
Sierra Club
Exhibit SC____(EDH-1)
Docket No. 18-035-36
Witness: Ezra D. Hausman, Ph.D.

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH**

IN THE MATTER OF THE APPLICATION
OF ROCKY MOUNTAIN POWER FOR
AUTHORITY TO CHANGE ITS
DEPRECIATION RATES EFFECTIVE
JANUARY 1, 2021

Docket No. 18-035-36

Direct Testimony of Ezra D. Hausman

**On Behalf of
Sierra Club**

March 30, 2020

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1 **I. PROFESSIONAL QUALIFICATIONS**

2 **Q. Please state your name, occupation, and business address.**

3 A. My name is Ezra D. Hausman, Ph.D. I am an independent consultant doing business as
4 Ezra Hausman Consulting, operating from offices at 77 Kaposia Street, Auburndale,
5 Massachusetts 02466.

6 **Q. What is your educational and professional background?**

7 A. I hold a BA from Wesleyan University, an MS in Environmental Engineering from Tufts
8 University, an SM in Applied Physics from Harvard University, and a PhD in
9 Atmospheric Chemistry from Harvard University. I have analyzed both regulated and
10 restructured electricity markets and other electric utility matters for over 20 years. I have
11 provided a detailed resume as Exhibit EDH-2.

12 Since early 2014 I have been an independent analyst and expert in energy market issues.
13 From 2005 until early 2014, I was employed at Synapse Energy Economics, Inc., a
14 research and consulting company located in Cambridge, Massachusetts, where I served as
15 Senior Associate, Vice President, and Chief Operating Officer. In these positions I have
16 provided analytical and expert services in energy economics, planning, and energy
17 market regulation. My specific areas of focus include: state and regional energy, capacity,
18 and transmission planning, including both utility resource planning and long-term (multi-
19 decadal) climate-constrained resource planning; regulatory and ratemaking proceedings;
20 electricity and generating capacity market design and analysis; electric system dispatch
21 modeling; economic analysis of environmental and other regulations, including

22 greenhouse gas regulation, in electricity markets; economic analysis, price forecasting,
23 and asset valuation in electricity markets; quantification of the economic and
24 environmental benefits of displaced emissions; treatment of energy efficiency and
25 renewable energy in electricity and capacity markets; and regulation and mitigation of
26 greenhouse gas emissions from the supply and demand sides of the U.S. electricity sector.

27 I have provided testimony before public utility commissions or legislative committees in
28 Arizona, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland,
29 Massachusetts, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, Nevada,
30 North Carolina, South Carolina, South Dakota, Vermont, Virginia, and Washington State,
31 as well as at the Federal level. I have provided expert representation for stakeholders at
32 the PJM ISO, the California ISO, the Midcontinent ISO, and at the Federal Energy
33 Regulatory Commission (“FERC”). While most of my testimony and analytical work has
34 centered on issues in electricity market economics, I have also brought my expertise as a
35 scientist to bear on cases involving greenhouse gas regulation and mitigation in the
36 electric sector.

37 Before joining Synapse, I was employed from 1998 through 2004 as a Senior Associate
38 at Tabors Caramanis and Associates (“TCA”) of Cambridge, Massachusetts. In 2004,
39 TCA was acquired by Charles River Associates (“CRA”), where I remained until I joined
40 Synapse in 2005. At TCA/CRA, I performed a wide range of electricity market and
41 economic analyses and price forecast modeling studies. These included asset valuation
42 studies, market transition cost/benefit studies, market power analyses, and litigation
43 support. I have extensive experience with market simulation, production cost modeling,

44 and resource planning methodologies and software.

45 **Q. Have you testified previously before the Utah Public Service Commission?**

46 A. No.

47 **Q. Are you providing exhibits with your testimony?**

48 A. Yes. I am sponsoring Exhibit EDH-2, which contains my resume.

49 **II. PURPOSE OF TESTIMONY AND RECOMMENDATIONS TO THE COMMISSION**

50 **Q. What is the purpose of your testimony in this proceeding?**

51 A. The purpose of my testimony is to address the depreciable lives proposed in the
52 stipulation signed by several of the parties to this proceeding.¹ I show that the proposed
53 lifetimes are unreasonable given recent developments associated with and affecting the
54 coal-fired units owned by RMP's parent company, PacifiCorp. Specifically, I show that:

- 55 1. The depreciable lives proposed in the application² and depreciation study
56 for four of PacifiCorp's coal-fired generating units are unrealistic and
57 unreasonable;
- 58 2. These depreciable lives are in direct conflict with PacifiCorp's 2019
59 Integrated Resource Plan ("IRP") and action plan; and
- 60 3. Therefore RMP risks imposing a significant intergenerational inequity on
61 its ratepayers without showing appropriate countervailing benefit.

62

¹ See Stipulation on Depreciation Rate Changes, Docket No. 18-035-36 (Mar. 19, 2020) (hereinafter "proposed stipulation").

² See Application of Rocky Mountain Power for Authority to Change its Depreciation Rates, Docket No. 18-035-06 (Sept. 11, 2018).

63 **Q. Why is the question of depreciable lifetime important in this case?**

64 A. Depreciable lifetime is one of the most fundamental inputs into a depreciation analysis,
65 along with the quantification of net book value for a utility's assets and has an important
66 impact on ratemaking. The depreciable life establishes the time over which an asset's
67 book value will be recovered from ratepayers, such that the facilities will be fully
68 depreciated at the time they are retired. This follows from the general principle of
69 "intergenerational equity;" the idea that each generation of ratepayers should pay
70 equitably for the resources that are used to provide them with energy and energy-related
71 services, and that these costs should not be imposed on other generations of ratepayers
72 who receive no such benefit.

73 If a utility does not fully depreciate an asset by the time that asset is removed from
74 service, the net book value becomes a "stranded asset." Asking ratepayers to continue to
75 fund such a stranded asset would violate another basic principle of ratemaking, that
76 ratepayers should only pay for resources that are "used and useful" at the time they are
77 included in rate base. Maintaining an extended depreciation schedule for an asset that is
78 scheduled to be taken out of service at an earlier date also puts the utility's recovery of its
79 remaining net book value at risk.

80 **Q. What are your conclusions and your recommendations for this Commission?**

81 A. I conclude that the proposed stipulation in this matter should be rejected, because it is
82 predicated, in part, on unrealistic and unreasonable assumptions for the depreciable lives
83 of four of PacifiCorp's coal-fired units. These assumptions are in direct contradiction
84 with PacifiCorp's own 2019 IRP and action plan. Given this, I recommend that the

85 parties be directed to withdraw the proposed stipulation, with instructions that the
86 Commission will only accept a stipulation that reasonably and accurately matches the
87 depreciable lives PacifiCorp’s coal-fired resources with their expected operating lives,
88 and that is consistent with the 2019 PacifiCorp IRP.

