BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Docket No. P-2014-2417907

PPL Electric Utilities Corporation

Statement No. 2

Direct Testimony of A. Joseph Cavicchi

April 25, 2014
I. Qualifications, Introduction, and Summary

Q: Please state your full name and business address.

A: My name is A. Joseph Cavicchi. My business address is 200 State Street, Boston, MA 02109.

Q: Who is your employer and what is your position?

A: I am employed by Compass Lexecon as an Executive Vice President.

Q: Please briefly describe the services provided by Compass Lexecon.

A: Compass Lexecon is an economics and financial consulting firm that provides corporations, law firms, and government agencies with analysis of complex economic and financial issues for use in legal and regulatory proceedings, and in strategic decision-making. Compass Lexecon is actively involved in a wide variety of matters that can arise in the areas of economics and finance. Our practice areas include energy and environmental economics, antitrust, securities, damages, intellectual property, as well as business consulting and public policy analysis.

Q: What are your duties as Executive Vice President?

A: I provide economic analysis and expert testimony in various state and federal regulatory proceedings related to electricity markets. In particular, I work with clients on a variety of state regulatory and Federal Energy Regulatory Commission proceedings, and often file testimony and affidavits supported by economic analyses. Throughout my career I have been directly involved with corporations, private and
public institutions, and state and federal regulatory authorities in connection with
the economics of the electricity industry. For the past 17 years I have been working
almost exclusively on the regulatory economics of the electricity industry, and, in
particular, performing economic analyses of wholesale electricity markets.

Q: What is your educational background?

A: I hold Masters degrees in Technology and Policy and in Environmental Engineering
from the Massachusetts Institute of Technology and Tufts University, respectively.

Q: Please describe your professional experience.

A: Prior to joining Compass Lexecon, I was a staff mechanical engineer and a project
manager at the Massachusetts Institute of Technology, overseeing the development,
permitting, engineering, construction, and start-up of a $40 million, 20 megawatt
gas turbine-based cogeneration facility on the Cambridge campus. In addition, I was
responsible for the implementation of various energy consumption monitoring
programs, and optimization of the operation of a centrally distributed electricity,
steam, and chilled water production facility.

Q: Have you previously testified as a witness on regulation and competition in the
electricity industry?

A: Yes. I have previously testified on power supply procurement plans in
Pennsylvania. In addition, I have testified on several occasions regarding wholesale
electricity market competitiveness and design issues at the Federal Energy
Regulatory Commission. I have also testified on qualifying facility pricing policy
and wholesale market design policy in the state of California. Finally, I have
written articles on electricity industry structure and issues associated with
procuring wholesale electricity supplies for delivery to retail customers. Additional
detail regarding my credentials and experience can be found in my curriculum vitae,
which is attached as Appendix A to this testimony.

Q: What is the subject matter of your testimony in this proceeding?

A: My testimony describes and evaluates the competitive procurement program
proposed by PPL Electric Utilities Corporation ("PPL Electric" or "Company") in its
Petition for Approval of a Default Service Program and Procurement Plan ("DSP
III"), filed with the Pennsylvania Public Utility Commission ("PUC" or
"Commission") on April 18, 2014, to procure default service supply for non-shopping
customers from June 1, 2015, through May 31, 2017. Consistent with the
Commission's policy on the provision of default service, PPL Electric is proposing a
default service program that: (1) establishes a procurement plan for acquiring
generation supply; (2) provides an implementation plan that identifies the schedules
and technical requirements of these generation supply procurements; (3) provides a
rate design plan; and (4) is designed to meet the requirements set forth in

Q: Please describe PPL Electric's proposed DSP III.

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1 Petition of PPL Electric Utilities Corporation for Approval of a Default Service Program and Procurement Plan for the Period June 1, 2015, through May 31, 2017, Docket No. P-2014-2417907April 18, 2014 (hereinafter "Petition").

2 See 66 Pa. C.S. § 2807(e).
A: The central objective of PPL Electric's proposed DSP III is to obtain a portfolio of default service supply contracts that provide power for non-shopping customers from June 1, 2015, through May 31, 2017. To meet this objective, PPL Electric proposes to use a portfolio of laddered fixed-price, full-requirements, load-following electricity supply contracts to meet the demand of its residential and small commercial and industrial customers, and a full-requirements, load-following, spot market service to meet the demand of its large commercial and industrial customers. Notably, the proposed DSP III's portfolio of products is generally similar to the Company's current, successful default service plan ("DSP II"). As I explain herein, PPL Electric's proposal provides a clear, logical procurement plan that recognizes the experience PPL Electric has had with DSP II, the ongoing high numbers of customers obtaining competitive retail service within the PPL Electric service territory, and the potential that PPL Electric's role as a default service provider could change in the future.

Q: What are full-requirements, load-following products and why is PPL Electric proposing to continue using these products for the provision of default service?

A: A full-requirements, load-following product obligates a wholesale electricity seller to supply a fixed percentage (referred to as a "tranche") of PPL Electric's default service.

Note that under DSP III the Company no longer proposes to procure wholesale power supply for its default service Time-of-Use ("TOU") customers. As the Petition explains, the Company proposes a TOU supply option consistent with the Joint Petition for Partial Settlement filed with the Commission on April 11, 2014, at Docket No. P-2013-2389572 (Petition at P 42). Under this proposed TOU rate option, PPL Electric will rely on Electric Generation Suppliers ("EGSs") to offer TOU rate options and provide the TOU service to customers in the Company's service territory. TOU load will not be included in the default service load procured for residential and small commercial and industrial customers because the TOU load will be separately supplied by retail EGSs.
service hourly load during every hour of a product's term. By assuming this
obligation, sellers are responsible for managing the acquisition of energy, capacity,
transmission (other than non-market-based transmission services), ancillary
services, alternative energy credits ("AECs"), and any other related products (net of
transmission and distribution losses) to meet default service customers' hourly
loads. The pricing for a full-requirements, load-following product is specified based
on the type of default service load being supplied. For PPL Electric's residential and
smaller commercial and industrial customers, the price is fixed for the term of the
product and does not vary regardless of the number of default service customers
being served. Thus, a fixed-price, full-requirements, load-following product provides
PPL Electric's smaller default service customers with reasonably stable rates that
change in response to power market changes as contracts expire and are replaced.
To reduce abrupt pricing changes, PPL Electric staggers, or ladders, procurements
to avoid situations where all contracts expire at the same time. For PPL Electric's
large commercial and industrial customers, the full-requirements, load-following
product pricing includes an energy component that varies hourly based on changes
in hourly wholesale electricity prices (commonly referred to as "spot" market
pricing). Because the majority of PPL Electric's larger customers obtain electric
supply service tailored to their needs from retail power providers, the full-
requirements, load-following, spot market product has proven to be the best
approach to providing large customers default service. Several power suppliers
compete to provide full-requirements, load-following products, and PPL Electric has
used these products successfully in all of its default service supply procurement
plans.
What guided the development of PPL Electric's proposed DSP III?

