

State of Rhode Island Public Utilities Commission

In Re: Solicitations of Long-Term Contracts for Renewable Energy and Renewable Energy Certificates (RECs), Pursuant To R.I. Gen. Laws §39-26.1-1 et seq.

Docket No. 4822

Pre-Filed Testimony of

Dan Koehler
July 17, 2018

1 **Q. Please state your name and business address.**

2 A. My name is Dan Koehler and my business address is 370 Main Street, Ste. 325,
3 Worcester, MA 01608.

4 **Q. On whose behalf are you appearing in these proceedings?**

5 A. I am testifying on behalf of Vineyard Wind, LLC (Vineyard Wind), an offshore wind
6 development company.

7 **Q. Please summarize your background and qualifications.**

8 A. I am a Senior Consultant at Daymark Energy Advisors Inc. (Daymark). I am
9 Daymark's Manager of Wholesale Market Analytics, ensuring that the firm's approach to
10 analysis and market forecasts is consistently of high quality. I have worked at Daymark
11 for eight years, focusing on the firm's utility regulation and planning and market
12 analytics practices. I have provided analysis and assistance with the development of
13 expert testimony with respect to utility planning and ratemaking issues for public utility
14 commissions in Michigan, North Dakota, New Hampshire, Arkansas, Wisconsin,
15 Vermont, Utah, and Manitoba. I have also assisted with the design, administration and
16 critical review of renewable energy procurements for utilities, end users, stakeholders and
17 regulators in Massachusetts, New York, Michigan and Utah. I received a Bachelor of
18 Arts degree in Applied Mathematics with a focus in Economics from Yale University and
19 a Master of Public Policy and Management Degree from the University of Southern
20 Maine.

21 My resume is included as Attachment A.

22 **Q. Please summarize Daymark and its business.**

1 A. Daymark provides consulting services in energy planning, market analysis, and
2 regulatory policy in the electricity and natural gas industries. We serve a national and
3 international clientele from our office in Worcester, Massachusetts, providing consulting
4 services to a broad range of organizations involved with energy markets, including
5 renewable energy producers, private and public utilities, energy producers and traders,
6 energy consumers and consumer advocates, regulatory agencies, and public policy and
7 energy research organizations. Our technical skills include power market forecasting
8 models and methods, economics, management, planning, rates and pricing, energy
9 procurement, and contracting. Our experience includes detailed analyses of energy and
10 environmental performance of the electric systems, economic planning for transmission,
11 and market analytics.

12 **Q. Have you previously testified before this or other Commissions?**

13 A. This is my first time providing testimony before the Rhode Island Public Utilities
14 Commission. I have provided testimony before the Public Service Commission of Utah,
15 the New Hampshire Public Utilities Commission, the Michigan Public Service
16 Commission and the Federal Energy Regulatory Commission.

17 **Q. What is the purpose of your testimony?**

18 A. I was retained by Vineyard Wind to review and comment on the draft Request for
19 Proposals for Long-Term Contracts for Renewable Energy (“RFP”) filed by Narragansett
20 Electric Company d/b/a National Grid (Company) on April 20, 2018. My testimony
21 provides information that will be helpful to the Commission in determining whether the

1 draft RFP is optimally designed to achieve its purpose. My testimony is supportive of,
2 and expands upon, certain issues raised by Vineyard Wind in comments filed in this
3 docket on June 7, 2018, and reply comments on July 9, 2018.

4 **Q. What is the purpose of the RFP and by what standard should it be evaluated?**

5 A. The RFP was developed in response to a February 5, 2018 announcement by
6 Governor Raimondo calling for a 400 MW renewable energy procurement to advance the
7 administration's goal of making Rhode Island's energy system 10 times cleaner by
8 adding 1,000 MW of renewable resources to the state's portfolio by the end of 2020. I
9 submit that the draft RFP ought to be evaluated in terms of its ability to facilitate the
10 state's broader renewable energy goals, combat climate change, and fulfill Governor
11 Raimondo's commitment to create a sustainable energy economy in Rhode Island. The
12 purpose of Rhode Island's long term contracting statute is to "encourage and facilitate the
13 creation of commercially reasonable long-term contracts between electric distribution
14 companies and developers or sponsors of newly developed renewable energy resources
15 with the goals of stabilizing long-term energy prices, enhancing environmental quality,
16 creating jobs in Rhode Island in the renewable energy sector, and facilitating the
17 financing of renewable energy generation within the jurisdictional boundaries of the state
18 or adjacent state or federal waters or providing direct economic benefit to the state."
19 Where the draft RFP frustrates Rhode Island's goals, the Public Utilities Commission
20 (Commission) should direct the Company to make appropriate changes.

