COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

Petition of NSTAR Electric Company and	**)**	
Western Massachusetts Electric Company	**)**	**D.P.U. 15-122/123**
d/b/a Eversource Energy for Approval of their	**)**	
Grid Modernization Plans	**)**	

DIRECT TESTIMONY OF

FRANK LACEY

ON BEHALF OF

THE CAPE LIGHT COMPACT

MARCH 10, 2017

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Frank Lacey. My business address is 3 Traylor Drive, West Chester, PA 19382.

Q. By whom are you employed and on whose behalf are you testifying?

A. I am an independent consultant testifying on behalf of the Cape Light Compact (the "Compact").

Q. Please summarize your educational background and professional experience.

A. I have worked in the electric power industry for approximately 24 years, beginning immediately after earning my graduate degree. I have worked on major industry restructuring issues including generation asset divestiture, with a specialization in environmental asset valuation which became relevant after the Clean Air Act Amendments of 1992 became law; stranded cost valuations; transmission restructuring including the development of Independent System Operators ("ISOs") and Regional Transmission Organization ("RTOs") and other independent transmission entities; the development of retail energy markets; and the development of demand response markets. I have worked as a consultant to industry participants and directly as an industry participant. As a consultant, I was employed by Putnam, Hayes & Bartlett, Inc. and by Arthur Andersen Business Consulting. Within the industry, I have worked for Strategic Energy, a retail electricity supplier, Direct Energy, a retail energy supplier that acquired

Strategic Energy in 2008, and most recently, Comverge, Inc. and CPower, two companies that share a common owner and provide demand response services to residential and to commercial & industrial ("C&I") customers, respectively. I created Electric Advisors Consulting LLC in the fall of 2015. As a consultant, I am providing policy-related consulting services to advanced energy management companies and end-use customers. I hold a Bachelor of Science degree in Transportation and Logistics from the University of Maryland and a Master of Science in Industrial Administration with concentrations in finance and environmental management from the Tepper School of Business at Carnegie Mellon University. My resume is provided as Exhibit CLC-FL-2.

Q. Would you please describe your professional affiliations?

A. I am currently a member of the board of directors of the Smart Electric Power Alliance ("SEPA"), a trade association with more than 1,000 members including utilities, distributed resource providers and related service providers. I am the Chairman of the Advisory Council on Demand Response and Smart Grid within SEPA, which is a standing Committee dedicated to enhancing the vision of demand response and smart grid ideas within SEPA. Prior to its dissolution in 2015, I served on the board of directors of the Demand Response and Smart Grid Coalition. I am also a founding member and the current Chairmen of the Advanced Energy Management Alliance. I served on the board of directors of the

Electric Reliability Council of Texas ("ERCOT"), the grid operator in Texas, from 2002 to 2004.

Q. Have you ever testified before the Massachusetts Department of Public Utilities or any other utility regulatory agency?

A. Yes, I testified before the Massachusetts Department of Public Utilities (the "Department") in the recent Investigation of the Propriety of Proposed Tariff Changes filed by National Grid in 2015. I have also testified numerous times before other state regulatory agencies, legislatures, and twice as a technical conference witness at the Federal Energy Regulatory Commission ("FERC"). In addition to the National Grid rate proceeding, I have provided expert testimony in Pennsylvania, Ohio, Maryland, Illinois, Utah and California. I have presented oral testimony in less formal proceedings before the Commissions of Maryland, Pennsylvania and Texas. I have presented legislative testimony in New York, Maryland, Pennsylvania, Delaware, Michigan, California, Texas and Virginia. I recently filed an expert report on energy matters in the Superior Court of New Jersey in Bergen County. I have also spoken at numerous trade shows, conferences and other industry and corporate events as an expert on electricity market issues. A summary of my prior testimony is contained in Exhibit CLC-FL-3.

Q. What is the Compact's interest in this proceeding as you understand it?

A. This proceeding involves a petition of NSTAR Electric Company and Western Massachusetts Electric Company d/b/a Eversource Energy ("Eversource") for approval of a grid modernization plan, as reflected in its Updated and Revised Incremental Grid Modernization Plan filed February 3, 2017 (the "Revised IGMP"). As stated in the direct testimony of Margaret T. Downey, Austin T. Brandt, and Kevin F. Galligan, Exhibit CLC-DBG-1, I understand that the Compact operates an opt-out retail power supply program and administers an energy efficiency program within a certain service territory along Cape Cod and Martha's Vineyard in Eastern Massachusetts. In both of these roles, the Compact has been an active participant in the competitive electric retail markets. I also understand that Eversource provides the electric distribution service to all of the towns within the Compact's service territory. The Compact generally supports the development of a smarter electric grid but is concerned that the Revised IGMP is not aggressive enough to achieve the intended goals and will inhibit the Compact's ability to offer its members premium electricity products and services.

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

A. In this testimony, I discuss the implications of the Revised IGMP for (1) customer engagement and (2) competitive supply markets.

With respect to customer engagement, I will show that the Revised IGMP is lacking in several areas. Most notably, despite a significant amount of apparent thought and effort on the topic of consumer engagement, the Revised IGMP

admittedly neglects ninety-five percent (95%) of Eversource's customers, thus, no real customer value is created. Additionally, the marginal cost of providing an incremental customer with advanced metering and communications is approximately one-fourth of the average cost that Eversource has proposed for building out the advanced distribution system for the five percent (5%) that Eversource is envisioning participating in the Plan. For a variety of reasons that I will discuss, Eversource's time-varying products will likely under-achieve the five percent (5%) goal described in the Revised IGMP.

With respect to competitive markets, I conclude that the Revised IGMP will give Eversource an unfair advantage to the detriment of competitive markets. That in turn will impair the ability of customers and competitive suppliers to work together to support the objectives that the Department has laid out for grid modernization. Specifically, I will show that the mere presence of two more basic service products is detrimental to the competitive market and will ultimately worsen the options available to customers, including those who reside in the Compact's territory.

Finally, I will show that Eversource's plan to deploy storage resources in connection with grid modernization is in direct conflict with evolving federal energy policy.

II. THE GRID MODERNIZATION PLAN

Q. Are you familiar with the grid modernization plan that Eversource is proposing in this proceeding?

A. I am.

Q. Could you please provide a brief summary of the proposal?

A. Eversource's Revised IGMP is atypical of most grid modernization plans. With the recent Revised IGMP, Eversource withdrew major portions of its original grid modernization plan, dated August 19, 2015, as updated June 16, 2016 (the "Initial Filing"). With the Revised IGMP, Eversource took a very unusual step of bifurcating its original proposal into two separate regulatory proceedings. The Grid Modernization Base Commitment ("GMBC") is now part of Eversource's distribution rate case filing in Docket No. D.P.U. 17-05. The GMBC details a number of distribution system investments. The Revised IGMP (this docket) solely proposes to develop and deliver two separate time-varying rate ("TVR") retail products that Eversource intends to offer to a small portion of its basic service customers, to carry out some customer education initiatives, and to make a few other minor investments.

Q. How does the bifurcation affect your ability to evaluate the Revised IGMP?

A. Without some level of investment of the kinds that were removed to D.P.U. 17-05, such as certain proposals related to data collection, centralized communication and control systems, and computer-assisted decision making, the plans presented

in this docket would be impossible to achieve. For example, the Revised IGMP generally details a consumer engagement plan that is heavily premised on Eversource's development and deployment of two TVR retail electricity products. These products, which the Compact is opposed to, would be impossible to implement without some of the investments outlined in the GMBC. Because of this tension, I will at times refer generally to the proposals that were removed to D.P.U. 17-05.

Q. What is your understanding and opinion of Eversource's goals in this proceeding?

A. The Initial Filing presented by Eversource stated several broad goals that are laudable and achievable. For example, the Initial Filing states that its mission "is to implement transformational change through innovation and escalation" and that the proposal "will deliver the benefits of a more modern and resilient grid to Eversource's customers, as intended by the Department".[1] However, the more specific plans of the Revised IGMP are neither laudable nor achievable. The Revised IGMP ignores the overwhelming majority of the customers in Eversource's territory and does virtually nothing to assist customers who are engaged or who want to be engaged with companies other than Eversource in the market for electricity.