Pennsylvania's Act 129, the Commission's Final Policy Statement in *Proposed Policy Statement Regarding Default Service and Retail Electric Markets*, its Final Order in *Investigation of Pennsylvania's Retail Electricity Market: End State of Default Service*, and the Company's experience with the Competitive Bridge Plan, DSP I, and DSP II guided the development of PPL Electric's DSP III. Consistent with Act 129 and PUC policy, the proposed DSP III ensures that default service customers will receive adequate and reliable electricity supply at least cost over time while supporting development of a competitive retail market.

Three important objectives were carefully considered when developing the proposed DSP III. First, to be consistent with the Commission's policy outlined in its DS Policy Statement and additional guidance provided in its Final ES Order, PPL Electric's DSP III continues semiannual competitive procurement of a laddered portfolio of supply products with differing terms that emphasizes shorter contract terms while maintaining price stability (similar to the Company's successful DSP II;...

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6 The Company also took into account Commission guidance when establishing its proposed TOU supply for DSP III (see Opinion and Order, Petition of PPL Electric Utilities Corporation for Approval of a Default Service Program and Procurement Plan, Docket No. P-2012-2302074, January 24, 2013, at p 115).


8 Final ES Order at pp 30-31 and 41-43.
however, shifting away from a greater reliance on 12-month term products to reliance on a mixture of 6- and 12-month term products). Thus, consistent with the Commission's DS Policy Statement, DSP III strikes a balance by providing reasonably frequent price adjustment without exposing customers to unacceptable price volatility, while encouraging retail customers to seek service from EGSs. Second, like DSP II, PPL Electric's DSP III has been designed to recognize some degree of uncertainty regarding PPL Electric's role as the default service provider after the plan's conclusion and does not propose increased reliance on longer-term default service contracts.9 Third, should the Company no longer serve as the default service provider, PPL Electric's DSP III is designed to allow the Company to modify the contract terms of its proposed final DSP III default service procurement to provide a smooth transition if necessary. This establishes a procurement platform for PPL Electric that can continue in the future as appropriate, or if the PUC properly so determines, easily accommodate transferring the responsibility of providing default service to an entity other than PPL Electric.

Q: Please summarize your conclusions.

A: In my expert opinion as an economist, I believe the proposed DSP III represents a prudent default service product mixture, procured at least cost over time, which will ensure that customers receive the benefits of competition in regional wholesale electricity markets while supporting continued growth of retail competition in

9 Final ES Order at p 20, where Commission indicates it may in the future consider adoption of an alternative DSP.
Pennsylvania. The heart of PPL Electric's DSP III is its portfolio of power supply products that will provide default service customers with competitively priced power supplies. PPL Electric's DSP III product portfolio provides for customer rates to change on a semiannual basis (and more frequently for larger customers), ensuring that customers have continued opportunities to assess competitive retail opportunities, while guarding against excessive price volatility. Finally, PPL Electric's DSP III relies on fixed-price, full-requirements, load-following products that have a proven record for supplying default service, and proposes to obtain these products through transparent competitive solicitations that have been widely successful in the Company's Competitive Bridge Plan, DSP I, and DSP II and elsewhere throughout Pennsylvania and the Mid-Atlantic U.S.

Q: Please summarize the following sections of your testimony.

A: In my testimony, I first review additional lessons learned from PPL Electric's experience with DSP II. Next, I describe the Company's proposed DSP III's product portfolio for each customer group. I then evaluate the proposed DSP III and explain why the plan is a reasonable approach to procuring default service supply in a manner that is consistent with Act 129's requirements and the Commission's Orders. In particular, I address why the product portfolio constitutes a "prudent mix" that will ensure "least cost over time" to non-shopping customers while continuing to support the development of a competitive retail market.

II. Lessons Learned From PPL Electric's DSP II

Q: Please provide a brief overview of PPL Electric's existing DSP II.
A: For residential and small commercial and industrial customers, PPL Electric's DSP II relies on a portfolio of laddered fixed-price, full-requirements supplies, combined for the residential class with a small decreasing quantity of pre-existing longer-term fixed-price block supplies. For example, Exhibit JC-1 shows DSP II's product portfolio and procurement schedule for the residential customer class. As Exhibit JC-1 shows, the product mixture is designed around semiannual procurements, generally obtaining 9- and 12-month products, and the Company conducts competitive solicitations to purchase these default service products. For its large commercial and industrial customers, PPL Electric's DSP II provides a full requirements, load-following, spot market power supply to meet the default service demand of those customers electing to receive such service.

Q: In your opinion, have the results of the procurements under DSP II continued to support the emergence of a competitive retail market?

A: Yes. Exhibit JC-2 shows the evidence of a robust competitive retail market within PPL Electric's service territory. Specifically, data from the Pennsylvania Office of Consumer Advocate show that from January 1, 2012, to January 1, 2014, PPL Electric's service territory has maintained a high rate of shopping by residential,

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10 Note that DSP I procured long-term block supplies for only residential default service customers.