89 The Commission should not be asked to accept, or use for ratemaking and planning
90 purposes, depreciable lives that are based on fundamental assumptions that are knowingly
91 and demonstrably false; nor should it be asked to blithely accept depreciable lives that are
92 in direct conflict with a contemporaneous IRP filed by the same utility.

93 **III. DEPRECIABLE LIVES OF PACIFICORP’S COAL-FIRED GENERATION UNITS**

94 **Q. Which considerations did PacifiCorp take into account in establishing or updating**
95 **the depreciable lives of its generation resources?**

96 A. As described by PacifiCorp witness Chad A. Teply in the Company’s application, the
97 Company considers “capital expenditures, impacts to ongoing operating and maintenance
98 expenses, and the potential for accelerated timelines for resource planning decisions.”³

99 **Q. Why might the Company “accelerate” depreciation timelines?**

100 A. In general, these decisions pertain to economic and policy drivers that affect the long-
101 term viability of specific resources. In the case of PacifiCorp’s coal-fired generating units,
102 there are several economic and policy drivers that lead to expectation of earlier retirement
103 than had been anticipated in prior depreciation schedules, meaning that PacifiCorp’s

³ Direct Testimony of Chad Teply on Behalf of PacifiCorp at 3:68-4:70 (“Teply Direct”).

104 depreciation timelines should be accelerated to reflect these shorter useful lives.

105 **Q. Does PacifiCorp acknowledge that economic and regulatory factors are leading to**
106 **accelerated retirement timelines for its coal-fired resources?**

107 A. Yes. These factors are discussed in detail in PacifiCorp’s 2019 IRP. The economic
108 benefits of accelerating the retirement of its coal-fired units are evaluated in depth in
109 Appendix R in Volume II. Through a series of model simulations, PacifiCorp reached the
110 following conclusion:

111 Each of the coal study phases show that early retirement of certain coal
112 units has potential to reduce overall system costs. In particular, **the coal**
113 **studies showed that the greatest customer benefits were most likely to**
114 **be realized with potential early retirement of coal units at the**
115 **Naughton and Jim Bridger coal plants located in Wyoming.**⁴

116 **Q. Has PacifiCorp acknowledged the impact of these economic drivers, and the result**
117 **of its IRP and coal study, in its depreciation study and in the application?**

118 A. In part, yes. As described in Mr. Teply’s testimony, PacifiCorp’s application reflects
119 acceleration of the depreciable lives of several coal-fired units. Mr. Teply summarized
120 these proposed changes in Exhibit RMP__(CAT-1), wherein he presents “Current” and
121 “Recommended” depreciation end-years for each coal and gas unit, along with other
122 information, and a calculation of the proposed acceleration where applicable. Specifically,
123 Mr. Teply proposed accelerating the anticipated retirement dates for Cholla Unit 4,
124 Colstrip Units 3 and 4, Craig Units 1 and 2, and Jim Bridger Units 1 and 2.

125 However, this still leaves a significant discrepancy between PacifiCorp’s assumptions

⁴ PacifiCorp, 2019 Integrated Resource Plan, Volume II, Appendix R at 591 (Oct. 18, 2019) (emphasis added), available at <https://www.pacificorp.com/energy/integrated-resource-plan.html> (“PacifiCorp 2019 IRP”).

126 underlying its depreciation study vs. its planned retirement dates as established in the
 127 “preferred portfolio” of its IRP.

128 **Q. What are the specific discrepancies between the 2019 IRP retirement dates and the**
 129 **dates assumed in the application’s depreciation study and proposed stipulation in**
 130 **this matter?**

131 A. The IRP’s preferred portfolio includes retirement of Naughton Units 1 and 2 by 2025,
 132 whereas the application assumed a retirement date of 2029; similarly, the IRP assumed
 133 retirement of Jim Bridger Unit 1 by 2023 and Jim Bridger Unit 2 by 2028, whereas the
 134 application assumed retirement years of 2028 and 2032, respectively. These differences
 135 are summarized in Table 1.

136 *Table 1. Current and PacifiCorp-proposed depreciable end of lives, and retirement dates from*
 137 *PacifiCorp’s 2019 IRP.*

Unit(s)	Current Depreciation Year	Proposed Depreciation Year	2019 IRP Retirement Year*
Naughton - 1&2	2029	2029	2025
Jim Bridger - 1	2037	2028	2023
Jim Bridger - 2	2037	2032	2028

138 **Based on the IRP “Preferred Portfolio”.*

139 **Q. What is the basis of the “Proposed” depreciation year shown in Table 1?**

140 A. According to the proposed stipulation, “the proposed depreciation rates . . . will be
 141 consistent with those in the Application.” Indeed, these same dates are “recommended” in
 142 the testimony of PacifiCorp witness Chad A. Teply, in RMP Exhibit CAT-1. Mr. Teply

143 provided no explanation for why he recommended dates so directly at odds with
144 PacifiCorp's 2019 IRP.

145 **Q. Does the inclusion of a retirement date in PacifiCorp's IRP preferred portfolio**
146 **represent a commitment to retire the indicated unit on that date?**

147 A. Inclusion in the IRP's preferred portfolio does not represent a commitment, but it is a
148 strong statement about the utility's expectations. The preferred portfolio represents an
149 assessment of the best set of resources to serve customers given expected future
150 conditions, including expectations for load growth, resource costs, fuel and emissions
151 costs, the regulatory environment, and other factors. As PacifiCorp explains:⁵

152 The primary objective of the IRP is to identify the best mix of resources to
153 serve customers in the future. The best mix of resources is identified
154 through analysis that measures cost and risk. The least-cost, least-risk
155 resource portfolio—defined as the “preferred portfolio”—is the portfolio
156 that can be delivered through specific action items at a reasonable cost and
157 with manageable risks, while considering customer demand for clean
158 energy and ensuring compliance with state and federal regulatory
159 obligations.

160 The above reasoning should apply equally to PacifiCorp's depreciation study—that it, like
161 the IRP, is based on the expectation for the lifetimes of generating units and other
162 resources, grounded in the best information available at the time the study is produced.
163 For this reason, it makes no sense that the two virtually contemporaneous filings would
164 contain such different conclusions regarding the expected or optimal retirement date of
165 certain units, with no explanation at all for the difference.

⁵ PacifiCorp 2019 IRP, Volume 1 at 5.