[1] See Revised IGMP, p. 6; GMBC, p. 4.

The Revised IGMP, even in the context of the GMBC investments, falls woefully short of its goal to deliver advanced grid capabilities to its customers as it intends to deliver advanced metering infrastructure and communications tools to only "about five percent of the total residential and C&I customer base".[2] Eversource describes its electric market as one that "offers customers tremendous opportunity to engage with the electric grid"[3] but expects to engage a mere five percent (5%) of its customers, leaving this "tremendous opportunity" untapped.

Q. Is it Eversource's responsibility to ensure that customers on competitive electric service have access to more advanced grid technologies?

A. Yes. Eversource, the distribution company, is a regulated monopoly and is solely responsible for providing distribution service. There is no viable competition for the distribution business and to my knowledge, no stakeholders have suggested that the electric distribution business be open to competition. Eversource is clear in its tariff that Eversource owns the meters on the customers' premises. As a regulated monopoly, Eversource should be compelled to treat all of its customers similarly, and should not discriminate among customers on the basis of their electricity supply companies. In this case, that means providing advanced metering and communications infrastructure to all customers, or at least all who want to engage more actively with the grid; not just a small group of customers

[2] See Revised IGMP, p. 24.
[3] See Revised IGMP, p. 9. (Emphasis added.)

taking a TVR product from basic service. Alternatively, if Eversource believes metering and grid-based communications should be a competitive service, it should state as much and amend its Revised IGMP, its distribution rates, its competitive supplier tariffs and other materials accordingly.

Q. Does the Revised IGMP meet the objectives for grid modernization established by the Department?

A. Here, it is important to look to both dockets. Eversource states that it developed its plan "to achieve the four grid-modernization objectives identified by the Department, which are to: (1) reduce the effects of outages; (2) optimize demand, including reducing system and customer costs; (3) integrate [distributed energy resources ("DER")]; and (4) improve workforce and asset management." The objectives of optimizing demand and integrating DER are predominantly customer-focused objectives. The other two, reducing the effect of outages and improving workforce and asset management, are more distribution-focused.

Standing alone, the Revised IGMP fails on all four objectives. The Revised IGMP will deliver to only "about five percent" of the customers in the Eversource territory a singular tool (a retail product) to optimize demand and presents no tools to enhance the integration of market-based DER.

When viewed in the context of other investments proposed in D.P.U. 17-05, such proposals would likely reduce the effect of outages and may improve workforce and asset management. However, even when reviewed comprehensively, the

other two objectives are still missed. For example, instead of focusing on how customers will be utilizing distributed energy resources to support their own operations and premises, and working to integrate those resources, the Revised IGMP instead, seeks to invest $100 million in ratepayer funds to develop one or more storage resources that it will integrate into the grid.

III. CUSTOMER VALUE

Q. Do you believe that the Revised IGMP will provide any meaningful market benefits to customers?

A. I do not.

Q. Could you please explain?

A. According to the Revised IGMP, Eversource "will install different metering equipment depending on the customers' needs,"[4] but it will only install that equipment for "customers who opt in to either the proposed TOU/CPP [time of use/critical peak pricing] or Targeted TOU rate."[5] Additionally, according to the Revised IGMP, Eversource only expects that "about five percent of the total residential and C&I customer base may sign-up for the opt-in TVR program."[6]

Q. What is the average cost per enrolled TVR customer of Eversource's proposed grid modernization plan?

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[4] See Revised IGMP, p. 27.
[5] See Revised IGMP, p. 27.
[6] See Revised IGMP, p. 24.

A. Eversource proposes to spend over $538 million in its Revised IGMP combined with the GMBC proposed in D.P.U. 17-05. This represents an investment that is capable of providing advanced meters and communications technologies to just five percent (5%) of its customers. This includes an investment in customer education and outreach that will provide Eversource with rate-based funds to cover a five-year advertising campaign that seeks to "create awareness of and drive customer participation in the opt-in TVR programs."[7] Using Eversource's representation that there are 1.338 million eligible customers[8], and Eversource's other assumptions and proposals, approximately 67,000 customers will be upgraded to advanced meters at an average cost of approximately $8,000 per upgraded customer.

Q. Could Eversource expand the deployment of advanced metering and communications equipment more efficiently?

A. Yes, it would be more efficient to deploy advanced metering to more customers than the 67,000 proposed. Based on the numbers presented in the Revised IGMP, the marginal cost of providing additional customers with advanced metering and modern information technology should be less than $1,600 per customer. In other words, each incremental customer can be added to the advanced metering system

[7] See Revised IGMP, p. 58.
[8] See Revised IGMP, p. 17-18.

for less than one-fourth of the cost for the customers identified in the Revised IGMP.

Q. Could you explain how you arrived at that conclusion?

A. Yes. The Revised IGMP budgets approximately $108 million for investments in TVR meters and information technology systems. As stated above, approximately 67,000 customers are expected to sign up for a TVR plan. Thus, the direct cost per customer is approximately $1,600.

Q. What would you expect to happen to the marginal cost of customer upgrades as more customers are included?

A. I would expect the marginal cost of additional advanced meter installations to decrease as more customers are included. Additionally, I would expect the marginal per-customer benefits to increase after more than five percent (5%) of customers are enrolled in market-based TVR or other load managing energy products and programs, as greater load shifting and peak shaving can be achieved. Thus, Eversource's investments would be substantially more cost-effective if a greater number of advanced meters are installed.

Q. Could customers who do not elect to participate in Eversource's TVR programs benefit from having advanced metering and communications technologies at their homes and businesses?

A. If they were allowed to have them, certainly. Customers around the country are engaged in various market programs and electricity products that help conserve

electricity and manage peak demand. These include "free nights and weekends" programs[9], pre-paid electricity products[10], demand response programs, peak-saver programs, advanced thermostat programs and others. Many of these products and programs are either enabled or greatly enhanced with the deployment of advanced meters and communications technologies. For example, in the ERCOT market, where the utilities have fully deployed advanced metering infrastructure ("AMI"), approximately 14% of customers are on supplier-sponsored price-responsive demand products. This figure is notable because those programs are market-based and not utility sponsored. Utilities have also deployed very successful load management programs. For example, Baltimore Gas and Electric ("BG&E") has over 320,000 customers (28%) participating in its Peak Rewards ™ program. The Potomac Electric Power Company ("PEPCO") has over 340,000 participating customers (approximately 65%) in its Energy Wise Rewards ™ program. BG&E and PEPCO have also fully deployed AMI meters and communications technologies. Massachusetts customers, like those in Texas and Maryland, could benefit significantly from a meaningful smart grid deployment, allowing better management of individual energy bills and bringing system-wide costs down over time. Greater deployment of advanced meters in Eversource's service territory

[9] As the name implies, a Free Nights and Weekends electricity product is one where customers are greatly incentivized (with free electricity) to consume electricity during "off-peak" hours which are typically nights and weekends.

[10] Prepaid products are akin to a toll pass where a customer can pay for a certain amount of electricity in advance and get daily updates regarding usage, remaining balance, budgeting guidance and perhaps tips for reducing consumption over the next few days.

would expand opportunities for the Compact and competitive entities to offer such products. The testimony of Margaret T. Downey, Austin T. Brandt, and Kevin F. Galligan, Exhibit CLC-DBG-1, describes how greater deployment of advanced meters could support the Compact's power supply program and other activities.