21 **Q. How is your testimony organized?**

1 A. I focus on two issues in particular. First, my testimony addresses the pricing threshold
2 requirements of the draft RFP, and whether those requirements appropriately apply cost
3 effectiveness guidance that was developed with wide stakeholder consensus and
4 approved by the Commission in Docket 4600. Second, I address project financeability
5 issues that can arise from an over-reliance on REC revenues in the current RFP design
6 framework, and the resulting impact on RFP competitiveness if inappropriate forecasting
7 methods were to be used.

8 **PRICING**

9 **Q. Do you wish to expand on Vineyard Wind’s comments on the price terms in the**
10 **draft RFP?**

11 A. Yes. National Grid, the Office of Energy Resources and the Division of Public
12 Utilities and Carriers all actively participated in Docket 4600, their consultants collected
13 a great wealth of research material and stakeholder input to support the Docket’s outcome
14 and a large group of representative stakeholders unanimously supported its result. The
15 Guidance Document adopted by the Commission on October 27, 2017 makes clear that
16 the Benefit-Cost Framework (Framework) in the Stakeholder Report should be applied, at
17 least qualitatively, to all proposals (with a few specific exceptions) that affect National
18 Grid’s distribution rates. To my understanding, the Commission and stakeholders agreed
19 on this Framework because it was recognized that the state’s goals for a modernized
20 electric system, including addressing the challenge of climate change and other forms of
21 pollution, could best be achieved with consistent application of benefit-cost analysis that
22 recognizes a broader spectrum of impacts from proposed initiatives.

1 **Q. Does the draft RFP allow for appropriate application of the Framework to**
2 **project bids?**

3 A. No. The draft RFP requires bid pricing to be below-market for both the energy and
4 RECs component. Bids with pricing that exceeds the Company's forecast of market
5 prices for energy and RECs over the term of the PPA will be disqualified. This represents
6 a binding cost effectiveness test that considers only three (since greenhouse gas
7 compliance costs are to be included in the forecast of market energy prices) of the thirty-
8 four categories of costs and benefits and fifty-three different drivers of costs or benefits in
9 the Framework. The Company does intend to consider other costs and benefits that align
10 with the Framework in the later stage bid evaluation process, but the point is moot if bids
11 have already been disqualified by the initial market price test.

12 **Q. What is your recommendation for application of the Framework in this RFP?**

13 A. Rhode Island should pursue and get the benefits of the good work done and the
14 consensus built in Docket 4600 to identify and measure value of investments in achieving
15 state goals. There is a great wealth of research material that supported the result in that
16 docket, including some materials listed at the bottom of the Commission's docket page
17 (see <http://www.ripuc.org/eventsactions/docket/4600page.html>) and many more listed on
18 the consultant's document repository that is also linked through the docket page (see
19 <http://www.raabassociates.org/main/projects.asp?proj=146&state=Services>). RFP
20 applicants should have full opportunity to prove the value of their proposal pursuant to
21 the docket 4600 Framework rather than being bound to compete on sub-market pricing.
22 The market price is set principally by natural gas-fired generators. The question is not

1 only whether large renewable projects can outcompete natural gas on price today but
2 whether they can deliver better value to customers, the distribution system and society
3 over the full length of the proposed contract. While there are many elements of the
4 framework that compel a valuation that goes far beyond market rates, I focus here on a
5 few significant benefits that are included in the Framework but not considered under the
6 draft RFP's proposed price threshold. These benefit categories include Energy Demand
7 Reduction Induced Price Effect, Electric Transmission Capacity Value, Greenhouse Gas
8 compliance costs, Greenhouse Gas externality costs and Criteria Air Pollutant and other
9 environmental externality costs.

