Mathematical Appendix

Form of depreciation

On p. II-1066 of his direct testimony, Mr. Spanos writes "I used the straight line remaining life method of depreciation, with the average service life procedure." On p. II-1072 he writes "The straight line remaining life method of depreciation allocates the original cost of the property, less accumulated depreciation, less future net salvage, in equal amounts to each year of remaining service life."

$$D_t = \frac{I_0 - (G_T - C_T) - \sum_{i=1}^{t-1} D_i}{T - t + 1} \qquad (3)$$

where D_t is depreciation expense in Year t, I_0 is original cost less accumulated depreciation in Year 0, which, in this case, is 2022, G is gross salvage, C is the cost of removal, and T is the year of retirement. Since equal amounts are allocated to each year of remaining life, I set $D_2 = D_1$, with D_1 being the only term in the summation.

$$D_2 = \frac{I_0 - (G_T - C_T) - D_1}{T - 1} = D_1 \qquad (4)$$

Solving the second equation for D_1, I get

$$D_1 = \frac{I_0 - (G_T - C_T)}{T} \qquad (5)$$

Since depreciation expense is the same every year in straight line depreciation,

$$D_t = \frac{I_0 - (G_T - C_T)}{T} \textit{ for all } t > 0 \qquad (6)$$

Depreciation expense is negatively related to both net salvage and remaining service life.

Nominal straight line remaining life depreciation is equivalent to real declining balance depreciation, but with real depreciation of

$$D_t^r = \frac{I_0 - (G_T - C_T)}{T} \Big/ (1+\pi)^t \tag{7}$$

where π is the rate of inflation, and real accumulated depreciation is

$$\sum_{i=1}^{t-1} D_i^r = \frac{I_0 - (G_T - C_T)}{T} \frac{1 - \left(\frac{1}{1+\pi}\right)^{t-1}}{\pi} \tag{8}$$

the sum of a finite geometric series. It is, therefore, not necessarily a problem to use nominal straight line remaining life depreciation for assets with short service lives, for which declining balance depreciation is sometimes recommended.

Aggregation

The table on page VI-4 of Attachment JJS-2 aggregates the determinants of future accruals of depreciation expenses across $N = 28$ categories of depreciable utility capital as follows:

$$\underbrace{\sum_{j=1}^{N} \underbrace{\underbrace{\left[\frac{G_T^j - C_T^j}{I_0^j + BDR_0^j}\right]}_{\substack{\text{categorical}\\ \text{net salvage}\\ \text{percent}}} \underbrace{\left(I_0^j + BDR_0^j\right)}_{\text{original cost}}}_{\substack{\text{categorical}\\ \text{net salvage}}}}_{\text{aggregate net salvage}} = \sum_{j=1}^{N} I_0^j - \underbrace{\left[\frac{\sum_{j=1}^{N} \frac{I_0^j - \left(G_T^j - C_T^j\right)}{T^j} T^j}{\sum_{j=1}^{N} \frac{I_0^j - \left(G_T^j - C_T^j\right)}{T^j}}\right]}_{\substack{\text{aggregate composite}\\ \text{remaining life } (T=30.1)}} \underbrace{\sum_{j=1}^{N} \underbrace{\frac{I_0^j - \left(G_T^j - C_T^j\right)}{T^j}}_{\substack{\text{categorical}\\ \text{depreciation}}}}_{\text{aggregate depreciation}} \tag{9}$$

where BDR_0^j is book depreciation reserve in Year 0 [2022].

Equation (9) simplifies to

$$\sum_{j=1}^{N} G_T^j - C_T^j = \sum_{j=1}^{N} I_0^j - T \sum_{j=1}^{N} \frac{I_0^j - \left(G_T^j - C_T^j\right)}{T^j} \tag{10}$$

Executing the summation signs, summing across categories, gives

$$G_T - C_T = I_0 - TD \tag{11}$$

Or,

$$D = \frac{I_0 - (G_T - C_T)}{T} \quad (1)$$

which is the same as (6), and evaluates to $11,697,980 for depreciable plant as a whole in Mr. Spanos' testimony. Mr. Spanos applies straight line remaining life depreciation to each category of plant and to total depreciable plant for Liberty.