Q. Could you summarize your testimony on customer value?

A. Yes. Eversource is proposing a grid modernization plan that ties the provision of real-time energy management benefits to only customers who choose to take one of Eversource's proposed TVR products. Customers in the Compact's jurisdictions as well as others across Eversource's service territory are taking electricity supply from companies other than Eversource. These suppliers offer innovative products that can help achieve the demand reduction goals described in the Revised IGMP. These products can be enhanced and the customers' experiences improved with the availability of real time metering data and communications. Eversource appears to believe only a utility can offer these advanced products and proposes to offer TVR products expected to achieve just a five percent (5%) penetration rate, compared to over sixty (60%) in other jurisdictions. The cost to install the necessary equipment at a customer's premise is one-third or less than the average cost proposed by Eversource for TVR customers. All customers in the Eversource territories would be much better served if they all had access to the metering and communications technology that

the Revised IGMP proposes to offer to only TVR customers. It should be noted that according to Eversource, its own research "shows that customers want more information, more ability to control energy costs, and opportunities to deploy new emerging energy technologies."[11] Yet the proposal put forth in the Revised IGMP seeks to provide those capabilities to a very narrow subset of customers and prevents the customers who take competitive supply from having access to these capabilities.

IV. THE TVR PROPOSALS

Q. Do you believe that five percent (5%) of Eversource's eligible customers will enroll in one of the TVR programs?

A. I do not.

Q. Please explain.

A. The TVR programs outlined in Revised IGMP are both "all stick and no carrot" programs. The financial risk to a customer for not adjusting its electricity consumption appropriately is relatively severe. Table 1 below shows that a hypothetical customer could see a monthly bill increase of 64% if consumption patterns were not modified (this calculation ignores the additional charges Eversource is going to apply to a customer's bill for communicating the meter data back to Eversource). On the other hand, the only potential benefit is that a

[11] Revised IGMP, p. 13.

customer could significantly modify its current electricity consumption patterns and possibly have a lower monthly electricity invoice.

Table 1 shows that in order for that hypothetical customer to see no bill increase, the customer would need to move 27% of its on-peak consumption to the off-peak period, assuming that the customer also could curtail three-quarters of its critical peak period load (this calculation also ignores the fees that the Eversource intends to charge TVR customers for communicating meter data back to Eversource).

Table 1: Summer Bill Comparison
Base Case vs. TOU/CPP Proposal

	Basic Service Bill		TOU/CPP Bill - No change		
	Off-peak	On-Peak	Off-Peak	On-Peak	Critical Peak
% of total	50.0%	50.0%	50.0%	49.2%	0.8%
kWh	500	500	500	491.8	8.2
Rate	$0.10000	$0.10000	$0.04965	$0.26841	$ 0.86955
Cost	$ 50.00	$ 50.00	$ 24.83	$ 132.00	$ 7.13
Total Bill		**$ 100.00**			**$ 163.96**

	Basic Service Bill		TOU/CPP Bill - No Bill Increase		
	Off-peak	On-Peak	Off-Peak	On-Peak	Critical Peak
% of total	50.0%	50.0%	77.5%	22.2%	0.21%
kWh	500	500	775	222	2
Rate	$0.10000	$0.10000	$0.04965	$0.26841	$ 0.86955
Cost	$ 50.00	$ 50.00	$ 38.50	$ 59.72	$ 1.78
Total Bill		**$ 100.00**			**$ 100.00**

By design, time-of-use ("TOU") and critical peak pricing ("CPP") rates are meant to be somewhat punitive when electricity is consumed during certain system peaks. The TOU/CPP rate structure proposed in the Revised IGMP includes three separate time blocks: off-peak, on-peak and critical peak. The illustrative on-peak and critical peak rates presented by Eversource certainly meet the "punitive"

standard. These peak rates are offset by off-peak rates for 18 hours a day, which are priced at roughly 50% of what would be the normal fixed-price basic service rate in the scenario outlined in the Revised IGMP. Under the TOU/CPP proposal, critical peak rates approach $1.00 per kWh[12] (or $1,000 per MWH). On-peak rates (noon to 6:00 PM) are about 2.7 times the price of what would be a fixed basic service price. The rate design generates a clear incentive to curtail usage during a CPP event and during on-peak hours and to move that consumption to off-peak hours. However, this rate design places too much risk on a customer, and it offers no tools to help manage that risk.

The customer will recognize the need to actively manage electricity load every day or face an electric bill that was higher than before. Customers are more than willing to engage with their electricity company to implement tools that will help manage their daily loads, such as automated devices, which have been shown to be high drivers of success in TVR programs. The Texas and Maryland examples presented above are good examples. Customers will generally shy away from programs that are primarily punitive. Successful CPP programs are designed so that a customer can benefit from CPP through active load management and lower prices for all other hours. The Gulf Power Energy Select ™ CPP program, for

[12] Eversource shows a CPP rate of $.087 per kWh (or $870 per MWH) using a hypothetical $0.10 basic service rate. The current basic service rate is above $0.10. See: https://www.eversource.com/Content/ema-c/residential/my-account/billing-payment/rates-tariffs/basic-service. Based on the algorithm described by Eversource, as basic service rates increase, the CPP rate would also increase.

example, provides a remotely-controlled thermostat for centralized load management and program prices below their normal tariff rate in 87% of all hours. Gulf Power's program has over 15,000 participants enrolled and has very high customer satisfaction rates (as high as 95%).

In contrast, from a customer's perspective, Eversource's language describing the TVR approach in the Revised IGMP is quite unnerving. The Revised IGMP acknowledges that CPP events will be on random days but explains the CPP period as "a six-hour window compared to a more traditional eight-hour or longer peak period."[13] However, when introducing its customer engagement initiatives, Eversource states, "the data indicates that customers are more disciplined about reducing load consistently during a short 2 hour period than customers placed onto a TVR covering the entire peak period, which is typically not the case in a traditional opt-out program."[14] Eversource also plans to target typically larger customers "with central air conditioning and other discretionary load" for the CPP program, making unmitigated consumption during the event that much more punitive. Finally, the TVR design commits a customer to the product for one full year.

Eversource has proposed a CPP product that targets the highest load customers, that will likely be called on twelve of the hottest days of the year. Eversource

[13] See Revised IGMP, p. 18.
[14] See Revised IGMP, p. 16.

acknowledged that research data shows that customers respond well for two hours, but the CPP period, which is priced near $1,000 per MWH, could be six hours long.[15] The customers will readily understand that if for some reason they cannot reduce their load during a CPP event, the bill could rise significantly. The customers will readily understand that if they are not willing to curtail air conditioning for the full six hours on several of the hottest days of the summer, their bill could rise significantly. They will know that Eversource is estimating about 12 CPP events per year, all of which are projected to be in the summer, or even more compressed into just a two-month window.[16] They will also know that if they decide they cannot make the requisite curtailments, then they are committed to the TVR for one full year. The product will be perceived by the customer as too much risk to manage with no tools to aid in managing the risk; too much work to take on to avoid the risk; and too much discomfort to achieve success. The TVR design would be significantly enhanced by the inclusion of some type of engagement tools (*e.g.*, direct load control device or remotely controllable thermostat) to help customers respond to the utility's pricing signal. Mr. Karl R. Rábago's testimony discusses this issue in more detail in Exhibit CLC-KRR-1.

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[15] The Revised IGMP does not explicitly say that the CPP dispatches will be for the entire six hours. On the other hand, the Revised IGMP does not commit to a shorter duration either. It only says that Eversource will determine the affected hours the day before the CPP event. Appendix 3 of the Revised IGMP shows a six-hour window where curtailments could happen.

[16] See IGMP, p. 19.

Q. Are you recommending that Eversource include some type of load control device in its proposal?

A. No. My recommendation is simply that Eversource expand its advanced metering upgrades to be available to all of its customers on an opt-out basis so that customers can work with either Eversource or another electric supplier to take advantage of the "tremendous opportunity" to engage with the grid.

Q. Your comments have been limited to the TOU/CPP product. Have you reviewed the targeted TOU product?

A. Yes. That product is less burdensome on customers, but still suffers from implementation problems. Most notably, there is no incentive to sign up for the product. There is no reason for the customer to bear the increased pricing risk every weekday, all year long. Using conservative assumptions, similar to the above, Table 2 shows that another hypothetical customer would have to permanently switch about enough load from its two-hour peak window so that 93.5% of the household consumption took place in off-peak periods in order to have the same monthly bill. If the customer failed to move any consumption out of the peak window, it would see a bill increase of about 17%.