166 **Q. Please describe the relevance of the action plan in PacifiCorp’s 2019 IRP.**

167 A. The 2019 IRP action plan identifies specific expenditures PacifiCorp will make, and
168 resource actions it will take, over the next two to four years to carry out priorities in the
169 preferred portfolio. As described in the IRP:⁶

170 PacifiCorp’s 2019 IRP action plan **identifies the steps the company will**
171 **take** over the next two-to-four years to deliver its preferred portfolio, with
172 a focus on the front ten years of the planning horizon . . . **The 2019 IRP**
173 **action plan is based on the latest and most accurate information**
174 **available** at the time portfolios are being developed and analyzed on cost
175 and risk metrics.

176 In general, an IRP action plan is a firm statement of the actions the Company expects to
177 take in the near future. The time horizon, four years in PacifiCorp’s case, is considered
178 critical because it requires immediate investment or commitments to implement near-
179 term resource modifications, closures, and/or construction.

180 **Q. Does PacifiCorp’s 2019 IRP action plan include the retirements listed in Table 1?**

181 A. Yes. The action plan includes the retirements at Naughton and Jim Bridger Unit 1, as
182 shown in Table 1. (While the anticipated date for retirement of Naughton 1 & 2 falls just
183 outside of the action plan time horizon, PacifiCorp’s 2019 IRP action plan identifies a
184 comprehensive list of actions at those units between now and 2023, including the
185 administration of “termination, amendment, or close-out of existing permits, contracts,
186 and other agreements.”⁷) The retirement of Jim Bridger Unit 2 in 2028, is just beyond the
187 time horizon in the action plan.

⁶ PacifiCorp 2019 IRP, Volume 1 at 273 (emphasis added).

⁷ PacifiCorp 2019 IRP, Volume 1 at 23, 276.

188 **Q. Above, you testified that PacifiCorp’s proposed depreciable lives in its application**
189 **for certain units were unrealistic and unreasonable, in addition to being inconsistent**
190 **with the Company’s 2019 IRP. Please explain.**

191 A. My conclusion that these assumptions are unrealistic and unreasonable derives from the
192 company’s recently completed Multi-State Protocols, which the company has filed with
193 various state commissions, including with the Utah Public Service Commission on
194 December 3, 2019.⁸ PacifiCorp anticipates that at least two of the states it serves (Oregon
195 and Washington) will “exit” these coal plants on a time scale similar to the retirement
196 dates in the IRP. In other words, PacifiCorp will no longer be permitted to allocate any
197 costs or benefits from these units to those two states; and, unless other states are willing
198 to take on the additional cost and risk, PacifiCorp will likely end up retiring at least some
199 of those units, especially given its own analysis showing that they are uneconomic to run
200 beyond the retirement dates shown in **Table 1**.

201 More significantly, the depreciation study’s later end-of-life dates are unrealistic and
202 unreasonable because PacifiCorp’s own analysis, as thoroughly documented in its 2019
203 IRP, unambiguously concludes that ratepayer interests will be best served by retiring
204 these units, as projected under the IRP’s Preferred Portfolio and as anticipated under its
205 action plan. In my opinion, it is unreasonable for the Company to ask this Commission to
206 simply ignore the findings of the IRP in considering depreciable lives, and to impose the
207 likelihood of stranded assets on PacifiCorp’s future ratepayers in Utah.

⁸ *Application of Rocky Mountain Power for Approval of the 2020 Inter-Jurisdictional Cost Allocation Agreement*
Docket No. 19-035-42 (Utah Pub. Serv. Comm’n Dec. 3, 2019).

208 **Q. Has any other witness in this proceeding addressed the issues you raise regarding**
209 **the reasonableness of the proposed depreciation end-of-life dates?**

210 A. Yes. Western Resource Advocates (WRA) witness Nancy Kelly discusses this issue in
211 detail. Based on PacifiCorp's IRP modeling, Ms. Kelly shows that the shorter operating
212 lives projected in the IRP preferred portfolio provide a present value benefit of
213 approximately \$471 million over 20 years compared with the longer depreciable lives
214 proposed in the application. Ms. Kelly also discusses numerous regulatory and economic
215 factors that show the earlier retirement dates in the IRP to be far more realistic than the
216 longer lives assumed by the Company in this proceeding.

217 **Q. Does Company witness Nikki L. Koblaha address the discrepancy between the end-**
218 **of-life assumptions in the 2019 IRP and the application in her testimony in support**
219 **of the proposed stipulation?**

220 A. No.

221 **Q. Does the proposed stipulation attempt to resolve this discrepancy?**

222 A. No. Paragraph 21 of the proposed stipulation simply acknowledges the discrepancy with:
223 "The Stipulating Parties agree to meet according to a timeline generally consistent with
224 the timelines to be established in the Company's general rate case, Docket No. 20-035-04,
225 to discuss strategies that may be implemented to address rate impacts associated with
226 potential earlier retirements at coal plants stemming from the 2019 IRP." Similarly,
227 Paragraph 22 says, "[t]he Stipulating Parties agree to meet within twelve months of the
228 date of the order approving this Stipulation on Depreciation Rate Changes to discuss
229 strategies that may be implemented over the longer term to address rate impacts

230 associated with potential earlier retirements of coal resources whose current depreciable
231 lives extend 10 or more years into the future.”

232 Finally, Paragraph 26 states that “[i]n agreeing to this Stipulation, the Stipulating Parties
233 are not implying any agreement or expectation about the operational lives of coal
234 resources.”

235 However, these paragraphs are simply an acknowledgement that the parties all recognize
236 the glaring discrepancy between the expected lives of the Company’s coal plants and the
237 end-of-life assumptions they are asking this Commission to accept for depreciation
238 purposes. The Commission should not accept a false premise today on the promise that
239 the parties will reconvene at some unspecified time to “discuss strategies that may be
240 implemented to address rate impacts” stemming from the knowing and intentional use of
241 false assumptions today. Open-ended aspirations do not substitute for consistent
242 planning; nor do they serve customer interests.

243 **Q. What are the potential outcomes should PacifiCorp rely on unrealistically long**
244 **depreciable lifetimes for specific assets, when it expects and intends to retire them at**
245 **an earlier date?**

246 A. There are two potential outcomes if PacifiCorp fails to align the depreciation schedules
247 with the expected and intended retirement of plants in the near term. First, in failing to
248 align depreciation and retirement now, PacifiCorp backloads cost and risk to future
249 ratepayers. For example, if ratepayers pay depreciation expense as if Naughton will be
250 retired in 2029, but then in three years PacifiCorp acknowledges the 2025 retirement date

251 and RMP asks for accelerated depreciation accordingly, ratepayers in 2023 will be
252 saddled with more than double the depreciation expense.⁹

253 Second, if the Company does not recover depreciation prior to retirement, it risks facing a
254 “stranded asset,” or undepreciated balance remaining after retirement. At that point either
255 the Commission would be asked to allow the Company to continue charging ratepayers
256 under a “regulatory asset” from which these future ratepayers derive no benefit, or the
257 Company would be asked to take a disallowance (i.e. taking the asset out of rate base.)
258 The Company has not proposed to request regulatory asset treatment of its retiring coal
259 units, nor has it offered to take a voluntary disallowance. Therefore, it must reconcile its
260 depreciation deadlines with the expected retirement fates as articulated in its action plan
261 in the 2019 IRP.