The market value of plant

According to the CPUC, "Depreciation in its value concept represents the loss in market value of property as compared with either its original cost new or the reproduction cost new of equivalent property."[7] Here, we are comparing "with its original cost new". The market value of plant depends on both its physical condition and the other causes of depreciation; that is, anything that changes the value of plant other than maintenance or improvement, when the change in the value of plant is negative. Mr. Spanos, on page I-3 of his attachment, and the CPUC[8] provide similar, and fairly exhaustive, lists of admissible causes of depreciation, some of which may well cause temporary appreciation during service life. Examples include "demand" and "obsolescence", which have little or no effect on the physical condition of plant, but do affect its market value.

I assume that the "original cost new" of a distribution network equals its market value (e.g., what it would fetch as part of a corporate merger or acquisition) at the time it becomes used and useful. The time at which a network composed of facilities that have become used and useful at different times can be summarized as Year 0 less composite preceding life, calculated as accumulated depreciation over annual depreciation for all facilities that are used and useful in Year 0.

Define I as the market value of a distribution facility. Since depreciation is "not restored by current maintenance"[9], the annual change in its value is given by its time-derivative, when time is measured in years, equaling

$$\dot{I} = M - D \quad (12)$$

where $\dot{I}$ is annual change in market value, M is additional investment in the facility, referred to as "maintenance," but which may also include improvement, and D is monetized depreciation, which may be accumulated in an account called "book depreciation reserve."

[7] Ibid, CPUC, p. 4.
[8] Ibid, CPUC, p. 5.
[9] Ibid, Spanos, p. I-3.

I assume that equity in the utility that owns the facility is given by

$$PQ = R - B + S \tag{13}$$

where P is the price of a share of stock in the utility, Q is the number of outstanding shares, R is the market value of the utility's entire stock of real capital, inclusive of I, B is its corporate debt, and S is the utility's retained earnings. If, for example, the utility were acquired, the amount paid for its stock in the acquisition would, by definition, be the market value of its real capital less its net corporate debt, like buying a piece of property with a lien on it.

Rearranging (13),

$$R = PQ + B - S \tag{14}$$

Differentiating with respect to time,

$$\dot{R} = \dot{P}Q + \dot{Q}P + \dot{B} - \dot{S} \tag{15}$$

Equation (15) relates a change in the market value of a utility's entire stock of real capital to changes in its outstanding financial instruments. $\dot{R}$ may be positive, $\dot{R} > 0$, for any of four reasons: 1) an increase in the share price, $\dot{P} > 0$; 2) equity-financed purchase of additional real capital, $\dot{Q} > 0$; 3) debt-financed purchase of additional real capital, $\dot{B} > 0$; or 4) cash-financed purchase of additional real capital, $\dot{S} < Sj - Bi - V$, where j is the rate of interest on corporate savings, i is the rate of interest on corporate debt, and V is dividends (Retained earnings are used for more than net payments to financial capital.) I have included 2), 3), and 4) for any specific existing facility under the rubric "maintenance", though they also encompass improvement.

Dividing (15) by (14),

$$\frac{\dot{R}}{R} = \frac{\dot{P}Q + \dot{Q}P + \dot{B} - \dot{S}}{PQ + B - S} \tag{16}$$

Assuming zero equity-financed purchase or liquidation of real capital, $\dot{Q} = 0$, so

$$\frac{\dot{R}}{R} = \frac{\dot{P}Q + \dot{B} - \dot{S}}{PQ + B - S} \tag{17}$$

Assuming zero debt-financed purchase or liquidation of real capital, $\dot{B} = 0$, and, assuming zero cash-financed purchase or liquidation of real capital, $\dot{S} = Sj - Bi - V$, so

$$
\begin{aligned}
\frac{\dot{R}}{R} &= \frac{\dot{P}Q - Sj + Bi + V}{PQ + B - S} \\
&= \frac{\dot{P}Q + V}{PQ + B - S} + \frac{Bi}{PQ + B - S} - \frac{Sj}{PQ + B - S} \\
&= \left(\frac{\dot{P}Q + V}{PQ} PQ + \frac{Bi}{B} B - \frac{Sj}{S} S \right) \Big/ \left(PQ + B - S \right) \qquad (18) \\
&= \left(\dot{P}Q + V + Bi - Sj \right) \Big/ \left(PQ + B - S \right) \\
&= WACC
\end{aligned}
$$

When zero real additional capital is purchased, and no existing real capital is liquidated, the rate of growth in the market value of a company's real capital equals its weighted average cost of capital $(WACC)$, with "debt" defined net of retained earnings. In the third to last line of Equations (18), $\left(\dot{P}Q + V\right)\big/PQ$ is the rate of return on equity, $Bi/B = i$ is the rate of interest paid on debt, and $Sj/S = j$ is the rate of interest earned on retained earnings. Assuming zero purchase or liquidation of real capital is consistent with the CPUC's assumption that "no additions to gross plant have been made and that there have been no interim retirements", on page 4 of CPUC (1961).