Table 2: Summer Bill Comparison
Base Case vs. Targeted TOU Proposal

	Basic Service Bill		TOU/CPP Bill - No change	
	Off-peak	On-Peak	Off-Peak	On-Peak
% of total	85.0%	15.0%	85.0%	15.0%
kWh	850	150	850	150
Rate	$0.10000	$0.10000	$ 0.08698	$ 0.28857
Cost	$ 85.00	$ 15.00	$ 73.93	$ 43.29
Total Bill		**$ 100.00**		**$ 117.22**

	Basic Service Bill		TOU/CPP Bill - No Bill Increase	
	Off-peak	On-Peak	Off-Peak	On-Peak
% of total	85.0%	15.0%	93.5%	6.5%
kWh	850	150	935	65
Rate	$0.10000	$0.10000	$ 0.08698	$ 0.28857
Cost	$ 85.00	$ 15.00	$ 81.36	$ 18.64
Total Bill		**$ 100.00**		**$ 100.00**

If air conditioning could be curtailed during the two-hour window every day, that would be a relatively easy solution, but Eversource is targeting air conditioning customers for the TOU/CPP program. In the absence of air conditioning, this hypothetical customer might need to modify from its current usage patterns significant amounts of lighting, television use, cable box use, computer use or other combinations of small appliances to meet its goals.

Q. Do Eversource's TVR price signals accurately reflect the wholesale market price signals?

A. No. The Revised IGMP states that the two TVR options "balance the Department's desire to more closely match price signals in the wholesale market with Basic Service prices with the need to recognize that many customers may not

be comfortable with the potentially extreme price swings that accompany CPP pricing or the long duration of traditional peak period pricing."[17] This argument is flawed on two fronts. First, the TVR rates do not reflect wholesale market prices and therefore do not align with the wholesale market prices of basic service prices. As described above, the Revised IGMP suggests that the CPP events will tend to occur in July and August. According to the ISO-NE market monitor, "[w]hile demand is highest during the summer months, electricity prices over the past several years have been highest during the winter months because of high natural gas prices."[18] According to the Revised IGMP, the CPP events will only be called during peak demand conditions and not peak pricing conditions. Second, Eversource is not planning to provide real-time data to its TVR customers, unless they pay a premium for that service. The base TVR offering from Eversource is to make available usage data from the day prior for its TVR customers. The TVR products therefore, are an inefficient response to the market signals.

Q. Do you have any other concerns with the TVR products?

A. Yes. The reconciliation mechanism for TVR products is extremely troubling. First of all, the reconciliation mechanism results in an extremely ironic outcome that if customers "over-perform" and move "too much" consumption to the off-

[17] See Revised IGMP, p. 17.
[18] ISO New England's Internal Market Monitor, 2015 Annual Markets Report, May 25, 2016, p. 18.

peak or lower-priced periods, they will be assessed a fee to compensate Eversource for the over-performance (under-collection of revenue). Similarly, if the customers "under-performed" and consumed "too much" during the peak periods, they would receive a credit on their bills because the utility would have over-collected. According to the Revised IGMP:

> [t]o the extent that customers alter their behavior and deviate from the average load profile, there will be differences in the revenue billed and the costs incurred for Basic Service. Since TVR is backed by Basic Service procurement, [Eversource] proposes to include TVR revenue with all other Basic Service revenue in the determination of any year end reconciliation. Basic Service reconciliation would continue to be recovered from all customers . . .[19]

More troubling for non-participating customers, however, is the recovery mechanism. In addition to the perverse incentives discussed above, the recovery mechanism becomes even more dysfunctional when TVR product reconciliation is factored in. TVR programs are designed to modify consumption behavior. Customers, however, respond differently to different inputs, like price, heat, humidity and time of day. If every customer failed to modify its behavior in the exact manner planned by the rate design team (or all customers in aggregate so failed), then a cost difference would be generated and that difference would be assessed to all customers, including customers who have opted out of basic

[19] Revised IGMP, p. 25.

service. This is troubling to all customers, especially those who have opted to move away from Eversource's products.

Q. How can these design flaws be fixed?

A. There is no "one shoe fits" solution for all customers. The Revised IGMP attempts to recognize this by offering two additional basic service TVR products, which results in too few TVR options to meet the needs of all customers, and too many basic service offerings for the distribution utility to be making in a competitive market. Eversource should be offering one basic service product.

An optimal TVR marketplace involves a wide array of rate programs, which is another reason why Eversource should make available its advanced metering and communications infrastructure to all customers. If advanced metering and communications were fully deployed, the competitive market could then offer customers advanced electricity products that will have the effect of reducing peak demand. A customer's response in a competitive market will be more closely tied to a wholesale market signal and the customers' preferences relevant to that market signal.

Additionally, the competitive supplier could provide customers with some type of technology to control consumption on their behalf. For example, several retail suppliers offer smart thermostat products to their customers. Control of these thermostats can be centralized and individualized. These thermostats (thus the

customers' load) can be tied to a peak load reducing product where one customer agrees to curtail if the temperature hits a certain threshold, another agrees to curtail based on a peak load threshold and yet another agrees to curtail at certain price points. Taking these three variables and multiplying them by two or three or more different comfort thresholds and then again by dozens of different suppliers results in potentially hundreds of varying products that could be managed synchronously to mitigate peaks year-round regardless of the cause of the peak.

The market-based TVR products would match individual customer preferences to the relevant market signals and include a technology that could be deployed remotely such that the retail supplier could guarantee a curtailment of certain consumption during the event. With effective grid modernization, customers would procure these types of products and would help Eversource achieve its goals of optimizing demand and reducing prices for consumers.

Q. If a supplier offered a TVR type of product and customers did not respond as expected, how would that difference be reconciled?

A. That would be a contractual issue between the customer and the supplier. If the supplier simply mismanaged its portfolio, the supplier would be responsible for any errors in estimations or calculations. It would not be able to pass along losses to Eversource's distribution customers.

Q. What could Eversource do to incorporate more customers into the plan?

A. Eversource should deploy a functional smart grid that all customers and their respective aggregators and/or energy service companies can utilize. The advanced grid tools should provide customers and their energy market representatives with real-time consumption information. With this information, the group of customers who want to be engaged with the grid and the suppliers who provide them with electricity products and services will collectively most efficiently achieve the objectives that are outlined by Eversource and supported by the Department.

Q. Could you please summarize your concerns with the TVR proposals?

A. The TVR product proposals are fatally flawed and for a variety of reasons, should not be allowed to be implemented as an Eversource-provided basic service option. As discussed below, the provision of a TVR basic service product will be damaging to the competitive market and the ability of customers to participate in advanced energy programs. Additionally, from an operations perspective, they provide no incentive to enroll in the product and are laden with financial risk for customer non-performance. The products do not align basic service rates with wholesale rates. The implementation of TVR, if customers enroll, will almost certainly generate adjustments to all customers' rates with the true-up mechanism and ironically, the true-up mechanism would assess a reconciliation fee to over-performing customers and provide a reconciliation credit to under-performing customers. Eversource should not be allowed to implement its proposed TVR

programs. Eversource should deploy advanced meters and smart grid technologies throughout its entire territory and all of the customers and their competitive market representatives should be allowed to access the infrastructure and the customers' real-time usage data. Eversource should offer a single basic service product, so that competitive markets are not harmed by multiple offerings. This approach would provide the most customer benefit.

V. COMPETITIVE MARKET IMPACT

Q. Do you have an opinion as to whether the TVR rates should be opt-in or opt-out?

A. The distribution utilities in a restructured market should offer one, and only one, basic service electricity product. It should be a basic service, fixed price offering. If a customer desires to interface with the grid more actively, then the customer should have many options to do that in the competitive market. Similarly, if Eversource wants to participate more interactively with customers, it could create a competitive retail affiliate and utilize the same distribution resources that all other market participants have access to in order to facilitate those relationships. However, if the Department believes that a TVR product is an appropriate basic service product, it should be deployed along with the fully functional modernized grid to all customers on an opt-out basis.