11 Note that PPL Electric relies on the same mixture of supply products for small commercial and industrial customers except that block products are not included. Note also that the Company intends to request to extend the two final DSP II residential and small commercial and industrial product terms by 6 months in order to avoid the “hard stop” to all DSP II products as of May 31, 2015, and continue supply product laddering.
In addition, residential and commercial customer shopping rates within PPL Electric's service territory continued to slowly increase, and the majority of larger customers that have already shopped are not returning to default service. Finally, there continues to be a large number of licensed EGGSs serving residential customers in PPL Electric's service territory as of January 2014. Retail competition is strong in the PPL Electric service territory.

Q: Is there evidence that the auction process used to solicit the fixed-price, load-following product types within DSP II provides least-cost supplies?

A: Yes. With respect to the product types within DSP II's product portfolio, PPL Electric has successfully procured these products numerous times (going back to July 2007, when PPL Electric first began procuring supplies for its Competitive Bridge Plan, through its most recent DSP II solicitation). The results from PPL Electric's auctions, as well as those of numerous similar auctions conducted by Pennsylvania, Maryland, and New Jersey utilities during the past several years for these products, confirm that these default service products draw numerous competitors and that multiple bidders are successful suppliers.

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13 As of January 2014, 36 EGGSs were reported as offering service to PPL Electric Utility residential customers (see PA Office of Consumer Advocate’s Electric Shopping Guides, January 2014, available at http://www.oca.state.pa.us/Industry/Electric/eleconwp/Archive/pricetcharts_archive.htm). In addition, 54 EGGSs were reported as willing to serve business consumers as of February 24, 2014 (see http://www.papowerswitch.com/shop-for-electricity/).

disciplines the prices offered by suppliers and drives competitors to innovate and
find methods to deliver services at lower costs to buyers than their rivals. The
evidence shows that there is substantial competition to supply the fixed-price, full-
requirements, load-following products.

Q: Are there other lessons that can be learned from PPL Electric’s experience with the
existing DSP II?

A: Yes. The product mixture within DSP II’s product portfolio (relative to PPL
Electric’s DSP I) for non-shopping residential (and small commercial and industrial)
customers has simplified the default service procurement process for PPL Electric,
and default service pricing has continued to be responsive to market changes, while
avoiding price volatility. For example, under DSP II PPL Electric procures default
power supply semiannually using a straightforward product mixture that effectively
balances responsiveness to power market changes and default service price stability.
Semiannual procurement allows PPL Electric to keep its default service
administrative costs lower than under the quarterly procurements in DSP I.
Default service pricing updates associated with a large quantity of PPL Electric’s
default service load being re-priced in each procurement ensures that EGSs continue
to have an opportunity to compete for customers in the PPL Electric service
territory.

February 24, 2014; and http://www.pepcoholdings.com/business/suppliers/sos/disclosure/, accessed February 24,
2014.

PPL Electric’s default service procurements under DSP II have been successful and approved by the
Commission.
III. PPL Electric's Proposed DSP III

A. Overview, Product Descriptions, and Procurement Plan

Q: Please provide an overview of PPL Electric's proposed DSP III.

A: For its residential and small commercial and industrial default service customers, PPL Electric's DSP III envisions obtaining a portfolio of laddered fixed-price, full-requirements, load-following supplies. In particular, for its non-shopping residential and small commercial and industrial customers, DSP III provides for the purchase of fixed-price, full-requirements, load-following products with 6- and 12-month contract terms using a laddering approach, and supports the possibility that PPL Electric may no longer be the default service supplier at the end of DSP III. DSP III's reliance on 6- and 12-month products reflects the incorporation of somewhat shorter-term contracts than the 9- and 12-month products (and legacy 24-month products) used to provide default supply during DSP II.

For large commercial and industrial customers, DSP III will continue the approach taken in DSP II and provide for the purchase of power supply pursuant to full-requirements, load-following contracts with an energy component that reflects wholesale electricity spot market prices on a real-time hourly basis to meet the default service demand of those customers electing to receive such service. To be

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16 Under DSP III, PPL Electric will continue to rely upon a small quantity of block supply that was purchased under DSP I. However, during DSP III, remaining pre-existing block supply contracts will continue to expire such that only a single long-term block purchase of 50 MW will remain as of January 2016.
clear, products to supply each customer group (i.e., residential, small commercial and industrial, and large commercial and industrial) will be procured separately.

1. Residential and Small Commercial and Industrial Customers

Q: How is the proposed DSP III structured for residential customers?

A: Exhibit JC-3A shows DSP III's product portfolio and procurement schedule. For residential customers, DSP III obtains a portfolio of 12- and 6-month fixed-price, full-requirements, load-following products procured semiannually. DSP III is structured so that, following its completion, PPL Electric will have only one 12-month default service supply (25% of the default service load) under contract at the end of the DSP III period (other than one 50 MW long-term product purchased under DSP I). If PPL Electric no longer continues to be the default service provider following the end of DSP III, the final solicitation under DSP III can be adjusted to purchase just a 6-month product, or the Company can consider assignment of the overhanging 12-month product.

Q: How is the proposed DSP III structured for small commercial and industrial customers?

A: For small commercial and industrial customers, DSP III obtains a portfolio of 12- and 6-month fixed-price, full-requirements, load-following products procured semiannually that mirrors the structure for residential customers with the exception that there is no reliance on block products. Exhibit JC-3B shows DSP III's product portfolio and procurement schedule for the small commercial and industrial customer group. Note also that the Company will implement a peak billing demand
demarcation of 100 kW between the small commercial and industrial customer
group and the large commercial and industrial customer group beginning on June 1,
2015. This will result in a small number of default service customers with peak
billing demand between 100 kW and 500 kW being reclassified from small
commercial and industrial customers to large commercial and industrial
customers.\textsuperscript{17}

Q: Why is the proposed DSP III's structure for small commercial and industrial
customers similar to residential customers?