10 **Q. Please describe potential benefits of RFP applicants that would fall under the**
11 **category of “Energy Demand Reduction Induced Price Effect (DRIPE).”**

12 A. DRIPE refers to the change in wholesale energy price related to a reduction in demand
13 (such as through energy efficiency or distributed energy resources). The analog for grid-
14 tied generation resources that might bid into the RFP is Locational Marginal Price (LMP)
15 impacts related to the injection of inframarginal-cost energy in the ISO-NE market.
16 Adding energy resources with zero or negative dispatch costs shifts the entire supply
17 stack, often resulting in a lower-cost resource as the marginal unit that sets the price.
18 Daymark has studied this impact for the proposed Vineyard Wind project in
19 Massachusetts and Connecticut and found significant impacts from 400 MW of offshore
20 wind injection. The effect can be even greater in certain conditions that could occur in the
21 future, such as a constrained natural gas supply scenario or strict greenhouse gas

1 regulation. Small changes in LMP can result in significant savings for Rhode Island
2 ratepayers.

3 The Framework notes that some energy savings will be offset by the adjustment of Net
4 CONE resulting from lower energy and ancillary services (E&AS) revenues in its
5 calculation. However, I also note that the new Competitive Auctions with Sponsored
6 Policy Resources (CASPR), which will take effect in the next Forward Capacity Auction
7 (FCA), allows policy-driven resources such as the RFP applicants to assume the capacity
8 supply obligation of a departing resource through a post-FCA substitution auction. By
9 reducing the need to procure new capacity in the FCA resulting from retiring resources,
10 RFP applicant projects could have a small price reduction impact in the FCM as well,
11 further benefitting Rhode Island ratepayers.

12 **Q. Please describe potential benefits of RFP applicants that would fall under the**
13 **category of “Greenhouse gas compliance costs”.**

14 A. Greenhouse gas compliance costs can come in two forms. First, there is a per ton cost
15 assessed on emissions under a carbon tax or a carbon cap and trade regime such as RGGI.
16 RGGI compliance costs can be captured in an appropriate market energy price forecast,
17 since energy prices reflect RGGI compliance cost through the dispatch cost of the
18 marginal unit offering into the market. The market price forecast relied on by the
19 Company to determine cost effectiveness should reflect a reasonable outlook for GHG
20 emission costs in the future, accounting for progressively stringent future reduction
21 targets.

1 A second form of compliance cost is direct costs related to programs or investments
2 required to meet greenhouse gas reduction targets. The 2014 Resilient Rhode Island Act
3 established aggressive statewide greenhouse gas emissions reduction targets, up to 80%
4 below 1990 levels by 2050. According to the Executive Climate Change Coordinating
5 Council (EC4)'s December 2016 Greenhouse Gas Emissions Reduction Plan, meeting
6 even the 2035 interim reduction target (45% below 1990 levels) would require major
7 mitigation initiatives throughout the energy economy. A "Major GHG Mitigation
8 Option" proposed in the plan contemplates major action across all GHG source sectors,
9 including significant electrification of heating and transportation, and achieving 67%
10 renewable installed capacity and 72% carbon-free generation before the end of any likely
11 PPA signed through the draft RFP. RGGI and the RES as currently formulated would not
12 be sufficient to drive such an outcome. RFP applicants would offset significant additional
13 compliance costs associated with meeting the Resilient Rhode Island Act targets. These
14 avoided compliance costs should be considered in the Company's evaluation of cost
15 effectiveness.

16 **Q. Please describe potential benefits of RFP applicants that would fall under the**
17 **category of "Greenhouse gas externality costs."**

18 A. Greenhouse gas emissions contribute to societal costs that are estimated to far exceed
19 current compliance costs imposed through RGGI. The U.S. Government's Interagency
20 Working Group (IWG) on Social Cost of Greenhouse Gases estimates monetized
21 damages associated with GHG emissions including (but not limited to) changes in net
22 agricultural productivity, human health impacts, property damages from increased flood

1 risk, and value of ecosystem services due to climate change. The IWG’s most recent mid-
2 range case estimates the cost of GHG emissions in 2020 to be nearly \$50 per ton¹. That
3 would be more than 12 times the latest RGGI auction clearing price of \$4/ton. As
4 Governor Raimondo has noted, Rhode Island is particularly vulnerable to the harmful
5 effects of climate change, and a national average estimate may understate the externality
6 costs to the state. The injection of zero emission renewable energy into the regional mix
7 will displace GHG-emitting generation throughout New England, leading to reduced
8 GHG emissions and associated externality costs. The benefit of these reductions, net of
9 RGGI compliance costs already accounted for in energy prices, should be considered in
10 determining the cost effectiveness of RFP applicants.