262 Neither the application nor the proposed stipulation describe any policy or economic
263 rationale for why the proposed depreciation schedule would be the better course of action
264 for customers; especially in light of the fact that PacifiCorp has clearly documented and
265 supported its expectation that the units in question will retire earlier.

⁹ Under accelerated depreciation, all remaining costs are recovered over a shorter time period. In this case, the depreciation expected to be recovered from 2026 to 2029 (three years) would have to be recovered in 2023-2025 (three years) in addition to the depreciation expense they already face.

266 **IV. CONCLUSIONS AND RECOMMENDATIONS**

267 **Q. Please state your conclusions and your recommendations for this Commission.**

268 A: My conclusions and recommendations are as follows:

269 • Based on the evidence cited in my testimony, I conclude that the depreciation study
270 submitted by RMP with its filing is fatally flawed. It makes unrealistic and
271 unreasonable assumptions about the future operating lives of several of PacifiCorp's
272 coal-fired units, and these assumptions are in direct conflict with the Company's own
273 2019 IRP and action plan.

274 • I recommend that the Commission reject the proposed stipulation, and instruct the
275 parties that the Commission will only accept a settlement that includes depreciable
276 lives that reflect the current economic and policy realities facing those resources, and
277 that are consistent with the 2019 PacifiCorp IRP.

278 • I recommend that the Commission not accept, or use for ratemaking and planning
279 purposes, a settlement based on a depreciation study knowingly predicated on
280 fundamental assumptions that are demonstrably false; nor should it accept two filings
281 from the same utility at essentially the same time (its IRP and its depreciation study
282 and application) that are in direct conflict with one another.

283 **Q. Does this conclude your testimony?**

284 A: Yes.

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH**

Docket No. 18-035-36

Exhibit SC____(EDH-2)

Ezra Hausman Curriculum Vitae

EZRA HAUSMAN CONSULTING

Ezra D. Hausman, Ph.D.
Curriculum Vitae

I am an independent consultant in energy and environmental economics.

I have worked for over twenty years as an electricity market expert with a focus on market design and market restructuring, environmental regulation in electricity markets, and pricing of energy, capacity, transmission, losses and other electricity-related services. I have performed market analysis, provided expert testimony, led workshops and working groups, made presentations and participated on panels, and provided other support to clients in a number of areas in both regulated and restructured electricity markets. My clients include federal and state agencies; offices of consumer advocate; legislative bodies; cities and towns; non-governmental organizations; foundations; industry associations; and resource developers.

I previously served as Vice President and Chief Operating Officer of Synapse Energy Economics, Inc. of Cambridge, Massachusetts. In addition to my consulting portfolio, this management role entailed responsibility for day-to-day operations of the company including overseeing finance, HR, communications & marketing, quality assurance, client service, and professional development of staff. I had overall responsibility for ensuring that project managers and project teams had the tools, information, and training they needed to successfully serve clients' needs and to produce high-quality deliverables on time and on budget. I was also a resource available to any of our clients to address any issues of customer service, quality, or any other issues.

I hold a Ph.D. in atmospheric science from Harvard University, an S.M. in applied physics from Harvard University, an M.S. in water resource engineering from Tufts University, and a B.A. in psychology from Wesleyan University.

PROFESSIONAL EXPERIENCE

Ezra Hausman Consulting, Newton, MA. President, March 2014 – Present.

I provide research, analysis, expert testimony, and policy support services in regulatory, litigation, and stakeholder processes covering a wide range of electric sector and electricity market issues. The focus of my consulting work includes:

- Ratemaking and regulatory proceedings
- Wholesale market design and analysis for electricity, generating capacity, and related services
- Demand-side management program design and cost/benefit analysis
- Interaction of air quality and environmental regulations with electricity markets
- Analysis and implementation of the Clean Power Plan and other greenhouse gas rules
- Clean Air Act enforcement support

- Long-term electric power system planning
- Energy efficiency and renewable energy programs and policies
- Consumer and environmental protection
- Market power and market concentration analysis in electricity markets.

Synapse Energy Economics Inc., Cambridge, MA.

Chief Operating Officer, March 2011 – February 2014;

Vice President, July 2009 – February 2014;

Senior Associate, 2005-2009.

- Conducted research, wrote reports, and presented expert testimony pertaining to consumer, environmental, and public policy implications of electricity industry regulation. Provided expert support and representation in planning, greenhouse gas mitigation, and other stakeholder processes.
- As Vice President and Chief Operating Officer, I was also responsible for day-to-day operations of the company, quality assurance, client service, and professional development of staff.

Charles River Associates (CRA), Cambridge, MA. Senior Associate, 2004-2005

CRA acquired Tabors Caramanis & Associates in October, 2004.

Tabors Caramanis & Associates, Cambridge, MA. Senior Associate, 1998-2004

As a member of the modeling group, developed and maintained dispatch modeling capability in support of electricity market consulting practice.

Performed modeling and analysis of electricity markets, generation and transmission systems.

Projects included:

- Several market transition cost-benefit studies for development of Locational Marginal Price (LMP) based markets in US electricity markets
- Long-term market forecasting studies for valuation of generation and transmission assets,
- Valuation of financial instruments relating to transmission system congestion and losses
- Modeling and analysis of hydrologically and electrically interconnected hydropower system operations
- Natural gas market analysis and price forecasting studies
- Co-developed an innovative approach to hedging financial risk associated with transmission system losses of electricity
- Designed, developed and ran training seminars using a computer-based electricity market simulation game, to help familiarize market participants and students in the operation of LMP-based electricity markets.
- Developed and implemented analytical tools for assessment of market concentration in interconnected electricity markets, based on the “delivered price test” for assessing market accessibility in such a network
- Performed regional market power and market power mitigation studies

- Performed transmission feasibility studies for proposed new generation and transmission projects in various locations in the US
- Provided analytical support for expert testimony in a variety of regulatory and litigation proceedings, including breach of contract, bankruptcy, and antitrust cases, among others.