A: The proposed DSP III approach for the newly defined small commercial and
industrial customers mirrors the approach for residential customers (ignoring block
purchases) because these non-shopping small commercial and industrial customers
collectively represent PPL Electric's lowest-load customers in this rate class. The
incidence of shopping for these lower-load customers is notably less than for larger-
load small commercial and industrial customers. In particular, I understand that
more than 90,000 small commercial and industrial customers, out of a total of
approximately 194,000 customers, are shopping and represent approximately 85% of
the load. Moreover, Mr. Rouland states that over 88% of the larger (over 100 KW)
Small C&I customers are shopping. Based upon this information, we can conclude
that the remaining non-shopping customers, representing 10% of the load, are
customers with much lower loads. Thus, the reasoning supporting the small
commercial and industrial product mixture is the same as that for the residential

\textsuperscript{17} See Testimony of James M. Rouland.
plan (see above). That is, DSP III provides a continued transition to somewhat shorter-term fixed-price, full-requirement, load-following products. Moreover, the PUC's DS Policy Statement allows for a similar mixture of products for these two customer groups, and using an approach that mirrors the residential plan simplifies the procurement process.\textsuperscript{18}

Q: When will the DSP III products for residential and small commercial and industrial customers be solicited?

A: The semiannual solicitations envisioned under DSP III will procure the 12- and 6-month products approximately two months prior to delivery.

Q: Why is the reliance on 12-month fixed-price, full-requirement, load-following products reduced for residential and small commercial and industrial customers under DSP III?

A: PPL Electric's DSP III's product mixture seeks to strike a balance where default service pricing regularly adjusts to ensure that the default service price-to-compare reflects changes in market prices, while avoiding price volatility, thereby continuing to support the competitive market. This is accomplished by gradually reducing the Company's reliance on 12-month products serving a majority of the default service load and shifting to a reliance on a more even mix of 12- and 6-month products serving this load. In particular, the first solicitation under the proposed DSP III meets 25% of the default service load under a 6-month term product with the

\textsuperscript{18} 52 Pa. Code § 69.1805.
amount growing to 45% in the second solicitation (see Exhibit JC-3A). Thereafter the product terms will continue to ladder a mixture of 6- and 12-month term products using a product supply mixture almost equally weighted (55% 12-month and 45% 6-month).

2. Large Commercial and Industrial Customers

Q: How is the proposed DSP III structured for large commercial and industrial customers?

A: As I describe above, for large commercial and industrial customers, DSP III obtains the default service supply for these customers at prices based on the wholesale electricity spot markets. PPL Electric will annually solicit contracts to administer the provision of this spot market supply. This is identical to the approach taken in the Competitive Bridge Plan, DSP I, and DSP II and, thus, non-shopping large commercial and industrial customers will experience no change in the structure of their default service.

Specifically, PPL Electric proposes to issue single solicitations in the second quarter of 2015 and the second quarter of 2016 in which PPL Electric will request competitive offers from suppliers to manage the provision of its default service spot market supply for a period of 12 months. Customer rates will include the real-time hourly spot market electric energy prices in the PPL Electric transmission zone.

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19 As noted previously, the change in the definition of the small and large commercial and industrial classes from a 500 kW peak billing demand split to a 100 kW split will result in a small number of current small commercial and industrial default service customers being moved from fixed-price to spot market default service pricing.
PJM's pre-determined electric capacity charge in the PPL Electric transmission zone, PPL Electric's costs of administering DSP III, and a competitive supplier charge that encompasses all other components of the spot market default service supply necessary for PPL Electric to satisfy its customer obligations, including AECs. Experience has shown that competitive suppliers will make offers in response to the solicitation, and the successful bidders' charges will form the basis of the competitive supplier charge described above.\textsuperscript{20}

Q: Please explain why PPL Electric is not offering a fixed-price product to large commercial and industrial customers.

A: Throughout DSP I, the Company sought bids from wholesale suppliers for a fixed-price, full-requirements, load-following product and for a full-requirements, load-following, spot market product for the large commercial and industrial customer class. The fixed-price product offering was not fully subscribed by suppliers (or no suppliers responded at all) in every attempt the Company made to procure it, and as a result the Company never offered a fixed-price default service option for large commercial and industrial customers. The full-requirements, spot market product, by comparison, has been fully subscribed in every offering throughout the Competitive Bridge Plan, DSP I, and DSP II. For this reason, the Company chose not to offer the fixed-price product as a product under DSP II, which was approved.

\textsuperscript{20} As discussed above, PPL Electric has successfully used this approach to obtaining default service supplies for large commercial and industrial customers in the Competitive Bridge Plan, DSP I and DSP II. In addition, I note that this service is similar to the commercial and industrial energy product solicited each year as part of New Jersey's basic generation service auctions.
by the Commission; similarly, the Company is choosing not to offer it under DSP III. Additionally, as Exhibit JC-2 shows, PPL Electric's large commercial and industrial customers are purchasing power supplies from competitive retail suppliers, and they can be expected to continue to seek supplies from competitive retail suppliers. Thus, continuing the default service spot market offering for these larger customers provides a flexible default service that is reasonably priced and available whenever a customer must rely on default service supply. Moreover, the spot market product has clearly been an appropriate default service product for supporting the development of a retail competitive market in Pennsylvania for these large customers.

B. DSP III Satisfies the “Prudent Mix” and “Least Cost Over Time” Requirements Put Forth by Act 129 and PUC Policy

Q: Can you please summarize how you have interpreted Act 129 and PUC policy for the purposes of supporting the proposed DSP III?

A: A primary aspect of Act 129 and PUC policy is the requirement that default service providers rely on a “prudent mix” of supplies that is “least cost over time” while

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21 I note that the introduction of a new peak billing demand demarcation of 100 kW for small commercial and industrial customers shifts some commercial and industrial customers into the large classification. However, I understand that of these 3,200 shifted customers almost 90% of them are already shopping, according to Mr. Rouland. Thus, the percentage of shopping commercial and industrial customers with peak billing demands of 100-500 kW is similar to those customers that are already classified as large commercial and industrial.