11 **Q. Please describe potential benefits of RFP applicants that would fall under the**
12 **category of “Criteria air pollutant and other environmental externality costs.”**

13 A. The same dynamic just described for GHG emissions also applies to other emissions
14 from energy generation, including NO_x, SO₂ and fine particulates. The societal cost of
15 these emissions is not fully captured in compliance costs, so emission reductions
16 achieved through the introduction of new, clean resources will convey benefits beyond
17 those captured in direct energy market costs.

18 **Q. Please describe potential benefits of RFP applicants that would fall under the**
19 **category of “Electric Transmission Capacity Costs / Value.”**

¹ Specifically, \$42 (2007\$) per metric ton. Adjusting for 2% inflation and converting to “short” tons (1 short ton = 2,000 lb) yields \$49/ton. See EPA 2016 RIA and Addendum 2020, 3% discount rate. https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf.

1 A. Benefits and costs in this category are driven by changes in transmission capacity
2 requirements associated with changes in the resource mix. RFP applicants could
3 demonstrate significant value in this category by injecting power in capacity constrained
4 zones close to the region’s largest load center of Boston. The most recent Regional
5 System Plan, the 10-year planning document produced by ISO-New England for
6 transmission investment to meet system needs, identifies the Southeast
7 Massachusetts/Rhode Island (SEMA/RI) as a key study area and includes several
8 proposed transmission projects aimed at addressing reliability issues for the import-
9 constrained zone. This area is seeing significant retirements of baseload generation
10 resources with the recent closure of 1,600 MW Brayton Point Station and the announced
11 closure of 670 MW Pilgrim Nuclear Power Station in May 2019. RFP applicants –
12 particularly offshore wind projects with high capacity factors and more reliable
13 production profiles – should be given the opportunity to demonstrate that their projects
14 might defer the need for some transmission investments. The cost of such transmission
15 allowing energy from significant power sources to move freely on the ISO-NE system is
16 shared by all New England load. Deferred Pool Transmission Facility (PTF) investment,
17 regardless of the specific location, would benefit Rhode Island ratepayers directly or
18 indirectly through reduced Regional Network Service transmission rates.

19 **Q. Are there other potential benefits of RFP applicants that would fall within the**
20 **Framework?**

21 A. Undoubtedly. Each applicant should be given the chance to advocate for the specific
22 benefits the project would provide under the Framework. I have cited some examples that

1 I believe would be commonly applicable to many eligible resources, including Vineyard
2 Wind. Allowing applicants to propose a more complete value proposition will allow for a
3 more competitive process.

4 **REC PRICING**

5 **Q. Please describe two different common approaches to REC price forecasting.**

6 A. One approach is commonly known as a “50/50” spot price forecast. A 50/50 forecast
7 is intended to predict prices, with the view that there is an equal probability that the
8 forecast will ultimately prove to be too high or that it will be too low. The second
9 approach is to develop a risk-adjusted or financeable forecast. This approach considers
10 how much value an actual lender or buyer would place on that expected stream of values
11 under uncertainty including policy and market risks. These forecasts tend to be
12 significantly lower than 50/50 forecasts and tend to be the approach that is relied on by
13 lenders financing these transactions.

14 **Q. In your opinion, which forecast type is more consistent with the “commercially**
15 **reasonable” standard?**

16 A. Commercially reasonable is defined in R.I. Gen. Laws § 39-26.1-2 to mean “terms and
17 pricing that are reasonably consistent with what an experienced power market analyst
18 would expect to see in transactions involving newly developed renewable energy
19 resources.” The draft RFP requires separate pricing for energy and RECs, with the bidder
20 assuming policy risk on the REC revenue stream if Rhode Island’s Renewable Energy
21 Standard is altered or abolished sometime in the contract term. Under these terms, I
22 expect a developer of a new renewable energy resource to be highly unlikely to obtain

1 financing if the economic viability of the project is dependent on REC revenues based on
2 a 50/50 forecast of REC prices. As a completely hypothetical example, if a 50/50 forecast
3 of RECs were \$40/MWh, and a project required \$80/MWh to be economically viable, it
4 is unlikely that the project could obtain financing with an energy bid of \$40/MWh and a
5 REC bid of \$40/REC. The financial market will price the risks and discount financeable
6 REC revenues accordingly. A financeable REC forecast might (hypothetically) be closer
7 to \$20/REC, and the project could only be financed with a \$60/MWh energy bid and \$20
8 REC bid. An appropriately risk-adjusted forecast of REC prices is more commercially
9 reasonable.