Global Risk Prediction Network, Inc., Greenland, NH. Vice President, 1997-1998

Developed private sector applications of climate forecast science in partnership with researchers at Columbia University. Specific projects included a statistical assessment of grain yield predictability in several crop regions around the world based on global climate indicators (Principal Investigator); a statistical assessment of road salt demand predictability in the United States based on global climate indicators (Principal Investigator); a preliminary design of a climate and climate forecast information website tailored to the interests of the business community; and the development of client base.

Hub Data, Inc., Cambridge, MA. Financial Software Consultant, 1986-1987, 1993-1997

Responsible for design, implementation and support of analytic and communications modules for bond portfolio management software; and developed software tools such as dynamic data compression technique to facilitate product delivery, Windows interface for securities data products.

Abt Associates, Inc., Cambridge, MA. Environmental Policy Analyst, 1990-1991

Quantitative risk analysis to support federal environmental policy-making. Specific areas of research included risk assessment for federal regulations concerning sewage sludge disposal and pesticide use; statistical alternatives to Most-Exposed-Individual risk assessment paradigm; and research on non-point sources of water pollution.

Massachusetts Water Resources Authority, Charlestown, MA. Analyst, 1988-1990

Applied and evaluated demand forecasting techniques for the Eastern Massachusetts service area. Assessed applicability of various techniques to the system and to regional planning needs; and assessed yield/reliability relationship for the eastern Massachusetts water supply system, based on Monte-Carlo analysis of historical hydrology.

Somerville High School, Somerville, MA. Math Teacher, 1986-1987

Courses included trigonometry, computer programming, and basic math.

EDUCATION

Ph.D., Earth and Planetary Sciences. Harvard University, Cambridge, MA, 1997

S.M., Applied Physics. Harvard University, Cambridge, MA, 1993

M.S., Civil Engineering. Tufts University, Medford, MA, 1990

B.A., Wesleyan University, Psychology. Middletown, CT, 1985

FELLOWSHIPS, AWARDS AND AFFILIATIONS

UCAR Visiting Scientist Postdoctoral Fellowship, 1997

Postdoctoral Research Fellowship, Harvard University, 1997

Certificate of Distinction in Teaching, Harvard University, 1997

Graduate Research Fellowship, Harvard University, 1991-1997

Invited Participant, UCAR Global Change Institute, 1993

House Tutor, Leverett House, Harvard University, 1991-1993

Graduate Research Fellowship, Massachusetts Water Resources Authority, 1989-1990

Teaching Fellowships:

Harvard University: *Principles of Measurement and Modeling in Atmospheric Chemistry; Hydrology; Introduction to Environmental Science and Public Policy; The Atmosphere.*

Wesleyan University: *Introduction to Computer Programming; Psychological Statistics; Playwriting and Production.*

Community Service

Vice President of Finance, Congregation Dorshei Tzedek, 2018 - Ongoing
Academic Mentor and Athletic Coach, SquashBusters Boston, 2014 - Ongoing
Judge, Cleantech Open innovation competitions, 2015-2016
President, Burr Elementary School Parent Teacher Organization, 2005-2007

EXPERT TESTIMONY AND SERVICES

New Jersey Board of Public Utilities – 2020-Ongoing

Expert participation in stakeholder process regarding conversion to high-efficiency street lights on behalf of Rate Counsel.

New Jersey Board of Public Utilities – 2019-Ongoing

Expert participation in stakeholder process regarding transportation electrification policies on behalf of Rate Counsel.

Washington Utilities and Transportation Commission – 2020-Ongoing

Expert witness on behalf of the Sierra Club regarding potential sale of ownership in Colstrip generating unit.

Utah Public Service Commission (Docket No. 18-035-36) – 2020-Ongoing

Expert witness on behalf of the Sierra Club in Rocky Mountain Power depreciation case.

PacifiCorp Multi-State Protocols Stakeholder Process – 2019-Ongoing

Participation on behalf of Sierra Club in stakeholder process to establish protocols for allocation of resource costs and benefits among PacifiCorp states.

Advisory Consulting for Natural Resources Defense Council – 2019-2020

Provide advisory and technical support to analysis team.

Memphis Light, Gas and Water – Power Supply Alternatives Study (2019-Ongoing)

Expert support for Sierra Club participation in Power Supply Advisory Team.

Washington Utilities and Transportation Commission (Dockets UE-190334 and UG-190335) – 2019

Expert witness on behalf of the Sierra Club in Avista Energy rate case.

New Jersey Division of Rate Counsel – 2016-Ongoing

General policy and stakeholder support on matters related to energy efficiency, renewable energy, and electrification of transportation in New Jersey.

New Jersey Board of Public Utilities – 2014-Ongoing

Expert witness on behalf of the New Jersey Division of Rate Counsel, reviewing and providing testimony on cost effectiveness and program design of various New Jersey gas and electric utility energy efficiency programs.

Public Service Commission of South Carolina (Docket No. 2018-319-E) – 2019

Expert witness on behalf of the Sierra Club in Duke Energy Carolinas rate case.

Public Service Commission of South Carolina (Docket No. 2018-318-E) – 2019

Expert witness on behalf of the Sierra Club in Duke Energy Progress rate case.

Virginia State Corporation Commission (Case No. PUR-2018-00065) – 2018

Expert witness on behalf of the Sierra Club in Dominion Power IRP proceeding.

Missouri Public Service Commission (Case No. EO-2018-0038) – 2018

Expert services in support of Sierra Club's participation in integrated resource planning process.

Florida Public Service Commission (Docket No. 20170225-EI) – 2017-2018

Expert witness on behalf of the Sierra Club in FPL Determination of Need proceeding.

North Carolina Utilities Commission (Docket No. E-7, SUB 1146) – 2017-2018

Expert witness on behalf of the Sierra Club in Duke Energy Carolinas rate case.

North Carolina Utilities Commission (Docket No. E-2, SUB 1142) – 2017

Expert witness on behalf of the Sierra Club in Duke Energy Progress rate case.

Idaho Public Utilities Commission (Case No. AVU-E-17-01) – 2017

Expert witness on behalf of the Sierra Club in Avista Corporation rate case.

Iowa Utilities Board (Docket No. RPU-2017-0002) -- 2017

Expert witness on behalf of the Sierra Club for Interstate Power and Light petition for ratemaking principles for proposed 500 MW wind project.

Washington Utilities and Transportation Commission (Dockets UE-170033 and UG-170034) – 2017

Expert witness on behalf of the Sierra Club in Puget Sound Energy (PSE) rate case.

Clean Power Plan Modeling in PJM and MISO – 2016-2017

Participation on behalf of the Sustainable FERC Project in ISO initiative to model scenarios for state compliance with federal greenhouse gas mitigation rules.