I assume that the market value of a specific distribution facility changes at the same rate as the rest of the utility's real capital when zero additional real capital is purchased, and no existing capital is liquidated, since stockholders hold them as a package.

$$
\frac{\dot{I}}{I} = \frac{\dot{R}}{R} \qquad (19)
$$

In a network industry, the components of the network are highly complementary. As an example, the capacity of two sections of a power line equals the capacity of the section whose capacity is less than the other. It is this complementarity among inputs that gives rise to the natural monopoly cost structure (declining average total cost) that characterizes networks and motivates economic regulation of network industries. Wohlgenant (2012) shows that, when all inputs are pair-wise complements, a one percent increase in the use of a single input leads to less than a one percent increase in output.[10] Therefore, it is cost-minimizing to increase the use of inputs in tandem when output increases. Both sections of the two-section power line should be expanded in order to meet an increase in peak load, and it is reasonable to assume that the market values of the two sections grow at the same rate, as in Equation (19). The fact that a large investment is necessary to serve additional load renders the network a natural monopoly, suitable for economic regulation. (19) becomes a weaker assumption still when I refers to a large stock of depreciable capital, rather than a very specific part thereof, because that large stock accounts for a large share, or all, of a utility's real capital.

[10] Wohlgenant, M.K. (2012). Input complementarity implies output elasticities larger than one: implications for cost pass-through, *Theoretical Economics Letters* 2, 50-53; **http://dx.doi.org/10.4236/tel.2012.21009**

I reiterate that

$$\dot{I} = M - D \qquad (12)$$

Combining (19) and (12),

$$I\frac{\dot{R}}{R} = M - D \qquad (20)$$

At the time of optimal retirement, T , the value of the facility being retired equals net salvage.

$$I_T = \frac{M_T - D}{\dot{R}_T / R_T} = G_T - C_T \qquad (21)$$

where I do not subscript D because of straight line depreciation, and, from Equations (18), $\dot{R}_T / R_T$ should be thought of as a long-run forecast of the weighted average cost of capital (WACC) if the date of retirement, T , is several years hence.

By the time of retirement, a utility stops investing in maintenance or improvement of a facility, so $M_T = 0$. Therefore,

$$I_T = \frac{-D}{\dot{R}_T / R_T} = G_T - C_T \qquad (22)$$

and

$$D = -\left(G_T - C_T\right)\frac{\dot{R}_T}{R_T} \qquad (2)$$

where $\dot{R}_T / R_T = WACC_T$.

In his direct testimony on behalf of the OCA, Aaron Rothschild estimates Liberty's WACC for the impending rate period as 7.15 percent, composed of an allowable return on equity of 8.45 percent, a cost of debt of 6.03 percent, and a capital structure of 46.12 percent common equity and 53.88 percent long term debt. "The authorized [return on equity] is based on a snapshot of the [cost of equity], which is constantly changing." (p. 7) The WACC in Equation (2), on the other hand, applies 30.1 years after December 31, 2022, based on Mr. Spanos' estimated composite remaining life of depreciable capital for Liberty. Therefore, I proceed to estimate a long term WACC applicable in 2053, but one that is consistent with Mr. Rothschild's current snapshot.