Q. What is the effect of Eversource offering these TVR products on the competitive retail market?

A. Eversource's participation in the retail market is disturbing at best and potentially extremely disruptive. Eversource has proposed two retail products which are demonstrably flawed. The offer alone will create a bias in the market. But to the extent any customers enroll in the product, it will create further distortion in the market. It is highly unlikely that the rate designers will predict every customers' reaction to the TVR products perfectly accurately. Because Eversource is proposing to be held harmless from pricing errors and hedging errors, with respect to this product, any errors are passed along to all other customers, including customers who have opted out of basic service. The TVR products, as outlined by Eversource, place the risk of failed rate design on all customers, including customers supplied by entities other than Eversource.

Additionally, Eversource is proposing that TVR customers be required to stay on the TVR product for one full year. That is a fully competitive product attribute and it would prevent the competitive suppliers from viably offering these customers any products or services.

The Revised IGMP proposes a $19 million customer engagement and outreach plan which amounts to a ratepayer funded advertising campaign for a competitive energy product. The stated goal of the campaign is "to create awareness of and drive customer participation in the opt-in TVR programs."[20] Eversource

[20] See Revised IGMP, p. 58.

unashamedly proclaims the first key theme of the education and outreach campaign to be "Eversource is investing in its system to support TVR offerings for customers on an opt-in basis."[21] It also states as a key theme that "TVR offer an opportunity for customers to lower, potentially significantly depending on load characteristics and behavior, their monthly electric costs."[22] The customer engagement and outreach proposals do not mention opportunities from the competitive supply market or any of the constraints that would prevent the competitive market from offering more advanced products. The clear message that customers will hear is that only Eversource is going to give you access to all of the tools you need to save money on your electric bill.

If the Department approves the TVR products included in the Revised IGMP and the customer engagement and outreach proposals, it would allow Eversource to begin "marketing" a competitive product and it would give them an undeniable competitive advantage with respect to their TVR (and perhaps other retail) products and services. Such competition would severely limit customers' options in the market.

Q. Do you believe that Eversource's basic service is a competitive service in the electricity market in its service territory?

[21] See Revised IGMP, p. 59.
[22] See Revised IGMP, p. 59.

A. Yes. Eversource's basic service is the electricity service against which all other suppliers must compete. For better or for worse, customers will evaluate basic service as the initial benchmark for electricity products and pricing in the market. In fact, Eversource tells its customers: "[y]ou may wish to shop the competitive market for your supplier. You can then compare the Competitive Power Suppliers' options to the Basic Service options from Eversource."[23] A supplier must offer something better than basic service from the customer's perspective to attract customers, or to keep customers in the case of a municipal aggregator offering a competitive supply program by default. Basic service is provided on a competitive basis, and the Compact, through its power supply program, directly competes with Eversource.

Q. Do you believe that Eversource's proposal to provide advanced metering and communications equipment to only its customers who opt-in to a TVR product is consistent with the Massachusetts Standards of Conduct?

A. No. In particular, the Standards of Conduct state that if a "Distribution Company provides its Competitive Energy Affiliate, or a customer of its Competitive Energy Affiliate, any product or service other than general and administrative support services, it shall make the same products or services available to all Non-

[23] See the "About Basic Service" discussion: https://www.eversource.com/Content/ema-c/residential/my-account/billing-payment/rates-tariffs/basic-service.

affiliated Energy Suppliers or their customers on a non-discriminatory basis."[24] Eversource's TVR customers must logically be considered either 1) distribution customers or 2) customers of some utility energy affiliate (in name or in practice). Thus, under this provision of the Standards of Conduct, Eversource should make available the advanced metering and communications products and services to, at a minimum all non-affiliated suppliers' customers and under the non-discrimination policies of their tariffs, all customers. Tying the availability of these services to enrolling in the proposed TVR products would be a discriminatory practice, would allow Eversource to offer an exclusive benefit to customers who enroll in basic service and would exclude municipal aggregators other entities that compete with Eversource to serve as the power supplier from participating in the advanced grid.

Q. Would the provision of advanced metering and communications infrastructure provide the Compact with the tools necessary to satisfy your concerns that the customers were being treated equitably?

A. No. The Compact is very concerned with the availability of customer usage data. As Eversource has made clear in its presentation of this case, the accessibility to and availability of customers' electricity usage data enables the implementation of the more advanced energy products that will satisfy the Department's objectives for grid modernization. Today Eversource charges an annual fee of $161.64 if a

[24] See Massachusetts Standards of Conduct for Distribution Companies and their Affiliates, 220 C.M.R. §12.03(4).

customer wants on-line access to its monthly usage data. Eversource is proposing to increase that fee to $300 per year in Docket No. D.P.U. 17-05. While real-time data is not available today, Eversource is proposing to charge up to $847.42 per request for what Eversource refers to as Load Pulse Data Access. To put those costs in perspective, if the Compact wanted simple on-line access to its members' usage data, that would cost approximately $40 million. If the Compact wanted real-time pulse data access for its members, it would cost $114 million. Table 3 summarizes the range of costs for data access that the Compact or its energy supplier would face.

Table 3: Summary of Costs to Access Customer Usage Data

Type of Data Request	Accounts Requested	Unit Cost	Total Cost
Once Annual Individual Customer Request	1	$ -	$ -
Individual Customer Second Request	1	$ 50	$ 50
Third Party Request for Individual Customer	1	$ 50	$ 50
On-line access to data (One Customer)	1	$ 300	$ 300
Third Party request for aggregation data	135,000	$ 50	$ 6,750,000
On-line access to aggregation data	135,000	$ 300	$ 40,500,000
Real-time data for individual customer with Existing Meter	1	$ 455	$ 455
Third Party Request for real-time data for Aggregation with Existing Meters	135,000	$ 455	$ 61,362,900
Real-time data for individual customer with Meter Upgrades	1	$ 847	$ 847
Third Party request for real-time data for Aggregation with Meter Upgrades	135,000	$ 847	$ 114,401,700

The costs for data access are not at issue in this proceeding. The point here is that without meaningful change to the direction of the Revised IGMP and the GMBC, none of the objectives of the Department will be met. Only Eversource will benefit.

Q. How is the Compact affected if Eversource offers competitive electricity products?

A. If Eversource is allowed to offer advanced electricity products and services to its basic service customers and continues to push pricing and hedging risk off to other customers as is being proposed with the TVR products, other competitive suppliers will not bring their products to market. The competitive scale would be unbalanced in Eversource's favor. As shown above, the proposed TVR products are demonstrably flawed. Under a modernized grid, the Compact would benefit from better, less expensive, more efficient, and grid-interactive electricity products. The Revised IGMP and the TVR products will deliver none of what the Compact is envisioning from grid modernization.

According to data collected from investor-owned distribution companies and reported on Mass.gov, approximately 70% of all load and almost 40% of all residential load in Massachusetts had migrated to a competitive supply option as of as of October 2016. These customers have demonstrated in the most visible of ways that competitive electric choices are favorable and provide value when compared to the basic service offering of the utilities. If Eversource is permitted to offer multiple TVR products and is allowed to exclude competitive supply customers from receiving advanced meters, it would jeopardize this competitive marketplace. Instead, Eversource should be required to maximize the value of its investments to all Massachusetts electric customers and market participants by

providing advanced metering and communications capabilities to all customers, allowing them to capitalize on market efficiencies.

Q. Do competitive electricity markets provide tangible value to electricity customers?

A. The University of Chicago recently published a comprehensive study of competitive energy markets and concluded that the forces of competition have resulted in approximately $3 billion in annual savings in electricity costs.[25] The study does not focus on retail rates because while all utilities in restructured states utilize the market dispatch tools of the ISOs, the opposite is not true. Some regulated utilities participate in the wholesale markets and others do not. Given the competitive nature of the retail electricity markets, and the profits shown by those publicly traded retail companies, I conclude that a portion (and likely a significant portion) of these savings has accrued to retail end users.