California ISO/PacifiCorp Market Integration – 2015-2017

Technical support to Sierra Club in stakeholder review and participation in all relevant proceedings in California.

United States Department of Justice – US District Court Dallas, TX Division (U.S. vs. Luminant Generation Company, LLC, and Big Brown Power Company, LLC) – Ongoing

Expert witness on behalf of the United States Department of Justice on clean air act enforcement case.

United States Department of Justice – US District Court for the Eastern District of Missouri (Civil Action No. 4:11-CV-00077) – 2013-Ongoing

Expert witness on behalf of the United States Department of Justice on successful prosecution of clean air act case.

Missouri Public Service Commission (Case No. EO-2015-0084) – 2014-2015

Expert services in support of Sierra Club's participation in integrated resource planning process.

Missouri Public Service Commission (File No. ER-2014-0258) – 2014-2015

Expert witness on behalf of the Sierra Club in Ameren Missouri rate case.

Arizona Corporation Commission (Docket No. E-01345A-11-0224) – 2014

Expert witness on behalf of the Sierra Club regarding Arizona Public Service petition for rate treatment for acquisition of an additional ownership share of the Four Corners generating units.

Missouri Public Service Commission (Docket No. ET-2014-0085) – 2013

Testimony on behalf of the Missouri Solar Energy Industries Association regarding Union Electric (d/b/a Ameren Missouri) motion to suspend payment of solar rebates.

Missouri Public Service Commission (Docket No. ET-2014-0059 and ET-2014-0071) – 2013

Testimony on behalf of the Missouri Solar Energy Industries Association regarding Kansas City Power and Light Company's motions to suspend payment of solar rebates.

Eastern Interconnect Planning Collaborative (EIPC) – 2012-2013

Expert support on behalf of coalition of NGO stakeholders in transmission and resource planning process, including development and review of modeling assumptions and interim results, and development of comments.

Puget Sound Energy (PSE) – 2012-2013

Expert participant in PSE's 2013 IRP stakeholder process on behalf of the Sierra Club.

Washington Utilities and Transportation Commission (Docket Nos. UE-111048 and UG-111049) – 2011

Testimony on behalf of the Sierra Club regarding the cost of operating the Colstrip power plant and other power procurement issues.

Kansas Corporation Commission (Docket No. 11-KCPE-581-PRE) - 2011

Presented written and live testimony on behalf of the Sierra Club regarding Kansas City Power and Light request for predetermination of ratemaking principles.

Vermont Department of Public Service - 2011

Provided scenario analysis of the costs and benefits of various electric energy resource scenarios in support of the state Comprehensive Energy Plan.

Massachusetts Department of Energy Resources – 2009-2011

Served as expert analyst and modeling coordinator for analysis related to implementation of the Massachusetts Global Warming Solutions Act.

Iowa Office of Consumer Advocate – 2010-2011

Assisted Consumer Advocate in evaluating a proposed power purchase agreement for the output of the Duane Arnold nuclear power station.

Missouri Public Service Commission (Docket No. EW-2010-0187) – 2010

Expert participant on behalf of the Sierra Club in stakeholder process to develop a “demand side investment mechanism” in Missouri.

Louisiana Public Service Commission (Docket No. R-28271 Subdocket B) – 2009-2010

Expert participant on behalf of the Sierra Club in Renewable Portfolio Standard Task Force considering RPS for Louisiana.

Joint Fiscal Committee of the Vermont Legislature – 2008-2010

Serving as lead expert advising the Legislature on economic issues related to the possible recertification of the Vermont Yankee nuclear power plant.

Town of Littleton, NH – 2006-2010

Serving as expert witness on the value of the Moore hydroelectric facility.

Nevada Public Service Commission (Docket No. 08-05014) – August 2008

Presented prefiled and live testimony on behalf of Nevadans for Clean Affordable Reliable Energy regarding the proposed Ely Energy Center and resource planning practices in Nevada.

Mississippi Public Service Commission (Docket No. 2008-AD-158) – July 2008

Presented written and live testimony on behalf of the Sierra Club regarding the resource plans filed by Entergy Mississippi and Mississippi Power Company.

Kansas House of Representatives - Committee on Energy and Utilities – February 2008

Presented testimony on behalf of the Climate and Energy Project of the Land Institute of Kansas on a proposed bill regarding permitting of power plants. Focus was on the risks and costs associated with new coal plants and on their contribute to global climate change.

Vermont Public Service Board (Docket No. 7250) – 2006-2008

Prepared report and testimony in support of the application of Deerfield Wind, LLC. For a Certificate of Public Good for a proposed wind power facility.

Iowa Utilities Board (Docket No. GCU-07-1) – October, 2007 – January 2008

Presented wrtten and live testimony on behalf of the Iowa Office of Consumer Advocate regarding the science of global climate change and the contribution of new coal plants to atmospheric CO₂.

Nevada Public Service Commission (Docket No. 07-06049) – October 2007

Presented prefiled direct testimony on behalf of Nevadans for Clean Affordable Reliable Energy regarding treatment of carbon emissions costs and coal plant capital costs in utility resource planning.

Massachusetts General Court, Joint Committee on Economic Development and Emerging Technologies – July 2007

Presented written and live testimony on climate change science and the potential benefits of a revenue-neutral carbon tax in Massachusetts.

Town of Rockingham, VT – 2006-2007

Served as expert witness on the value of the Bellows Falls hydroelectric facility.

South Dakota Public Utilities Commission (Case No EL05-22) – June 2006

Minnesota Public Utilities Commission (Docket TR-05-1275) – December 2006

Submitted prefiled and live testimony on the contribution of the proposed Big Stone II coal-fired generator to atmospheric CO₂, global climate change and the environment of South Dakota and Minnesota, respectively.

Arkansas Public Service Commission (Docket No. 06-070-U) – October 2006

Submitted prefiled direct testimony on inclusion of new wind and gas-fired generation resources in utility rate base.

Federal Energy Regulatory Commission (Docket Nos. ER055-1410-000 and EL05-148-000) – May-Sept 2006

- Participant in settlement hearings on proposed capacity market structure (the Reliability Pricing Model, or RPM) on behalf of State Consumer Advocates in Pennsylvania, Ohio and the District of Columbia
- Invited participant on technical conference panel on PJM's proposed Variable Resource Requirement (VRR) curve
- Filed Pre- and post-conference comments and affidavits with FERC
- Participated in numerous training and design conferences at PJM on RPM implementation.

Illinois Pollution Control Board (Docket No. R2006-025) – June-Aug 2006

Prefile and live testimony presented on behalf of the Illinois EPA regarding the costs and benefits of proposed mercury emissions rule for Illinois power plants.