I begin with the long term cost of equity. The price of the stock in a corporation is the present value of present and future profits.

$$P_0 = \sum_{t=0}^{\infty} \frac{\pi_0 (1+g)^t}{(1+r)^t} \tag{23}$$

where π_0 is profit at Time $t = 0$, g is the annual rate of growth in nominal profits, and r is the annual nominal rate of return on equity, used to discount future profits. Assuming that $0 < g < r$, this is the sum of a geometric series equaling

$$P_0 = \frac{\pi_0}{\left(\frac{r-g}{1+r}\right)} \tag{24}$$

Since this representation is symbolic, I normalize $\pi_0 \equiv 1$, so that

$$P_0 = \frac{1+r}{r-g} \quad \text{and} \quad r = \frac{1+P_0 g}{P_0 - 1} \tag{25}$$

To estimate r from data, I form an econometric equation.

$$P_t = \hat{\delta}_o + \hat{\delta} t + \hat{\delta}_P P_{t-1} + e_t \tag{26}$$

where δ_0 is an intercept term, not subscripted for time, $\hat{x}$ is an econometric estimate of any variable x, and e_t is a residual. Letting $t-1$ approach t, and assuming $e_t = 0$, the estimated long term trend value of P_t is

$$\hat{P}_t = \frac{\hat{\delta}_0 + \hat{\delta} t}{1 - \hat{\delta}_P} \tag{27}$$

At Time $t = 0$, combining (25) and (27),

$$\hat{P}_0 = \frac{1+r_0}{r_0 - g} = \frac{\hat{\delta}_0}{1 - \hat{\delta}_P} \tag{28}$$

where I take $r_0 = 8.45\%$, the snapshot cost of equity from Mr. Rothschild's testimony, and respecting $\pi_0 \equiv 1$. That is, his snapshot is taken along my estimated long term trend in the cost of equity.

Therefore,

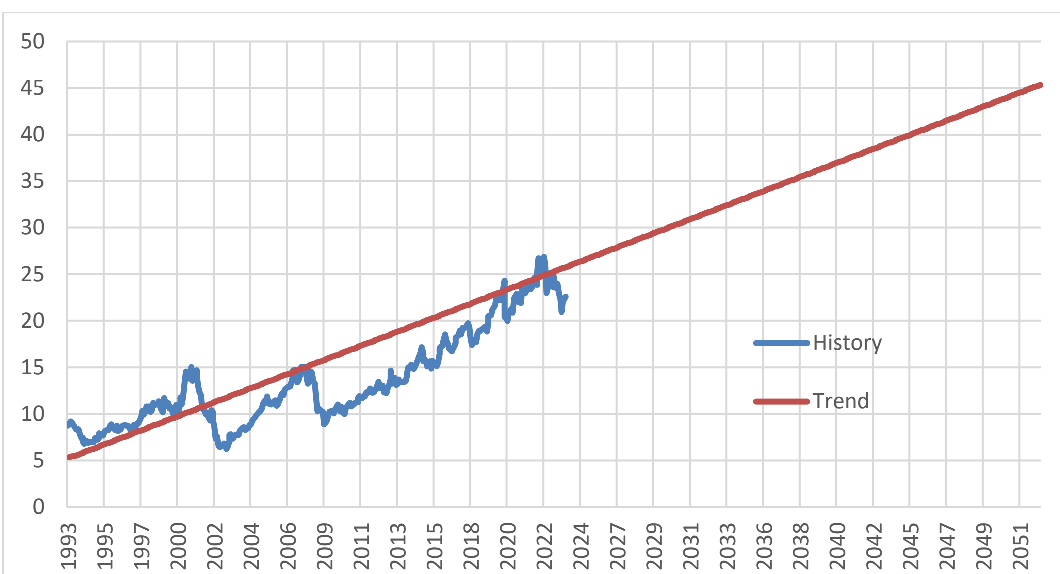
$$\frac{1+r_0}{r_0-g}\left(1-\hat{\delta}_P\right)=\hat{\delta}_0 \tag{29}$$

Subtracting (29) from (26) and adding $-\frac{1+r_0}{r_0-g}\hat{\delta}_P$ to both sides gives an estimable linear equation with no intercept term.

$$P_t-\frac{1+r_0}{r_0-g}=\hat{\delta}t+\hat{\delta}_P\left(P_{t-1}-\frac{1+r_0}{r_0-g}\right)+e_t \tag{30}$$

I scale monthly $N=355$ observations of the Standard & Poor's utilities stock index[11] beginning in May 1993 so that (28) holds in January of 2023 to estimate (30). The estimates are $\hat{\delta}=\underset{0.0055}{0.00125}$ and $\hat{\delta}_P=\underset{0.0872}{0.97774}$, where the number below is the standard error of estimate, and autocorrelation in e_t is $\underset{0.05432}{0.05239}$, which is not statistically significantly different from zero. An intercept term, if added, would also not be anywhere near significant, validating its omission from Equation (30), and the derivation of Equation (29). Figure 2 plots the estimated long term trend and history of the index.