22 In states where retail competition has been introduced, the majority of large commercial and industrial customer loads have switched to competitive suppliers. This is consistent with PPL Electric's experience (see Exhibit JC-2).
providing default service to customers that is adequate and reliable. At the same time, consistent with Act 129, the PUC's policy regarding default service encourages the continued development of retail competition. Thus, in my analysis I consider that the structure of a default service program should be consistent with encouraging the continued development of retail competition. I also believe a balance should be struck between market-reflective pricing and avoidance of excessive price volatility.

Q: How have you interpreted PUC policy with respect to the default service customers in each of PPL Electric's customer classes?

A: I have considered customer groupings as defined by PPL Electric in accordance with Commission policy. I have evaluated residential and small commercial and industrial customers collectively, recognizing that most non-shopping customers within these various rate schedules are primarily PPL Electric's smallest (i.e., lowest load per customer) customers (see above). I considered the prudent mix for large commercial and industrial customers separately. In this way, I am able to appropriately evaluate a suitable prudent mix for the different customer classes, recognizing the different risks that the customer classes' loads present to the service.

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26 However, I note that residential customers' default service supply will continue to include remaining block purchases procured under DSP I (which was the result of a settlement process between the relevant parties).
PPL Electric obtains as the default service provider and observations (from both the Company’s experience and other jurisdictions) that a substantial majority of large commercial and industrial customers elect service from competitive retail suppliers.

Q: Can you please summarize why DSP III’s proposal for residential and small commercial and industrial customers is appropriate to comply with Act 129 and the PUC’s related orders regarding default service?

A: Consistent with Act 129, and Commission policy, defining a prudent mix requires consideration of supporting retail competition while providing for the provision of reliable supply without excessive price volatility over time. PPL Electric’s proposed DSP III for its residential and small commercial and industrial customers continues to rely on short-term, fixed-price, full-requirements, load-following products which have a proven track record as prudent default service products. As I explain in greater detail below, market uncertainty impacts any particular mixture of power supply products, and it is not possible to know ahead of time that one mixture will be less expensive than another. Thus, there can be many mixtures that will provide customer rates that are consistent with Commission policy.

Moreover, Commission policy does not provide an explicit definition regarding the power supply mix that a default service provider should procure or precisely prescribe how the supplies must be procured, but instead Commission policy offers options to the default service provider as to what types of products and

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procurement processes are acceptable. Commission policy recognizes that it is desirable for default service programs to be structured so as to accommodate incremental changes as more experience is gained with particular product mixtures, and with the impact of Pennsylvania's other policy objectives, including continued development of the competitive retail market. DSP III for PPL Electric's residential and small commercial and industrial customers provides logical incremental changes to DSP II default service product terms and in my opinion is a reasonable evolution of PPL Electric's provision of default service supply.

Q: Can you please summarize why DSP III's proposal for large commercial and industrial customers is appropriate to comply with Act 129 and the PUC's related orders regarding default service?

A: As I discuss above, Exhibit JC-2 shows that the vast majority of PPL Electric's large commercial and industrial customers and load will continue to be served by competitive suppliers. By continuing to offer default service with spot market pricing to non-shopping large commercial and industrial customers, these non-shopping customers will continue to have a strong incentive to consider the competitive offerings from retail suppliers, whose short- and long-term products will be best suited to their particular individual needs. Moreover, as Exhibit JC-2 shows,
PPL Electric's largest customers have demonstrated that they are able to consistently obtain power supply from retail suppliers. Finally, as I explained above, PPL Electric learned from its experience with DSP I that wholesale suppliers are not interested in providing a fixed-price, load-following, full-requirements product to serve the default service needs of the large commercial and industrial customers.

1. The Proposed DSP III Provides a "Prudent Mix"

Q: Does PPL Electric's proposed DSP III represent a "prudent mix" under Act 129?

A: Yes. The Company's proposed DSP III includes each of the default service product types specified in Act 129. Thus, the Company's proposed DSP III is consistent with Act 129's prudent mix requirement.

Q: What factors did you take into consideration when evaluating what products constitute a prudent mix for the Company's two default service customer groupings?

A: As I explained above, the definition of a prudent mixture takes into account balancing the objective that default service rates support the continued growth of retail competition against ensuring that default service rates are not unacceptably volatile. In addition, it is important to ensure that any product mixture can be successfully procured from the wholesale electricity market.

Q: How do the product types within PPL Electric's proposed DSP III constitute a "prudent mix" for residential and small commercial and industrial customers?
A: For residential and small commercial and industrial customers, DSP III’s reliance on fixed-price, full-requirements, load-following products with terms of 6 and 12 months will track ongoing changes in wholesale electricity market prices while guarding against price volatility. The proposed product mixture will continue to promote the development of retail competition while protecting against various risks that must be addressed by any default service plan. Simply stated, the costs of otherwise protecting against uncertain future load and prices (e.g., having the Company engage in managing default service procurement risk) will not be known until after the fact and, thus, are best minimized by using short-term (i.e., 12 months or less) fixed-price, full-requirements, load-following products. These products are well known throughout the industry and can be competitively procured by PPL Electric to obtain reasonably priced reliable power supplies for default service.

Q: Can you please explain why the use of fixed-price, full-requirements, load-following products continues to remain appropriate for obtaining default service supply for non-shopping residential and small commercial and industrial customers?

A: The proposed DSP III continues to use a laddering approach whereby fixed-price, full-requirements, load-following products are purchased periodically to establish default service pricing for 6-month periods, and in doing so, reduces the risk of unreasonable price volatility. Moreover, competition between wholesale suppliers in the provision of fixed-price, full-requirements, load-following products has been robust for several years and ensures that PPL Electric will be able to obtain supply.
for default service through these products at reasonable prices for its customers while minimizing the risks associated with the provision of default service supply.

Q: What types of risk do wholesale suppliers manage when providing default service?

A: Wholesale suppliers primarily manage the risks associated with offering a fixed-price default service while underlying supply input costs and customer loads can change throughout a product term. For example, wholesale suppliers agree to meet a fixed percentage of default service load regardless of the number and type of default service customers and the variance in load that occurs due to seasonal weather changes. Wholesale suppliers also must manage the costs of default service supply and hedge against possible shifts in fuel and power markets during the product delivery term. Wholesale suppliers specialize in managing these risks and compete to provide the lowest-price default service to PPL Electric's customers.