Long Island Sound LNG Task Force – January 2006

Presentation of study on the need for and alternatives to the proposed Broadwater LNG storage and regasification facility in Long Island Sound.

Iowa Utilities Board (Docket No. SPU-05-15) – November 2005

Presented written and live testimony on whether Interstate Power and Light's should be permitted to sell the Duane Arnold Energy Center nuclear facility to FPLE Duane Arnold, Inc., a subsidiary of Florida Power and Light.

PUBLICATIONS AND REPORTS

Hausman, E., The Worst of Both Worlds: Why the Ohio Legislature's OVEC Bailout Bill would Harm Consumers, Impede Competition, Increase Pollution, and Impair the Health and Welfare of Ohioans for Decades. White paper produced on behalf of The Sierra Club, June 2017.

Hausman, E., Risks and Opportunities for PacifiCorp - State Level Findings: Utah, Produced on behalf of the Sierra Club, October 2014.

Hausman, E., Risks and Opportunities for PacifiCorp - State Level Findings: Oregon, Produced on behalf of the Sierra Club, October 2014.

Hausman, E., Risks and Opportunities for PacifiCorp in a Carbon Constrained Economy, Produced on behalf of the Sierra Club, October 2014.

Luckow, P., E. Stanton, B. Biewald, J. Fisher, F. Ackerman, E. Hausman, 2013 Carbon Dioxide Price Forecast, Synapse Energy Economics, November 2013.

Stanton, E., T. Comings, K. Takahashi, P. Knight, T. Vitolo, E. Hausman, Economic Impacts of the NRDC Carbon Standard: Background Report prepared for the Natural Resources Defense Council, Synapse Energy Economics for NRDC, June 2013

Comings T., P. Knight, E. Hausman, Midwest Generation's Illinois Coal Plants: Too Expensive to Compete? (Report Update) Synapse Energy Economics for Sierra Club, April 2013

Stanton E., F. Ackerman, T. Comings, P. Knight, T. Vitolo, E. Hausman, Will LNG Exports Benefit the United States Economy? Synapse Energy Economics for Sierra Club, January 2013

Chang M., D. White, E. Hausman, Risks to Ratepayers: An Examination of the Proposed William States Lee III Nuclear Generation Station, and the Implications of "Early Cost Recovery" Legislation, Synapse Energy Economics for Consumers Against Rate Hikes, December 2012

Wilson R., P. Luckow, B. Biewald, F. Ackerman, and E.D. Hausman, 2012 Carbon Dioxide Price Forecast, Synapse Energy Economics, October 2012.

Fagan B., M. Chang, P. Knight, M. Schultz, T. Comings, E.D. Hausman, and R. Wilson, The Potential Rate Effects of Wind Energy and Transmission in the Midwest ISO Region. Synapse Energy Economics for Energy Future Coalition, May 2012.

Hausman, E.D., T. Comings, "Midwest Generation's Illinois Coal Plants: Too Expensive to Compete? Synapse Energy Economics for Sierra Club, April 2012.

Hausman, E.D., T. Comings, and G. Keith, Maximizing Benefits: Recommendations for Meeting Long-Term Demand for Standard Offer Service in Maryland. Synapse Energy Economics for Sierra Club, January 2012.

Keith G., B. Biewald, E.D. Hausman, K. Takahashi, T. Vitolo, T. Comings, and P. Knight, Toward a Sustainable Future for the U.S. Power Sector: Beyond Business as Usual 2011 Synapse Energy Economics for Civil Society Institute, November 2011.

- Chang M., D. White, E.D. Hausman, N. Hughes, and B. Biewald, Big Risks, Better Alternatives: An Examination of Two Nuclear Energy Projects in the U.S. Synapse Energy Economics for Union of Concerned Scientists, October 2011.
- Hausman E.D., T. Comings, K. Takahashi, R. Wilson, and W. Steinhurst, Electricity Scenario Analysis for the Vermont Comprehensive Energy Plan 2011. Synapse Energy Economics for Vermont Department of Public Service, September 2011.
- Wittenstein M., E.D. Hausman, Incenting the Old, Preventing the New: Flaws in Capacity Market Design, and Recommendations for Improvement. Synapse Energy Economics for American Public Power Association, June 2011.
- Johnston L., E.D. Hausman, B. Biewald, R. Wilson, and D. White. 2011 Carbon Dioxide Price Forecast. Synapse Energy Economics White Paper, February 2011.
- Hausman E.D., V. Sabodash, N. Hughes, and J. I. Fisher, Economic Impact Analysis of New Mexico's Greenhouse Gas Emissions Rule. Synapse Energy Economics for New Energy Economy, February 2011.
- Hausman E.D., J. Fisher, L. Mancinelli, and B. Biewald. Productive and Unproductive Costs of CO2 Cap-and-Trade: Impacts on Electricity Consumers and Producers. Synapse Energy Economics for National Association of Regulatory Utility Commissioners, National Association of State Utility Consumer Advocates, National Rural Electric Cooperative Association, and American Public Power Association, July 2009.
- Peterson P., E. Hausman, R. Fagan, and V. Sabodash, Report to the Ohio Office of Consumer Counsel, on the value of continued participation in RTOs. Filed under Ohio PUC Case No. 09-90-EL-COI, May 2009.
- Schlissel D., L. Johnston, B. Biewald, D. White, E. Hausman, C. James, and J. Fisher, Synapse 2008 CO2 Price Forecasts. July 2008.
- Hausman E.D., J. Fisher and B. Biewald, Analysis of Indirect Emissions Benefits of Wind, Landfill Gas, and Municipal Solid Waste Generation. Synapse Energy Economics Report to the Air Pollution Prevention and Control Division, National Risk Management Research Laboratory, U.S. Environmental Protection Agency, July 2008.
- Hausman E.D. and C. James, Cap and Trade CO2 Regulation: Efficient Mitigation or a Give-away? Synapse Energy Economics presentation to the ELCON Spring Workshop, June 2008.
- Hausman E.D., R. Hornby and A. Smith, Bilateral Contracting in Deregulated Electricity Markets. Synapse Energy Economics for the American Public Power Association, April 2008.
- Hausman E.D., R. Fagan, D. White, K. Takahashi and A. Napoleon, LMP Electricity Markets: Market Operations, Market Power and Value for Consumers. Synapse Energy Economics for the American Public Power Association's Electricity Market Reform Initiative (EMRI) symposium, "Assessing Restructured Electricity Markets" in Washington, DC, February 2007.