10 **Q. Why is it a concern if the default REC price forecast is too high?**

11 A. Bidders will need to submit bids such that the combined value stack of energy and
12 REC revenues makes the project economically viable. The higher the expectation and
13 allowed bid price on REC value, the more downward competitive pressure on the price of
14 energy in the value stack if applicants are competing on combined price. That dynamic
15 puts developers in a very dangerous position of having to rely on high REC pricing long-
16 term to make their projects economically viable. The financial market does not tolerate
17 excessive risk and generally will not commit to high REC values as a backstop to project
18 viability. Therefore, it is essential that REC pricing is forecast conservatively and
19 consistently with financial market expectations or it can play a significant role in
20 undermining project viability.

1 **Q. Have you reviewed the “Base Case, Class 1 Market Price Forecast for Rhode**
2 **Island” prepared by Sustainable Energy Advantage that National Grid proposes to**
3 **use to determine a default REC price?**

4 A. No. To my understanding, under the draft RFP this forecast will not be known by
5 bidders prior to bid submission.

6 **Q. What recommendations do you have with regard to the REC price component?**

7 A. The Company should guarantee both energy and REC payments for the full term of
8 the contract, regardless of changes to R.I. Gen. Laws § 39-26-5. This proposed RFP is
9 driven by the Governor’s initiative in support of the goal to deploy 1,000 MW of
10 renewable energy by 2020. Any projects selected through this RFP and brought into
11 commercial operation will contribute irrevocably to meeting this goal, regardless of
12 future policy changes that may alter the state’s clean energy priorities. Forcing
13 developers to assume the risk that future policymakers will re-think renewable energy
14 priorities will increase costs for ratepayers by making it more difficult for applicants to
15 obtain favorable financing terms and make it more difficult for developers to submit
16 commercially reasonable bids.

17 **Q. What recommendation do you have for the “default REC price” in the event**
18 **that the final RFP continues to make REC payments contingent on continued**
19 **conformance with the RES?**

20 A. The Company should not evaluate bid eligibility based on a view that commercially
21 reasonable terms include an excessive reliance on uncertain REC revenues. The default
22 REC price should represent an appropriately risk-adjusted, financeable price forecast

1 consistent with the outlook of financiers active in major renewable project development.
2 The Company should also submit its proposed REC price forecast for Commission
3 review and approval prior to requesting bids. This will enable stakeholder and
4 Commission input on the appropriateness and commercial reasonableness of the forecast.

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

6 A. Yes.

Appendix A: Resume of Dan Koehler



Dan Koehler

Senior Consultant and Manager of Wholesale Market Analytics

Dan provides clients economic and policy analysis and strategic insights in matters including resource planning and procurement, ratemaking and regulation, and asset valuation. He has provided expert testimony before state regulatory agencies on resource planning and ratemaking issues. In his capacity as Manager of Wholesale Market Analytics, Dan works to ensure that our team's approach to analysis is consistently of high quality and that best practices are observed.

SELECTED PROFESSIONAL EXPERIENCE

Wholesale Market Analytics

- Manages and coordinates the firm's wholesale market analytics practice area, including maintaining and extending the firm's capabilities and technology to analyze and forecast market trends in energy, capacity, natural gas and other markets.
- Supervising operator of Daymark's AURORAxmp Electric Market Model ("Aurora"), an hourly chronological dispatch model simulating the economic dispatch of North American power plants within a competitive framework. Manages the team that maintains, updates and operates the Aurora model to support analysis for numerous client projects.
- Developed process improvement strategies in wholesale electricity market modeling for a large Canadian independent power producer. In particular, assisted the client in improving the representation of NYISO in AURORAxmp, with a focus on improved output benchmarking tools, supply stack representation and fuel forecasts. Also assisted the client with programming AURORAxmp to conduct Monte Carlo risk analysis with multiple correlated continuous and discrete risk variables.
- Developed and successfully benchmarked models of various systems using AURORAxmp software including PJM, NYISO, Southern Company and neighboring Balancing Authority Areas, Duke Energy, and ISO New England.