VI. FEDERAL ENERGY POLICY

Q. Is "integrating DER" an appropriate objective for Eversource to address?

A. The successful, reliable integration of DER is a distribution function. However, the deployment of DER should be a customer and market function. As part of its GMBC, Eversource has proposed a rate-payer funded storage resource used for market-based purposes. Eversource should hone its grid modernization focus on

[25] Cicala, Steve, Imperfect Markets versus Imperfect Regulation in U.S. Electricity Generation, University of Chicago, January 22, 2017.

building a distribution network that will fully and seamlessly integrate distributed energy resources of all types, not developing distributed resources in direct competition with market participants.

The GMBC describes a seemingly robust distribution network that would facilitate the integration of DER. However, the GMBC also describes a deployment of at least one storage resource by Eversource.[26] It is not appropriate for the distribution company to make a market-facing investment such as a large-scale storage resource, especially in light of Notice of Proposed Rulemaking ("NOPR") recently issued by FERC that envisions incorporating storage and other DERs into the federally-regulated organized wholesale markets, such as the market operated by ISO-NE.

Q. Could you please elaborate on the NOPR recently issued by FERC?

A. Yes. On November 16, 2016, FERC proposed a rulemaking that seeks to incorporate storage resources and other DERs into the wholesale markets. Specifically, FERC is proposing to require each RTO and ISO to revise its tariff to "(1) establish a participation model consisting of market rules that, recognizing the physical and operation characteristics of electric storage resources, accommodates their participation in the organized wholesale electric markets and (2) define distributed energy resource aggregators as a type of market participant

[26] See GMBC, p. 53-59.

that can participate in the organized wholesale electric markets under the participation model that best accommodates the physical and operation characteristics of its distributed energy resource aggregation." Comments on the proposed rule were filed by interested stakeholders on February 13, 2017.

In this NOPR, FERC proposed that storage resources be allowed to participate in the ISO markets under rules that recognize "the physical and operational characteristics" of those resources. The proposed rules require, among other items, that storage resources be eligible to provide all capacity, energy and ancillary services that they are technically capable of providing; that the storage resources can set the wholes market clearing prices as both a wholesale seller and a wholesale buyer; and that the sale of energy from a storage resource must be at the wholesale LMP. FERC is also proposing that the storage resources be allowed to provide other services that have traditionally been deemed to be generator provided such as black start, frequency response and reactive power if they are capable.

Q. What services does FERC envision that storage and other DERs would provide to the ISOS AND RTOS?

A. FERC is proposing that the ISOs allow storage resources to provide capacity, energy, ancillary services at market based rates and other non-market based services such as black start and reactive power at compensation levels commensurate with what generators are paid for these services.

Q. Does FERC envision utilities participating in the wholesale market?

A. FERC is silent on this explicit question in the NOPR, however, based on the language in the NOPR, FERC is not envisioning the distribution utility being a DER aggregator or "market participant". FERC has proposed requiring each RTO and ISO to provide for coordination among the ISO/RTO, the DER aggregator "and the relevant distribution utilities with respect to (1) the registration of distributed energy resource aggregations and (2) ongoing coordination, including operational coordination, between the RTO/ISO, a distributed energy resource aggregator, and the relevant distribution utility or utilities" (emphasis added). The purpose of the coordination is to "ensure that all of the individual resources in the DER aggregation are technically capable of providing services to the RTO/ISO through the aggregator and are eligible to be part of the aggregation."[27] Given this very specific language, FERC is envisioning a long-term role for Eversource that is not as the market participant or DER aggregator. The utility role in the FERC model is one of distribution system reliability assurance.

Q. Does the role of ensuring distribution system reliability conflict with the role outlined by Eversource in the GMBC?

[27] See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 157 FERC ¶ 61,121, November 7, 2016, p. 115.

A. Yes. The conflict arises because under the GMBC, Eversource would own an asset that will be participating in the wholesale market and at the same time, Eversource would be evaluating whether competitive resources are eligible to participate in the exact same market for the exact same product. This market conflict should not be allowed by either state or federal regulators.

Eversource's proposal states that storage systems can provide "peak shaving, load shifting, system resilience, renewable intermittency mitigation and ancillary services."[28] Those are essentially capacity, energy and ancillary services – the same energy products utilized in the wholesale electricity market run by ISO-NE. System resilience might fall outside of these products, but depending upon the actual context, it might be an ancillary service. Eversource is proposing in its Plan to deploy energy storage "aimed at voltage smoothing to address PV intermittency."[29] The ISO-NE ancillary service market includes a "Voltage Support" product that compensates resources for maintaining voltage-control capability, which allows system operators to maintain voltage levels within an acceptable range.[30]

Q. Could Eversource own a storage resource and not participate in the ISO-NE wholesale energy market?

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[28] See GMBC, p. 54.
[29] See GMBC, p. 55.
[30] See: https://www.iso-ne.com/about/what-we-do/three-roles/administering-markets.

A. FERC has not proposed a must-offer obligation on DERs in its NOPR. However, it would be irresponsible of Eversource management to not collect any available revenues for which the resource could qualify. This issue further exacerbates the glaring conflict that would be created if Eversource were to deploy rate-based storage or other DERs.

Q. Is it common for interested parties to file comments on NOPRS?

A. Yes. The federal rule-making process is an open process designed so that the agencies (in this case FERC) can hear the concerns of affected stakeholders.

Q. Did Eversource file comments on this NOPR?

A. I reviewed FERC's website ten days after comments were due to determine if Eversource had filed comments. No comments from Eversource were shown on the FERC website that day.

Q. Did ISO-NE file comments on the NOPR?

A. They did. Citing the NOPR in its comments, ISO-NE agreed that "successful implementation of distributed energy resource aggregations will require close coordination between the RTO or ISO, the aggregator, and the distribution utility."[31] The ISO also stated that "it is worth emphasizing the large and critical role envisioned here for the distribution utility in facilitating the participation of

[31] See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Comments of ISO-NE, p. 52.

these assets in the wholesale markets. FERC is correct that it is the distribution utility that will be primarily responsible for assessing whether the individual assets associated with a distributed energy resource aggregation are properly metered, are technically capable of providing service to the RTO or ISO, are not participating in another retail program, and are able to participate in the wholesale markets without safety or reliability risks to the distribution system, and to report all of this information to the RTO or ISO. These are roles the RTO or ISO cannot itself perform, and so the distribution utility will essentially be certifying to the RTO or ISO that the assets underlying a new or modified aggregation meet all of these requirements."[32] One additional note the ISO included was that "a distributed energy resource's retail metering will need to be adjusted to account for its wholesale activities."[33] Based on these comments, it is clear that ISO-NE does not envision the distribution utility participating in the markets as a resource aggregator, but rather as a "gateway" to ensuring technically capable, reliable and properly metered resources are participating.

Q. Did the Commonwealth of Massachusetts file comments in the NOPR?

[32] See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Comments of ISO-NE, p. 53-54 (Emphasis added).
[33] See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Comments of ISO-NE, p. 55.

A. Yes. The Department filed joint comments with the Massachusetts Department of Energy Resources ("DOER"). In its comments, the Department and DOER encouraged FERC to "clarify and strengthen the authority of distribution utilities with respect to [the] important coordination function. For example: (1) will utilities have the ability to impose reasonable conditions or deny wholesale market participation by a specific resource interconnected to a distribution system if it has negative system impacts; and (2) what are the appropriate criteria to assess system impacts and what role to states retain in the process?" Again, based on these comments, the Department and DOER envision, like FERC and ISO-NE, the utility being the gatekeeper to the market and not a market participant itself.

Q. Are you familiar with any distribution utility operating in a restructured retail market that has any market-based resources participating in the wholesale electricity markets?

A. I am not. This would be the domain of an unregulated affiliate, not the regulated distribution company.

VII. CONCLUSION

Q. Could you please summarize your testimony?

A. Yes. In developing its Revised IGMP and GMBC, Eversource appears to assume that it will take over several market functions, including peak management, DER deployment and integration, ancillary services and retail product design and implementation. It is inappropriate and inefficient for the distribution company to

be a participant in the energy markets. Eversource should focus its efforts on modernizing its grid in such a manner that will allow all customers to have equal access to benefits and opportunities associated with the modernization. Customers would be better served with a modernized grid and a vibrant competitive retail electricity market to provide energy products.