Q: Is there any evidence to support your claim that PPL Electric's use of fixed-price, full-requirements, load-following products has resulted in reasonable prices for customers?

A: Yes. The pricing of the fixed-price, full-requirements, load-following products is consistent with the actual prices of underlying wholesale electricity market products at the time the purchases are made. To show this I have prepared Exhibits JC-4A and JC-4B, which compare the prices obtained for the various fixed-price, full-requirements, load-following products serving the residential and small commercial and industrial customer groups in the more recent DSP I and DSP II solicitations to the estimated costs of each major component of the full-requirements product obtained separately (not including the costs of overhead and risk management...
services, and a competitive profit margin). These components are the cost of energy
(whenever possible based on price of the concomitantly procured block product\(^{31}\) of
the same term plus a load-shaping adjustment, otherwise based on
contemporaneous forward prices of the same term plus a load-shaping adjustment),
the cost of capacity (based on the applicable price of capacity established by PJM),
the cost of ancillary services (based on the price of ancillary services reported in
PJM's \textit{2012 State of the Market Report}\(^{32}\)), and the costs of AECs (based on the price
reported in \textit{2012 Annual Report: AEPS Act of 2004}\(^{33}\)).

As Exhibits JC-4A and JC-4B show, the cost build-up (not including the
expected costs of overhead and risk management services, and a competitive profit
margin) is somewhat less than the full-requirements product (which includes all the
costs a supplier expects to incur). On average, across the solicitations, the fixed-
price, full-requirements, load-following product prices are slightly higher than the
cost build-up (by roughly $3.30 per MWh for the residential customer group and
$7.70 per MWh for the small commercial and industrial group).

Next, because estimating the costs a supplier incurs associated with overhead
and risk management services is difficult and subject to each supplier's particular

---

\(^{31}\) The block products obtained under DSP I are around-the-clock electricity service, for a given time period, which
includes all necessary energy, transmission (other than Network Integration Transmission Service), transmission
losses, congestion management costs, and such other services or products (but exclude capacity, ancillary
services, and alternative energy credits to meet Pennsylvania’s Alternative Energy Portfolio Standards Act).

\(^{32}\) \textit{2013 State of the Market Report for PJM}, Monitoring Analytics, LLC, Independent Market Monitor for PJM,
March 13, 2014.

Commission in cooperation with the PA Department of Environmental Protection, October 2013.
business structure, I have not tried to estimate these costs for the individual procurements, or tried to estimate a competitive profit margin. However, empirical analysis suggests that these excluded costs are at least in the range of $3-8/MWh.\textsuperscript{34} Thus, these excluded costs fall squarely into the range of the difference between default service auction prices and the estimated prices using the cost build-ups. Including an estimate of the costs associated with overhead and risk management services and a competitive profit margin causes the results of my cost build-up analysis to be closely comparable to the actual default service auction prices. This indicates that default service pricing based on fixed-price, full-requirements, load-following products has been competitive and consistent with power market conditions at the time the supply is procured.

Q: Why have the contract terms been reduced for residential and small commercial and industrial customers?

A: Under DSP II, PPL Electric began to transition from longer-term (12- and 24-month) to shorter-term (9- and 12-month) fixed-price, full-requirements default service products, and DSP III continues this transition by moving to 6- and 12-month term products. As I explained above, PPL Electric's lessons learned under DSP II show continued high numbers of shopping customers and competitively priced default

\textsuperscript{34} Statistical modeling has shown that the modal premium associated with hedging is around 5%, the median premium is 8%, and the mean premium is 11% (see Paruqui, Alunad, "The Ethics of Dynamic Pricing," The Brattle Group, March 30, 2010). As with any statistical study, the result depends on assumptions regarding underlying stochastic variables. However, applying these results to the fixed-price, full-requirements, load-following products in Exhibits JC-4A and JC-4B suggests that roughly an additional $3-8/MWh of costs associated with risk management are not included in the cost build-ups. This is consistent with the estimates reported elsewhere.
service supply contracts. Under DSP III, the Company's default service load (less block purchases where relevant) is continually re-priced through semiannual solicitations for non-shopping residential and small commercial and industrial customers. This structure encourages these non-shopping customers to consider offers from competitive retail suppliers (for example, prices each year will rise and fall with market conditions during summer/fall and winter/spring, which helps signal to customers the value of competitive supplier products), promoting the further development of Pennsylvania's competitive retail electricity markets. Moreover, resetting prices for 6-month time periods facilitates non-shopping customers' evaluation of EGS offers by providing a long enough time horizon to make a reliable estimate of the savings available from shopping. In my opinion, this approach is fully consistent with Act 129 and the PUC's default service policies, and an appropriate evolution for the prudent mixture of default service products for the Company's residential and small commercial and industrial customers.

Q: How does the product type within PPL Electric's proposed DSP III constitute a "prudent mix" for large commercial and industrial customers?

A: In my opinion, the full-requirements, load-following, spot market product provides non-shopping large commercial and industrial customers a cost-effective default service that has been consistently available from competitive wholesale suppliers. By using a spot market product, PPL Electric protects large commercial and industrial customers.

For smaller customers, more frequent default service price changes that accompany even shorter-term products (e.g., quarterly, monthly, and spot market) make the determination of savings less certain, and all else equal, will increase price volatility.
industrial customers from the risks of high costs that could result if longer-term products were purchased which required bidders to incorporate into their prices the uncertainty associated with shopping customers possibly returning to default service. For example, almost all of the Company's large commercial and industrial customers are shopping (see above). If the Company were to introduce a longer-term product, wholesale suppliers would be in a difficult position of trying to predict if the provision of a fixed-price product would result in shopping customers returning to default service. To manage this uncertainty, wholesale suppliers would have to increase their bids to account for the possibility that customers would return to default service. Moreover, as explained above, the Company learned from DSP I that suppliers were not interested in bidding for a large commercial and industrial fixed-price, full-requirements, load-following product.