Generation Asset Valuation

- Assisted with the preparation of an appraisal critique and alternative asset valuations for a 540 MW natural gas-fired generation unit in Rhode Island and several hydroelectric assets in Northern New England. Supported expert witness Dan Peaco in multiple ongoing tax appeal litigation proceedings in Vermont, New Hampshire and Rhode Island courts.
- Provided analysis, expert witness preparation, and litigation support in two arbitration cases concerning fair market value of hydroelectric generation assets in Maine and Vermont. Assisted expert witness Dan Peaco with testimony in arbitration proceedings regarding the valuation of 4 MW Brassua Dam in Maine (AAA Case No. 11 153 Y 02133 11) and the valuation of 7 MW Winooski One in Vermont (AAA Case No. 11 198 Y 002014 12).
- Co-authored a report with the New Hampshire Public Utilities Commission Staff on the market value of Public Service Company of New Hampshire's generation fleet.

Utility Planning

- Assisted PSEG Long Island with the design, administration and evaluation of the 2015 Renewable RFP on behalf of Long Island Power Authority.
- Analyzed a request to the North Dakota Public Service Commission for an Advanced Determination of Prudence for installation of \$500 million Air Quality Control System at Big Stone coal-fired power facility. Assisted Richard Hahn with developing expert testimony on behalf of NDPSC Staff in Docket No. PU-11-165.
- Analyzed a petition to the Arkansas Public Service Commission for approval of installing \$500 million in environmental controls at Flint Creek coal-fired power plant in northwest Arkansas. Assisted Richard Hahn with developing expert testimony on behalf of APSC Staff in Docket No. 12-008-U.
- Evaluated the Integrated Resource Plan of a North Dakota utility and helped prepare expert testimony before the Public Service Commission on the utility's application to build a new generation unit.
- Evaluated application filings and drafted testimony for presentation to the Wisconsin Public Service Commission on a proposed 345kV transmission project and a quarter billion dollar distribution system upgrade.
- Assisted with developing and drafting Integrated Resource Plans for two Vermont utilities, including producing a multivariate regression analysis to forecast load.
- Monitors new and developing environmental regulations affecting electric generating units – particularly the Cross-State Air Pollution Rule (CSAPR), Regional Haze Rule, Mercury and Air Toxics Standards (MATS), and greenhouse gas standards – and has provided consultation to clients on potential impacts.
- Analyzed the application of a Utah utility for approval of a new 625 MW combined cycle generation resource, and assisted with expert testimony of Richard Hahn on behalf of the Division of Public Utilities in Utah PSC Docket No. 10-035-126.
- Provided analysis of climate change impacts and potential renewable energy export markets for independent consultant work on the Manitoba Hydro application to construct over 2,000 MW of new hydro facilities

Rates and Regulation

- Advised PSEG Long Island on the development of three feed-in tariffs to encourage the development of clean energy resources on the Long Island Power Authority system.
- Filed testimony to FERC on behalf of the New York State Utility Intervention Unit, presenting analysis of and proposed adjustments to NEET New York's requested base ROE.
- Provided expert pre-filed and oral testimony to the Michigan Public Service Commission in Consumers Energy Company's last three general electric rate cases (Case Nos. U-17735, U-17990 and U-18322) focusing on coal-fired generation investment decisions and proposed investment recovery mechanisms.
- Managed the project team assisting Kaua'i Island Utility Cooperative (KIUC) with re-design of rates, with a focus on addressing issues related to widespread installation of distributed energy resources.
- Assisted the Utah Division of Public Utilities in a review of Rocky Mountain Power's net power cost reconciliation ("Energy Balancing Account") for each year since 2011, with particular focus on the

prudence of natural gas and electric hedging transactions. Filed expert report and testimony in Docket No. 15-035-03 auditing 2014 EBA costs and No. 16-035-01 auditing 2015 EBA costs.