Figure 2: Standard & Poor's 500 utilities index



[11] **https://finance.yahoo.com/quote/%5ESP500-55/history?period1=736560000&period2=1701734400&interval=1mo&filter=history&frequency=1mo&includeAdjustedClose=true**, accessed December 5, 2023

I use growth in nominal profits of $g = 4.14\% = 1.67\% + 2.47\%$, where 1.67% represents real growth in U.S. gross domestic product[12], and 2.47% is investors' expectations of inflation over the next thirty years.[13] This gives a long term trend cost of equity in 2053 of 6.49 percent. According to a recent survey of analysts, the median twenty year expected return to equity for large capitalization corporations is 7.30 percent.[14] Utilities are thought to be less risky than comparably sized non-utility corporations, implying a lower rate of return. I retain Mr. Rothschild's cost of debt and capital structure, so the long run $WACC_T = 6.24\%$, for use in Equation (2). Algonquin Power & Utilities has a BBB bond rating. The average effective yield for such bonds since 1997 has been 5.26 percent and is currently 5.76 percent, compared to Mr. Rothschild's estimated 6.03 percent cost of long term debt.

---

[12] See **https://www.cbo.gov/publication/58957**, accessed December 6, 2023.
[13] **https://fred.stlouisfed.org/series/EXPINF30YR**, accessed December 5, 2023.
[14] **https://www.horizonactuarial.com/_files/ugd/f76a4b_1057ff4efa7244d6bb7b1a8fb88236e6.pdf**, p. 18, accessed December 6, 2023.

EDUCATION

Ph.D. in Economics, Brown University, Providence, RI, 2007
M.A. in Economics, Brown University, Providence, RI, 1999
B.A. in Economics with departmental honors, University of Oregon, Eugene, OR, 1986

EXPERIENCE

New Hampshire Office of the Consumer Advocate, Concord, NH, August 2023 – present
- Expert testimony and analysis in regulatory proceedings on behalf of residential customers of public utilities in New Hampshire
- Education of customers

Rivier University, Nashua, NH, January 2020 – present
- Teach business economics and macroeconomics

The Economic Utility Group, Nashua, NH, February 2021 – June 2021, July 2022 – July 2023
- Forecasted wages and employment in the skilled trades with Senior Economist at Construction Industry Resources
- Forecasted volatile upstream fuel prices and climate damages
- Forecasted electric vehicle and non-EV electrification load for Hitachi Energy USA

Hitachi Energy USA, Nashua, NH, June 2021 – June 2022
- Analysis, modeling, forecasting, and reporting on wholesale power markets, especially in Mexico, using PROMOD® (a production cost model)

Elevation Direct Corporation, Nashua, NH, July 2015 – January 2021
- Jointly sponsored testimony before the Rhode Island PUC on the employment impacts of Clear River Energy Center (CREC) for the Rhode Island Building and Construction Trades Council; individually sponsored rebuttal testimony on the need for CREC
- Used Aurora® (a capacity expansion and production cost model) to evaluate potential purchase of Termoelectrica de Mexicali, a combined cycle natural gas-fired generator
- Used Aurora to forecast wholesale electric prices in Michigan and sponsored testimony on behalf of Michigan Public Service Commission staff in a case regarding a purchased power agreement for the output of the Palisades nuclear plant
- Work in restructured wholesale power market in Mexico
  - Provided forecasts of gross state product, loads, and fuel, energy, congestion, loss, ancillary service, and capacity prices, as well as prices of clean energy certificates and social costs of emissions in evaluations of pumped storage, combined-cycle gas, internal combustion, and wind and solar facilities; co-authored market studies done using Aurora, Plexos, and Encompass (capacity expansion and production cost models)
  - Assembled Mexican database and used Aurora to model expansion and operation of power grid for several independent generators
  - Co-authored a report on the economics of introducing liquefied natural gas to southern Baja California
  - Estimated a weighted average cost of capital to Comisión Federal de Electricidad (CFE)
  - Trained employees of CFE in load forecasting
  - Estimated Herfindahl-Hirschman indices of market concentration following breakup of CFE under Mexican energy reform

Universidad del Pacifico, Jesús María, Lima, Peru, September 2014
- Taught topical graduate course in energy economics.