Finally, a spot market-priced service provides default service customers the opportunity to shop without restrictions that would be necessary to support a longer-term fixed-price service. For example, it is likely that a fixed-price service for large commercial and industrial customers would require a tariff provision to ensure customers taking service remain for a certain number of months, or pay a termination fee, in order to define a product that might be of interest to bidders. However, these types of restrictions would reduce customers' shopping options.

Company experience has shown that the full-requirements, load-following, spot

---

This type of uncertainty is not a problem for residential and small commercial and industrial customers whose historical switching behavior has evolved in conjunction with the use of fixed-price products.
market product facilitates retail competition and has been a consistently successful
default service product.

2. The Proposed DSP III Ensures “Least Cost Over Time”

Q: In your opinion, will the products procured under the proposed DSP III ensure “least
cost over time” to customers?

A: Yes. First, it is important to note that there are numerous assumptions regarding
inherently uncertain future market conditions that affect a given product portfolio’s
costs to customers. On a going-forward basis, there are many possible contract
mixtures that can constitute a prudent mix, and the cost of these various mixtures is
not necessarily known ahead of time. Thus, when assessing a product portfolio
prospectively, it is important to analyze the products recognizing the uncertainty
surrounding energy markets at the time the products are purchased. It is
impossible to say with certainty whether one particular prudent mixture of products
will always be less costly than another prudent mixture of products when evaluated
post procurement. What can be said with certainty is that exposing PPL Electric’s
smaller default service customers to price and quantity volatility can result in
unexpected cost increases. DSP III explicitly recognizes such possibilities and
insures against uncertain outcomes by relying primarily on fixed-price, full-
requirements, load-following products.

Consistent with the realities of the inherent uncertainty in energy markets, I
have interpreted “least cost over time” along two dimensions. First, in a broader
context, it is my understanding that the phrase “least cost over time” requires the
selection of contracts that compose a prudent mix, and that the types of products in
the prudent mix are selected by considering all relevant and appropriate risks and costs. Second, in a narrow context, it is my understanding that this phrase requires default service products to be procured through a process that produces the lowest cost for the particular product being purchased.

Q: How does PPL Electric’s proposed DSP III satisfy the broad interpretation of “least cost over time” with respect to residential and small commercial and industrial default service customers?

A: I have analyzed the proposed DSP III from the perspective of satisfying the policy objectives of the Commonwealth. In particular, I have assumed that it is important to promote the development of retail competition while protecting default service customers, over time, from costly risks. As I have explained above, retail competition is supported by default service rates that track changes in wholesale electricity markets and provide customers an opportunity to assess the benefits of shopping. At the same time, I have recognized that fixed-price default service supply products for residential and small commercial and industrial customers continue to provide cost-effective protection against price volatility. In my opinion, DSP III’s product portfolio promotes the development of retail competition (one of the Commonwealth’s primary public policy objectives). DSP III promotes this objective while balancing market-reflective price changes with reasonable price stability (which is another one of the Commonwealth’s public policy objectives especially important for smaller customers). The plan also takes into account the various risks that must be addressed by any default service plan.
Q: How does PPL Electric's proposed DSP III satisfy the narrow interpretation of “least cost over time” with respect to residential and small commercial and industrial default service customers?

A: The proposed DSP III satisfies this provision by regularly holding transparent solicitations in which wholesale suppliers can compete with one another to be the source of default service supply. Over time this approach will produce default service prices that are the least cost over time given the underlying energy market conditions. PPL Electric relies on widely advertised, well-defined solicitations to procure these products where the overarching objective is to seek out the lowest-cost suppliers. By obtaining default service supplies through competitive solicitations in the form of an auction, PPL Electric always obtains default supplies at the lowest possible cost for the product being procured.

Q: How does PPL Electric's proposed DSP III satisfy the broad interpretation of “least cost over time” with respect to large commercial and industrial default service customers?

A: As I have discussed above, by using the spot market to price default service for non-shopping large commercial and industrial customers, the proposed DSP III ensures that these customers are provided a default service product that has been demonstrably successful and competitively priced. An alternative fixed-price, full-requirements, load-following product would require bidders to estimate the costs of managing the uncertainty that large customers will move onto and off of the default service and, as a result, increase default service rates, all else equal. Moreover, such
a product also would require the Company to place unacceptable restrictions on
shopping in order to obtain suppliers interested in bidding on such a product.

Providing default service supplies based on the spot market allows the large
commercial and industrial customers complete flexibility to shop and recognizes that
retail suppliers have clearly offered large commercial and industrial customers
products that will take into account the particular needs of the individual customers.
It is my opinion that default service with prices based on the spot market will be
least cost over time for these customers.

Q: How does PPL Electric’s proposed DSP III satisfy the narrow interpretation of “least
cost over time” with respect to large commercial and industrial default service
customers?

A: The proposed DSP III satisfies this provision for the same reasons I have explained
above with respect to the fixed-price, full-requirements, load-following products used
to obtain supply for residential and small commercial and industrial customers.
Namely, wholesale competition among suppliers of the spot market-priced product
will ensure that PPL Electric provides this default service at the lowest possible
cost.

Q: Does this conclude your direct testimony?

A: Yes.
Appendix A
CURRICULUM VITAE

Joseph Cavicchi

OFFICE: Compass Lexecon
200 State Street
9th Floor
Boston, MA 02109
(617) 520-0200 main
(617) 520-0251 direct

PROFESSIONAL EXPERIENCE

Compass Lexecon, Boston, MA
Executive Vice President, April 2013 – present
Senior Vice President, January 2007 – March 2013
Managing Director, 2003 – 2006
Vice President, 2001 – 2003
Senior Consultant, 1999 – 2001
Consultant, 1997 – 1999

Provides wholesale and retail electricity market regulatory economic analyses in connection with the restructuring of the US electricity industry. In particular, he advises clients in Federal Energy Regulatory Commission matters, state regulatory proceedings, and arbitration and court proceedings. He files testimony, affidavits and expert reports supported by economic analyses.