- Conducted market research and designed Time of Use, Critical Peak Pricing and Real Time Pricing rates for multiple small New England municipal utilities.
- Assisted the Utah Division of Public Utilities with the analysis of capital expenditures in a major utility's general rate case, including a novel sampling approach to generalize findings, and assisted with preparation of expert testimony.
- Designed Allocated Cost of Service-based Critical Peak Pricing Rates for Stowe Electric Department and drafted supporting testimony to the Vermont Public Service Board.
- Worked with a team to develop testimony in several electric rate cases on behalf of the Wisconsin Citizens Utility Board.

Other

- Leads team providing electric energy advisory and procurement services to the Massachusetts Port Authority.
- Modeled, analyzed and contributed to a report on the current and potential impact of a Renewable Energy and Energy Efficiency Portfolio Standard in North Carolina.
- Analyzed the merger application of Duke and Progress and assisted with drafting testimony on behalf of environmental organizations in North Carolina and South Carolina Commission proceedings.
- Research and analytical support for Central Procurement Options study for Massachusetts DOER and Attorney General's Office.
- Provided research and market analytics support for expert witness testimony on the potential for Hydro Quebec to export wind power to New England markets.
- Analyzed PJM's proposed capacity market overhaul and assisted a large coalition of stakeholders with intervention at the FERC regarding the transition process.

EMPLOYMENT HISTORY

Daymark Energy Advisors, Inc.	Boston, MA
<i>Senior Consultant and Manager of Wholesale Market Analytics</i>	2017 – Present
<i>Consultant</i>	2013 – 2017
<i>Analyst</i>	2010 – 2013
Kennebec Valley Organization	Waterville, ME
<i>Director</i>	2003 – 2009
United States Peace Corps	Paraguay
<i>Volunteer</i>	2000 – 2002

EDUCATION

University of Southern Maine	Portland, ME
<i>Master of Public Policy and Management</i>	2011
Yale University	New Haven, CT
<i>B.A., with Major in Applied Mathematics</i>	2000

PRESENTATIONS & TESTIMONY

Invited Speaker & Conference Presentations

- *Regulation, Markets and Headwinds for Coal Generation*, presented at the La Capra Associates Client Symposium, Burlington, VT, November 2012.
- *Incorporating Discrete Scenario Inputs in AURORA Monte Carlo Analysis*, presented at the EPIS Electric Market Forecasting Conference, Tucson, AZ, October 2013.

Expert Testimony

FORUM	ON BEHALF OF	TOPIC
Michigan Public Service Commission (Docket No. U-17735)	Michigan Environmental Council and Natural Resources Defense Council	Expert testimony in Consumers Energy general rate case focusing on proposed investment recovery mechanism and generation asset disposition. June 2015.
Utah Public Service Commission (Docket No. 15-035-03)	Division of Public Utilities	Joint testimony sponsoring an audit report of Rocky Mountain Power's Energy Balancing Account. July 2015.
New Hampshire Public Utilities Commission	PUC Staff	Valuation of PSNH generation assets.
Michigan Public Service Commission (Docket No. U-17990)	Michigan Environmental Council, Natural Resources Defense Council and Sierra Club	Expert testimony in Consumers Energy general rate case focusing on proposed investment recovery mechanism and generation asset disposition. July 2016.
Utah Public Service Commission (Docket No. 16-035-01)	Division of Public Utilities	Joint testimony sponsoring an audit report of Rocky Mountain Power's Energy Balancing Account filing. July 2016.
Federal Energy Regulatory Commission	NY State Utility Intervention Unit	Analysis of and proposed adjustments to NEET New York's requested base ROE. No. ER16-2719-000. December 2016.
Michigan Public Service Commission (Docket No. U-18142)	Michigan Environmental Council and Sierra Club	Impact of wind RFP non-selection decision on 2017 Power Supply Cost Recovery Plan filing. June 2017.
Michigan Public Service Commission (Docket No. U-18322)	Michigan Environmental Council, Natural Resources Defense Council and Sierra Club	Review of Consumers' proposed investment in life extension of coal-fired generation units, focusing on the modeling and economic analysis of various retirement dates. August 2017.
Utah Public Service Commission (Docket No. 17-035-01)	Division of Public Utilities	Joint testimony sponsoring an audit report of Rocky Mountain Power's Energy Balancing Account filing. November 2017.