Eversource's primary consumer engagement tool is the development of two TVR products. These products suffer from extremely flawed product designs and the likelihood of customer uptake is minimal. Perhaps most importantly, the availability of a retail product that imposes no risks on the retail supplier (in this case Eversource) creates a heavily advantaged incumbent and will result in fewer product offerings for the customers in the Eversource territory. Eversource should provide just one basic service retail product.

Additionally, the Revised IGMP with respect to investing in storage resources is in direct conflict with evolving federal energy policy. Eversource should not be allowed to invest in generation or other resources that fall within the domain of competitive entities, especially when it will be the gateway to the market for similar resources.

Eversource should be directed to deploy a smart grid infrastructure. However, the Revised IGMP, both standing alone and as it relates to the proposal in D.P.U. 17-05, benefits Eversource more than any other entity. Eversource should be

directed to modify its filings and present a revised plan that considers all customers' needs as well as the other market participants' needs.

Q. Does that conclude your direct testimony?

A. Yes. It does.

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Summary

Recognized energy industry executive known for developing innovative regulatory and business strategies to support emerging energy market products and services. Strong knowledge of regional energy markets, market trends and national energy policy.

Board of Directors positions: Smart Electric Power Alliance (f/k/a Solar Electric Power Association (finance committee) (2015-present); Association for Demand Response and Smart Grid (finance chair) (2011-2015); Advanced Energy Management Alliance (Chairman) (2012-Present); ERCOT (finance committee) (2002-2004); Electric Power Supply Association (2002-2004).

Experience

Electric Advisors Consulting 2015- Present
Founder and President

Advise senior leadership on developing strategies to address legislative and regulatory change in the energy industry. Also provide expert testimony to advise and assist entities on facilitating legislative and regulatory change to accommodate evolving business strategies and technologies.

Comverge, Inc./CPower Corporation 2011-2015
Senior Vice President, Regulatory and Market Strategy

Served on companies' executive teams, developing and implementing corporate and regulatory strategy, including M&A analyses and due diligence, market entry plans and complex communications for a $150 million company performing demand response services in the electricity markets.

Direct Energy 2006 - 2011
Director, Products and Complex Transactions (2008-2011)

For a multi-billion dollar retail electric and gas company, led team consisting of four direct reports and eight cross-functional leaders, facilitating incremental gross margin sales from non-standard product requests.

Director, Government and Regulatory Affairs (2006-2008)

Managed regulatory strategy and regulatory risk in Mid-Atlantic region of US, participating in multiple rate proceedings and regulatory initiatives, securing shareholder value through reduced credit and collateral exposure and increased sales.

Starlight Energy 2004 - 2006
President

Led the development of business plan and pro formas for venture seeking $20 million in equity financing and other financial relationships. Successes included securing $100 million credit relationship and working capital financing to enable launch of competitive electricity markets retail supply company.

Strategic Energy 2001- 2004
Director, Regulatory Affairs,
Served on the company's Leadership team, managing a regulatory group of 15 people. Managed the development of regulatory strategy, the oversight of regulatory risk and the attainment of desired regulatory results, advocating for market design structures in emerging electricity markets across 13 states and the federal government.

Arthur Andersen 1998 - 2001
Senior Manager
Responsibility for development and growth of Andersen's transmission restructuring business in Eastern half of US market.

Putnam, Hayes and Bartlett, Inc 1995 - 1998
Associate Consultant
Associate consultant in firm's energy practice with expertise in environmental asset valuation.

Education

Carnegie Mellon University, Tepper School of Business
MSIA with concentrations in finance, entrepreneurship and environmental management

University of Maryland
B.S. in Transportation and Logistics

Programs for Life
Certified Leadership Development Trainer

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Prepared Direct Testimony of Frank Lacey On Behalf of Strategic Energy, LLC, before the Public Utilities Commission of the State of California in the matter of the *Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060*. Docket No. R. 02-01-011. June 6, 2002.

Prepared Rebuttal Testimony of Frank Lacey On Behalf of Strategic Energy, LLC before the Public Utilities Commission of the State of California in the matter of the *Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060*. Docket No. R. 02-01-011. June 20, 2002

Cross Examination testimony of On Behalf of Strategic Energy, LLC before the Public Utilities Commission of the State of California in the matter of the *Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060*. Docket No. R. 02-01-011. July 2002.

Prepared Testimony of Frank Lacey on the subject of truing up the CERS Fee On Behalf of Strategic Energy, LLC before the Public Utilities Commission Of the State Of California in the matter of the *Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060*. Docket No. R. 02-01-011. March 19, 2003

Prepared Direct Testimony of Frank Lacey on behalf of Strategic Energy L.L.C. before the Pennsylvania Public Utility Commission in the matter *Pennsylvania Public Utility Commission, et al. v.Duquesne Light Company*, Docket Nos. R-00038092, R-00038092C0001 and R-00038092C0002. January 2003.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Strategic Energy L.L. C. Before the Pennsylvania Public Utility Commission in the matter *Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company* Docket Nos. R-00038092, R-00038092C0001 and R-00038092C0002. February 2003.

Prepared Supplemental Testimony of Frank Lacey on behalf of Strategic Energy L.L.C. before the Pennsylvania Public Utility Commission in the matter *Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company* Docket Nos. R-00038092, R-00038092C0001, R-00038092C0002. November 2003

Cross Examination testimony of Frank Lacey on behalf of Strategic Energy L.L.C. before the Pennsylvania Public Utility Commission in the matter *Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company* Docket Nos. R-00038092, R-00038092C0001, R-00038092C0002. July 1, 2003.

Prepared Direct Testimony of Frank Lacey submitted on behalf of

Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the *Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company* Case No. 02-2779-EL-ATA and the *Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code* Case No. 02-2879-EL-AAM. May 19, 2003.

Prepared Supplemental Testimony of Frank Lacey submitted on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the *Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company* Case No. 02-2779-EL-ATA and the *Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code* Case No. 02-2879-EL-AAM. June 12, 2003.

Deposition Testimony of Frank Lacey submitted on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the *Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company* Case No. 02-2779-EL-ATA and the *Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code* Case No. 02-2879-EL-AAM. May 2003 and June 2003.

Cross Examination testimony of Frank Lacey on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the *Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company* Case No. 02-2779-EL-ATA and the *Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code* Case No. 02-2879-EL-AAM. June 2003**.**

Oral Testimony of Frank Lacey before the Standing Committee on Energy of the New York State Assembly on the issue of Ensuring a Reliable Supply of Electricity to the People of New York, Chairman Paul D Tonko, presiding. March 6, 2003

Prepared Direct Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. before the Pennsylvania Public Utility Commission in the matter of the *Petition of Duquesne Light Company for Approval of Plan for Post-Transition Period Provider of Last Resort Service.* Docket No. P-00032071. February 2004.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. before the Pennsylvania Public Utility Commission in the matter of the *Petition of Duquesne Light Company for Approval of Plan for Post-Transition Period Provider of Last Resort Service.* Docket No. P-00032071. February 2004.

Cross Examination testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. before the Pennsylvania Public Utility Commission in the matter of the *Petition of Duquesne Light Company for Approval of Plan for Post-Transition Period Provider of Last Resort Service.* Docket No. P-00032071. April 1, 2004.

Oral Testimony of Frank Lacey at the *POLR Roundtable* before the Pennsylvania Public Utility Commission re: Optimal Future POLR Design models. May 3, 2004.

Prepared Direct Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. and Mid-American Energy Company before the Public Utilities Commission of Ohio in the matters of *The Application of the Cincinnati Gas & Electric Company to Modify its Non-Residential Generation Rates to Provide for Market-Based Standard Service Offer Pricing and to Establish a Pilot Alternative Competitively-Bid Service Rate Option Subsequent to Market Development Period*, Case No. 03-93-EL-ATA, *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Certain Costs Associated with the Midwest ISO*, Case No. 03-2079-EL-AAM, and *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Capital investment in its Electric Transmission and Distribution System and to Establish a Capital Investment Reliability Rider to be Effective After the Market Development Period*, Case Nos. 03-2080-EL-AAM and 03-2080-EL-ATA. May 6, 2003.