21 South Fruit Street, Suite 18, Concord, New Hampshire 03301, USA
603.271.1175
marc.h.vatter@oca.nh.gov; **https://www.oca.nh.gov**

Economic Insight, Portland, OR, January 2010 – March 2013
- Used Aurora to model electric resource planning in the Pacific Northwest
- Used Aurora to estimate trade benefits of Entergy and South Mississippi Electric Power Association joining regional transmission organizations, sponsored testimony before the Mississippi Public Service Commission (MPSC)
- Assessed application to install pollution controls on a coal plant; jointly testified with Sam Van Vactor before the MPSC
- Estimated dollars of spending per employee by generating technology
- Analyzed issues regarding pricing and royalties in geothermal and natural gas leases in California and Texas;
- Analyzed pricing and alleged use of market power in California power crisis
- Estimated lost earnings in a wrongful death lawsuit and testified to report
- Editor of scholarly research written by non-native speakers of English (intermittent)

Pacific University, Forest Grove, OR, August 2008 - May 2009
- Taught principles of microeconomics, environmental economics, and international trade

New York Department of Public Service, Albany, NY, August 2006 - December 2007

Eastern Connecticut State University, Willimantic, CT, August 2005 - May 2006
- Taught principles of microeconomics

Allan M. Feldman, Ph.D., Providence, RI, 2002-2003
- Worklife evaluation for litigation related to personal injury or wrongful death

Brown University, Providence, RI, 1999-2002
- Research and teaching assistance in valuation of individual earning capacity, industrial location in Indonesia, and principles of microeconomics and macroeconomics

Synapse Energy Economics, Cambridge, MA, July 1998 - February 1999
- Evaluated forecasts of electricity prices submitted in "stranded-cost" claim by four Maryland utilities

Bonneville Power Administration, Portland, OR, September 1988 - June 1997
- Authored and testified to marginal cost analysis in 1996 rate case before FERC
  - Helped prepare inputs to and interpreted and applied results of Power Marketing Decision Analysis Model (PMDAM) to rate design and to planning and evaluation of resources
  - Prepared and conducted public meetings on analysis and its implications for rate design
  - Fielded and incorporated comments from a variety of participants
  - Authored rate case study, documentation, and testimony
- Research on marginal costs of generating and marketing hydropower on the West Coast
- Prepared workshop briefing material, rate case studies, and documentation supporting marginal cost analysis and other rate-related issues as assigned
- Evaluated contracts for disposition of wholesale power

Economic Insight, Portland, OR, May 1988 - September 1988
- Surveyed forecasts of electricity prices and estimates of demand elasticities related to litigation over Washington Public Power Supply System bond defaults

ECO Northwest, Eugene, OR, July 1986 - August 1987
- Worklife evaluation for litigation related to personal injury and wrongful death; wrote company training manual on the subject

Changsha Normal University of Water Resources and Electric Power, Changsha, Hunan, PRC, August 1987 - January 1988; Brown University, Providence, RI, Summer 2001
- Taught English as a second language

RESEARCH

Vatter, M. (2022). Pricing global warming as a mortal threat. United States Association for Energy Economics (USAEE) Working Paper No. 21-491, **http://ssrn.com/abstract=3821603**, and IAEE Conference Proceedings, online, June 7-9, 2021, **https://www.iaee.org/proceedings/article/17059**

Vatter, M., Van Vactor, S., and Coburn, T. (2022). Price responsiveness of shale oil: a Bakken case study. *Natural Resources Research*, 31:1, **https://doi.org/10.1007/s11053-021-09972-9**, and IAEE Conference Proceedings, Montreal, May 29-Jun 1, 2019, **https://www.iaee.org/proceedings/article/16313**

Vatter, M. (2020). Stratified zoning in central cities. *Journal of Housing Economics*, 50, **https://doi.org/10.1016/j.jhe.2020.101716**

Vatter, M. (2019). OPEC's risk premia and volatility in oil prices. *International Advances in Economic Research*, 25:2, DOI: **10.1007/s11294-019-09734-7**