- Hausman E.D. and K. Takahashi, The Proposed Broadwater LNG Import Terminal Response to Draft Environmental Impact Statement and Update of Synapse Analysis. Synapse Energy Economics for the Connecticut Fund for the Environment and Save The Sound, January 2007.
- Hausman E.D., K. Takahashi, D. Schlissel and B. Biewald, The Proposed Broadwater LNG Import Terminal: An Analysis and Assessment of Alternatives. Synapse Energy Economics for the Connecticut Fund for the Environment and Save The Sound, March 2006.
- Hausman E.D., P. Peterson, D. White and B. Biewald, RPM 2006: Windfall Profits for Existing Base Load Units in PJM: An Update of Two Case Studies. Synapse Energy Economics for the Pennsylvania Office of Consumer Advocate and the Illinois Citizens Utility Board, February 2006.
- Hausman E.D., K. Takahashi, and B. Biewald, The Glebe Mountain Wind Energy Project: Assessment of Project Benefits for Vermont and the New England Region. Synapse Energy Economics for Glebe Mountain Wind Energy, LLC., February 2006.
- Hausman E.D., K. Takahashi, and B. Biewald, The Deerfield Wind Project: Assessment of the Need for Power and the Economic and Environmental Attributes of the Project. Synapse Energy Economics for Deerfield Wind, LLC., January 2006.
- Hausman E.D., P. Peterson, D. White and B. Biewald, An RPM Case Study: Higher Costs for Consumers, Windfall Profits for Exelon. Synapse Energy Economics for the Illinois Citizens Utility Board, October 2005.
- Hausman E.D. and G. Keith, Calculating Displaced Emissions from Energy Efficiency and Renewable Energy Initiatives. Synapse Energy Economics for EPA website 2005
- Rudkevich A., E.D. Hausman, R.D. Tabors, J. Bagnal and C Kopel, Loss Hedging Rights: A Final Piece in the LMP Puzzle. Hawaii International Conference on System Sciences, Hawaii, January, 2005 (accepted).
- Hausman E.D. and R.D. Tabors, The Role of Demand Underscheduling in the California Energy Crisis. Hawaii International Conference on System Sciences, Hawaii, January 2004.
- Hausman E.D. and M.B. McElroy, The reorganization of the global carbon cycle at the last glacial termination. *Global Biogeochemical Cycles*, 13(2), 371-381, 1999.
- Norton F.L., E.D. Hausman and M.B. McElroy, Hydrospheric transports, the oxygen isotope record, and tropical sea surface temperatures during the last glacial maximum. *Paleoceanography*, 12, 15-22, 1997.
- Hausman E.D. and M.B. McElroy, Variations in the oceanic carbon cycle over glacial transitions: a time-dependent box model simulation. Presented at the spring meeting of the American Geophysical Union, San Francisco, 1996.

PRESENTATIONS AND WORKSHOPS

American Public Power Association: Invited expert participant in APPA's roundtable discussion of the current state of the RTO-operated electricity markets. October 2013.

California Long-Term Resource Adequacy Summit (Sponsored by the California ISO and the California Public Utility Commission): Panelist on "Applying Alternative Models to the California Market Construct." February 26, 2013.

ELCON 2011 Fall Workshop: "Do RTOs Need a Capacity Market?" October 2011.

Harvard Electricity Policy Group: Presentation on state action to ensure reliability in the face of capacity market failure. February 2011.

NASUCA 2010 Annual Conference: "Addressing Climate Change while Protecting Consumers." November 2010.

NASUCA Consumer Protection Committee: Briefing on the Synapse report entitled, "Productive and Unproductive Costs of CO₂ Cap-and-Trade." September 2009.

NARUC 2009 Summer Meeting: Invited speaker on topic: "Productive and Unproductive Costs of CO₂ Cap-and-Trade." July, 2009.

NASUCA 2008 Mid-Year Meeting: Invited speaker on the topic, "Protecting Consumers in a Warming World, Part II: Deregulated Markets." June 2008.

Center for Climate Strategies: Facilitator and expert analyst on state-level policy options for mitigating greenhouse gas emissions. Serve as facilitator/expert for the Electricity Supply (ES) and Residential, Commercial and Industrial (RCI) Policy Working Groups in the states of Colorado and South Carolina. 2007-2008.

NASUCA 2007 Mid-Year Meeting: Invited speaker on the topic, "Protecting Consumers in a Warming World" June 2007.

ASHRAE Workshop on estimating greenhouse gas emissions from buildings in the design phase: Participant expert on estimating displaced emissions associated with energy efficiency in building design. Also hired by ASHRAE to document and produce a report on the workshop. April, 2007.

Assessing Restructured Electricity Markets An American Public Power Association Symposium: Invited speaker on the history and effectiveness of Locational Marginal Pricing (LMP) in northeastern United States electricity markets, February, 2007.

ASPO-USA 2006 National Conference: Invited speaker and panelist on the future role of LNG in the U.S. natural gas market, October, 2006.

Market Design Working Group: Participant in FERC-sponsored settlement process for designing capacity market structure for PJM on behalf of coalition of state utility consumer advocates, July-August 2006.

NASUCA 2006 Mid-Year Meeting: Invited speaker on the topic, "How Can Consumer Advocates Deal with Soaring Energy Prices?" June 2006.

Soundwaters Forum, Stamford, CT: Participated in a debate on the need for proposed Broadwater LNG terminal in Long Island Sound, June 2006.

Energy Modeling Forum: Participant in coordinated academic exercise focused on modeling US and world natural gas markets, December 2004.

Massachusetts Institute of Technology (MIT): Guest lecturer in Technology and Policy Program on electricity market structure, the LMP pricing system and risk hedging with FTRs. 2002-2005.

LMP: The Ultimate Hands-On Seminar. Two-day seminar held at various sites to explore concepts of LMP pricing and congestion risk hedging, including lecture and market simulation exercises. Custom seminars held for FERC staff, ERCOT staff, and various industry groups. 2003-2004.

Learning to Live with Locational Marginal Pricing: Fundamentals and Hands-On Simulation. Day-long seminar including on-line mock electricity market and congestion rights auction, December 2002.

LMP in California. Led a series of seminars on the introduction of LMP in the California electricity market, including on-line market simulation exercise. 2002.

Resume updated February 2020

STATE OF UTAH
Public Service Commission

IN THE MATTER OF THE APPLICATION
OF ROCKY MOUNTAIN POWER FOR
AUTHORITY TO CHANGE ITS
DEPRECIATION RATES EFFECTIVE
JANUARY 1, 2021

Docket No. 18-035-36

CERTIFICATE OF SERVICE

I CERTIFY that on March 30, 2020, a true and correct copy of the foregoing Direct Testimony of Ezra Hausman, Ph.D. on Behalf of Sierra Club was served upon the following as indicated below:

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Dated this 30th day of March, 2020 at Oakland, CA.

/s/ Ana Boyd

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