Deposition of Frank Lacey in the matters of *The Application of the Cincinnati Gas & Electric Company to Modify its Non-Residential Generation Rates to Provide for Market-Based Standard Service Offer Pricing and to Establish a Pilot Alternative Competitively-Bid Service Rate Option Subsequent to Market Development Period*, Case No. 03-93-EL-ATA, *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Certain Costs Associated with the Midwest ISO*, Case No. 03-2079-EL-AAM, and *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Capital investment in its Electric Transmission and Distribution System and to Establish a Capital Investment Reliability Rider to be Effective After the Market Development Period*, Case Nos. 03-2080-EL-AAM and 03-2080-EL-ATA. May 2003.

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Oral Testimony of Frank Lacey before the Michigan Senate Committee on Technology and Energy on the subject of revision to Public Act 141, the Michigan Electricity Choice and Restructuring Act, Chairman Bruce Patterson, Presiding. May 19, 2004.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Maryland Senate Finance Committee on Senate Bill 561 on the subject of communications between electric companies and suppliers to enhance the development of competitive electric markets, Chairman Thomas Middleton, Presiding. March 7, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Maryland Senate Finance Committee on Senate Bills 814, 1048, 1051 and 1078 on the subject of retail electricity market design, Chairman Thomas Middleton, Presiding. March 14, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Maryland House of Delegates Economic Matters Committee on House Bills 1334, 1654 and 1712 on the subject of retail electricity market design, Chairman Dereck Davis, Presiding. March 14, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utility Commission in the Matter of *Petition of Direct Energy Services, LLC for Emergency Order*, Docket No. P-00062205, April 11, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utility Commission in the Matter of *Policies to Mitigate Potential Electricity Price Increases*, Docket No. M-00061957, June 22, 2006.

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Duquesne Light Company Base Rate Case*, Docket No. R-00061346, July 7, 2006. (Case Settled)

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Duquesne Light Company Base Rate Case*, Docket No. R-00061346, August 2, 2006. (Case Settled)

Prepared Surrebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Duquesne Light Company Base Rate Case*, Docket No. R-00061346, August 16, 2006. (Case Settled)

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of PPL Electric Utilities Corporation for Approval of Competitive Bridge Plan*, Docket No. P-00062227, November 15, 2006.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of PPL Electric Utilities Corporation for Approval of Competitive Bridge Plan*, Docket No. P-00062227, December 6, 2006.

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Prepared Surrebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of *Petition of Duquesne Light Company for Approval of Default Service Plan for the Period January 1, 2008 through December 31, 2010*, Docket No. P-00072247, April 20, 2007. (case settled)

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of Pike County Light & Power Company for*

Expedited Approval of its Default Service Implementation Plan, Docket No. P-00072245, March 28, 2007.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of Pike County Light & Power Company for Expedited Approval of its Default Service Implementation Plan, Docket No.* P-00072245, April 11, 2007.

Oral Surrebuttal Testimony and Cross-examination Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of Pike County Light & Power Company for Expedited Approval of its Default Service Implementation Plan, Docket No.* P-00072245, April 19, 2007.

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Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of *Petition of West Penn Power Company dba Allegheny Power for Approval of its Retail Electric Default Service Program and Competitive Procurement Plan for Service at the Conclusion of the Restructuring Transition Period, Docket No.* P-00072342, February 12, 2008.

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Restructuring Transition Period, Docket No. P-00072342, April 2, 2008.

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC, before the Pennsylvania Public Utility Commission in the matter of the *Joint Application of West Penn Power Company d/b/a Allegheny Power, Trans-Allegheny Interstate Line Company and FirstEnergy Corp. for a Certificate of Public Convenience under Section 1102(a)(3) of the Public Utility Code approving a change of control of West Penn Power Company And Trans-Allegheny Interstate Line Company,* Docket Nos. A-2010-2176520 and A-2010-2176732, August 17, 2010

Prepared Sur-Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC, before the Pennsylvania Public Utility Commission in the matter of the *Joint Application of West Penn Power Company d/b/a Allegheny Power, Trans-Allegheny Interstate Line Company and FirstEnergy Corp. for a Certificate of Public Convenience under Section 1102(a)(3) of the Public Utility Code approving a change of control of West Penn Power Company And Trans-Allegheny Interstate Line Company,* Docket Nos. A-2010-2176520 and A-2010-2176732, October 1, 2010.

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Prepared Direct Testimony of Frank Lacey On Behalf of Comverge, Inc., before the Illinois Commerce Commission in the matter of *Commonwealth Edison Company Petition for Statutory Approval of Smart Grid Advanced Metering Infrastructure Deployment Plan Pursuant to Section 16-108.6 of the Public Utilities Act*, Docket No. 12-0298, March 11, 2012, and oral cross-examination and rebuttal testimony provided on May 23, 2012 in the same proceeding.

Prepared Direct Testimony of Frank Lacey On Behalf of Comverge, Inc., before the Illinois Commerce Commission in the matter of *Ameren Illinois Company Petition for Statutory Approval of a Smart Grid Advanced Metering Infrastructure Deployment Plan Pursuant to Section 16-108.6 of the Public Utilities Act*, Docket No. 12-0244 on rehearing, August 24, 2012, and oral cross-examination on

September 20, 2012 in the same proceeding.

Prepared Direct Testimony of Frank Lacey on Behalf of Comverge, Inc., before the Illinois Commerce Commission in the matter of *Commonwealth Edison Company's Petition for Approval of Tariffs Implementing ComEd's Proposed Peak Time Rebate Program*, Docket No. 12-0484, October 25, 2012, and oral cross-examination on December 7, 2012 in the same proceeding.

Prepared Direct Testimony of Frank Lacey on Behalf of Comverge, Inc., before the Maryland Public Service Commission in the matter of *The Investigation of the Process and Criteria for Use in Development of Requests for Proposal by the Maryland Investor-Owned Utilities for New Generation to Alleviate Potential Short-Term Reliability Problems in the State of Maryland*, Case No. 9149, January 31, 2013.

Prepared Supplemental Direct Testimony of Frank Lacey on Behalf of Comverge, Inc., before the Maryland Public Service Commission in the matter of *The Investigation of the Process and Criteria for Use in Development of Requests for Proposal by the Maryland Investor-Owned Utilities for New Generation to Alleviate Potential Short-Term Reliability Problems in the State of Maryland*, Case No. 9149, February 25, 2013.

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Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy before the Massachusetts Department of Public Utilities in the *Investigation as to the Propriety of Proposed Tariff Change* in response to the Petition of Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid, Docket Number DPU 15-155, March 18, 2016.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy before the Massachusetts Department of Public Utilities in the *Investigation as to the Propriety of Proposed Tariff Change* in response to the Petition of Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid, Docket Number DPU 15-155, April 28, 2016.

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Expert Rebuttal Report and Damage Summary of Frank Lacey,

Response to the Review Submitted by Nathan Katzenstein, prepared on behalf of Astral Energy in the matter of *Treetop Development, et al. v. Astral Energy, et al.,* Docket #: BER-L-9414-13, Superior Court of New Jersey, Bergen County, December 9, 2016.

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COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

Petition of NSTAR Electric Company and Western Massachusetts Electric Company d/b/a Eversource Energy For Approval of their Grid Modernization Plan	D.P.U. 15-122/123

AFFIDAVIT OF FRANK LACEY

Frank Lacey does hereby depose and say as follows:

I, Frank Lacey, certify that the direct testimony and exhibits submitted on behalf of the Cape Light Compact in the above-captioned proceeding, which bear my name, were prepared by me or under my supervision and are true and accurate to the best of my knowledge and belief.

Signed under the pains and penalties of perjury.

Frank Lacey
President, Electric Advisors Consulting LLC

Dated: March 10, 2017