Vatter, M., Suurkask, D. (2018). The impact of trade with the United States on electric loads in Mexico. *Heliyon*, 4:8, **https://doi.org/10.1016/j.heliyon.2018.e00717**, and *IAEE Energy Forum*, 2nd quarter 2017, **https://www.iaee.org/en/publications/newsletterdl.aspx?id=406**

Vatter, M. (2017). OPEC's kinked demand curve. *Energy Economics*, 63, **https://doi.org/10.1016/j.eneco.2017.02.010**

Vatter, M. (2017). Stockpiling to contain OPEC. USAEE Working Paper No. 17-136, **http://ssrn.com/abstract=912311,** and USAEE Conference Proceedings, New Orleans, December, 2008, **https://www.iaee.org/proceedings/article/17512**

Vatter, M. (2017). Social discounting with diminishing returns on investment, **http://ssrn.com/abstract=1078502**

Vatter, M., Barney, F. (2016). Macroeconomic risk and residential rate design. USAEE Working Paper No. 15-208, **http://ssrn.com/abstract=2596258**

Vatter, M. (2008). OPEC's demand curve, **http://ssrn.com/abstract=1127642**, reviewed at **http://knowledgeproblem.com/2008/05/14/**

Peer Reviewer for *Land Economics*: effects of endowments of petroleum resources on corruption, 2008; hedging in coal contracts under the acid rain program, 2010-11; suburban agriculture as an amenity, 2012; prorationing versus unitization in the U.S. petroleum industry in the 20th century, 2013

Streaming Media

International Atlantic Economic Society video: Nice world economy you have there; be a shame if something should happen to it, temporarily available at **https://www.iaes.org/**, accessed June 15, 2022

IAEE webinar: Is another oil price shock possible, and would it matter? January 11, 2021, **https://www.iaee.org/en/webinars/webinar_vatter.aspx**

USAEE podcast: OPEC as a destabilizing influence, July 21, 2020, **https://www.usaee.org/podcasts.aspx**

Video: **Discussing transmission costs with New Hampshire Senate Energy and Natural Resources Chair Kevin Avard**, **https://www.youtube.com/watch?v=QRkLdLplz9Y&feature=youtu.be&fbclid=IwAR2Euva286vNRa5Lit0RstjHwtPuV5a_t439Cml4Z8S2WHYptXNdJ40vkZs**

Video: **Discussing manufacturing, net metering rate design, and transmission costs on *Perspectives* with David Schoneman**, **https://youtu.be/m9YRY3U-DzM**

Awards

Twelve monetary awards for job performance at Bonneville Power Administration
Award for best undergraduate research project in economics at University of Oregon; examined deregulation of U.S. airline industry

Other Activities

Monitored the House Science, Technology, and Energy Committee in Concord, NH for the Northeast Energy and Commerce Association
Founded and managed "Micro Lunch" seminar, Brown University, 2001-2002
Role of expert witness in Lewis & Clark Law School's mock personal-injury litigation, 1996
Peer Advisor, Department of Economics, University of Oregon, 1984-1986

Memberships

International and United States Associations for Energy Economics; Northeast Energy and Commerce Association; Northeast Energy and Commerce Association; New Hampshire Business and Industry Association, Manufacturing and End Users Policy Committee

Testimonials

"We asked Marc to provide us with a forecast of future locational marginal prices under two different scenarios, which he managed very well. He provided us with testimony that was on point and met our needs." Lauren Donofrio, Assistant Attorney General, Public Service Division, State of Michigan

21 South Fruit Street, Suite 18, Concord, New Hampshire 03301, USA
603.271.1175
marc.h.vatter@oca.nh.gov; **https://www.oca.nh.gov**

"Marc Vatter provided joint testimony with Sam Van Vactor on behalf of Staff in 2010 regarding Mississippi Power's application to install pollution controls on the Victor J. Daniel coal-fired generator. He brought to light critical issues regarding uncertainty over natural gas prices that bore on the decision to install scrubbers. We hired the two again in 2012 in a proceeding on integrating Entergy's transmission assets into a regional transmission organization. Marc added significant detail representing the state of Mississippi to a production cost and capacity expansion model that he used to quantify the effects of integration. A number of consultants engaged in similar efforts, and Marc's analysis was of superior quality." Dr. Christopher Garbacz, Director, Economics and Planning Division, Mississippi Public Utilities Staff