climate change.
    - Development and assistance of legislators in advancing legislation mandating state climate change monitoring and reporting.
    - Provide frequent testimony before State Legislature on climate issues.
- Cleantech
  - Startup/Entrepreneurial Advice
    - Assistance in accessing DOE loan guarantees and other federal funding.

- Assistance in networking with potential wind developers for wind turbine technology and wind maintenance companies.
- B Corps
  - Extensive leadership in development of B Corp legislation, including testimony and drafting of key provisions and assisting in the negotiation of a compromise which led to final B Corps legislation in Colorado.
  - Ongoing counseling and input to companies regarding advantages of B Corp and related components.
  - Work with American Sustainable Business Institute on initiatives toward corporate accountability and sustainability.
- Carbon Trading and Credits
  - Assistance with start-up company on carbon credit trading and related development of carbon bank through Brazilian tree-farming company.
  - Advise on company structuring and carbon bank feasibility studies.
- Sustainability
  - Corporate Sustainability Policies
    - Assistance in development of law firm sustainability policy and implementing same.
    - Involvement in national law firm consortium on sustainability policies and means of enforcing and measuring same.
    - Assist in developing benchmarks for sustainability/social impact assessments.
  - Corporate Social Responsibility Policies
    - Work on “measuring stick” criteria for establishing B Corps credibility and annual audit criteria.
    - Assist client in review of overall corporate responsibility policy, and attractiveness of B Corp status
- Reuse and Recycling

As a former member of the Colorado Solid and Hazardous Waste Commission, led a variety of entities in advancing recycling, reuse, and waste reduction initiatives, including helping to assess market opportunities, overcome regulatory barriers, and navigate various recycling/solid waste laws governing these activities. Regularly assist emerging technology companies – from waste tire to energy to more traditional recycling and waste management companies – in developing regulatory strategies and related government relations matters. The advancement of recycling, reuse, and waste reduction programs is a critical component of my sustainability practice, and I assist companies at all stages of start-up to try to achieve market stability.

  - Recycling
    - Assisting several companies currently on recycling initiatives.
    - Assist medical waste handling and recycling company in developing waste reduction technologies and siting facility in Aurora, Colorado.
    - Assist in local government relations, project development, market assessment, and related strategic issues.

- Extensive policy work with Colorado Association for Recycling on means of advancing recycling opportunities, waste-to-energy programs, developing recycling studies and supporting legislation and other policy initiatives.
- Development of award winning video that won the EPA's National Video Award for Recycling featuring Kelsey Freeman (Roger Freeman's daughter) which can be viewed at <http://www.youtube.com/watch?v=2tGg2reKz-Y>
- Formation and chairing of special committee on recycling at Colorado Solid and Hazardous Waste Commission.
- Hazardous and Solid Waste Recycling
  - Assistance in assessing regulatory barriers to hazardous and solid waste recycling under RCRA and counterpart state laws.
  - Assessment of potential liabilities associated with waste recycling steps.
  - Stewardship/reuse - Development of award winning video that won the EPA's National Video Award for Recycling featuring Kelsey Freeman (Roger Freeman's daughter) which can be viewed at <http://www.youtube.com/watch?v=2tGg2reKz-Y>
- Product Stewardship/Reuse
  - Assist in Colorado paint reuse legislation passed in 2014.
- Waste Tires
  - Assistance in assessing regulatory structure for relocation of waste tires for beneficial use.
  - Extensive involvement in developing overall Colorado waste tire regulatory structure and implementation thereof.
  - Assist companies in analyzing current regulatory structure under recent Colorado legislation.
  - Counsel waste-to-energy companies in development of appropriate permitting and local regulatory plan and interactions with regulatory agencies.
  - Development of regulatory strategy for addressing new Colorado regulations and advancing market opportunities.
- Water Treatment and Handling
  - Assist water treatment technology company in developing market opportunities and networking with key strategic partners.
- Grease
  - Extensive involvement in development of grease regulations in the state of Colorado and implementation thereof.
  - Assist local grease company in assessing regulatory structure and various related competitive issues raised by regulatory structure.
  - Counseling on legislation involving grease rules.
  - Interaction with food industry generally on grease rule applications and opportunities for conversion to biofuel.