Extensive knowledge of wholesale market operations with general economic theory of contracting and electricity generation plant dispatch that provides companies with detailed analyses that impact both regulatory and business decisions. Actively involved in the electricity industry both before and after restructuring for a total of more than 20 years.

Tufts University, Medford, MA
Adjunct Instructor, Summer 2000

Taught graduate-level environmental economics.
Massachusetts Institute of Technology, Cambridge, MA

Research Engineer, 1997
Research Assistant, 1995 – 1997

Performed an analysis of water and electricity resources in Mendoza, Argentina. Developed a computer simulation model to support analysis and permit the display of results to a diverse group of stakeholders. Traveled frequently to Mendoza to interact with government officials and relevant institutions in an effort to establish electricity and water policy.

Massachusetts Institute of Technology, Cambridge, MA

Project Manager/Staff Mechanical Engineer, 1989 – 1995

Managed the development, engineering, and construction of a $40 million, 20 MW gas turbine-based cogeneration facility at the Cambridge campus. Directed all attributes of the project for its three-year duration. Involved extensively in energy conservation programs with emphasis on building and utility plant optimization through innovative engineering applications.

Carrier Building Systems and Services, Waltham, MA

Project Engineer, 1987 – 1988

Engineered and managed the installation of Energy Management Systems used exclusively for demand-side management. Interfaced direct digital control systems to mechanical equipment associated with thermal systems of industrial, commercial, and educational buildings.

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA
S.M. in Technology Policy, 1997

Tufts University, Medford, MA
S.M. in Environmental Engineering, 1992

University of Connecticut, Storrs, CT
B.S. in Mechanical Engineering, 1987
TESTIMONY

San Diego Gas and Electric Company

PPL EnergyPlus


Transalta Energy Marketing

Avista Corporation et al

Department of Justice
Before the United States Court of Federal Claims, Pacific Gas and Electric Company and Southern California Edison Company, Plaintiffs et al v. The United States, Defendant, No. 07-157C, No. 07-167C (Consolidated), No. 07-
184C. Deposition of A. Joseph Cavicchi, March 27, 2013. Confidential, Subject to
Protective Order.

Before the United States Court of Federal Claims, Pacific Gas and Electric
Company and Southern California Edison Company, Plaintiffs et al v. The United
States, Defendant, No. 07-157C, No. 07-167C (Consolidated), No. 07-
184C. Expert Report of A. Joseph Cavicchi, March 1, 2013. Confidential, Subject
to Protective Order.

PPL Montana and PPL EnergyPlus
Before the Federal Energy Regulatory Commission, Puget Sound Energy, Inc.,
Complainant v. All Jurisdictional Sellers of Energy and/or Capacity at Wholesale
into Electric Energy and/or Capacity Markets in the Pacific Northwest, Including
Parties to the Western System Power Pool Agreement Participants, Docket.
No. EL01-085. Prepared Answering Testimony of A. Joseph Cavicchi on behalf of
Deposition of A. Joseph Cavicchi on behalf of PPL Montana and PPL EnergyPlus,
February 8, 2013.

Constellation New Energy
Before the Federal Energy Regulatory Commission, Puget Sound Energy, Inc.,
Complainant v. All Jurisdictional Sellers of Energy and/or Capacity at Wholesale
into Electric Energy and/or Capacity Markets in the Pacific Northwest, Including
Parties to the Western System Power Pool Agreement Participants, Docket.
No. EL01-085. Prepared Answering Testimony of A. Joseph Cavicchi on behalf of
Constellation Energy Commodities Group, December 17, 2012. Written,
Public. Deposition of A. Joseph Cavicchi on behalf of Constellation Energy
Commodities Group, February 8, 2013.

Constellation NewEnergy
Before the Federal Energy Regulatory Commission, San Diego Gas & Electric
Company, Complainant, v. Sellers of Energy and Ancillary Services into Markets
Operated by the CAISO and CA Power Exchange, et al., Respondents, Docket No.
EL00-95-248. Direct Testimony and Exhibits of Constellation NewEnergy, Inc.
Testimony of A. Joseph Cavicchi on behalf of Constellation NewEnergy, July 11,

PPL Electric Utility Corporation
Before the Pennsylvania Public Utility Commission, Docket No. P-2012-2302074,
PPL Electric Utility Corporation. Statement No. 2. Direct Testimony of A.
Joseph Cavicchi, August 17, 2012. Statement No. 3. Testimony of A. Joseph
PPL Corporation


Entegra Power Services, LLC


Constellation NewEnergy, Inc.


CP Energy


Edison Mission.


Entegra Power Services, LLC


PPL Corporation


Entegra Power Services LLC

*Before the Federal Energy Regulatory Commission*, Gila River Power, J.P, Docket No. ER05-1178-015 and Entegra Power Services LLC, Docket ER09-838-

PPL Corporation

Entegra Power Services LLC

Chesapeake Energy Corp., et al.

Chesapeake Energy Corp., et al.

Chesapeake Energy Corp., et al.

PPL Electric Utilities Corporation

PPL Corporation and E.ON U.S.


BG Masspower


Allegheny


MPS Merchant Services


PPL Montana, LLC


Constellation New Energy


Energy Northwest

Before the American Arbitration Association, Seattle, Washington, Grays Harbor Energy LLC, Claimant, Energy Northwest, Respondent, Case No. 75-158-115-08. Testimony of A. Joseph Cavicchi on behalf of Energy Northwest, June 18,

Entegra Power Services LLC


Union Pacific Railroad Company


PPL Electric Utilities Corporation


PPL Electric Utilities Corporation


Union Power Partners, L.P.


PPL Electric Utilities Corporation


PPL Electric Utilities Corporation

PPL Electric Utilities Corporation
*United States of America, Before the Federal Regulatory Commission, Docket No. ER00-1712-008, ER02-2408-003, ER00-744-006, ER02-1327-005, ER00-1703-003, ER02-1749-003, ER02-1747-003, ER99-4503-005, ER00-2186-003, ER01-1559-004. Affidavit of A. Joseph Cavicchi on behalf of PPL Companies, September 2, 2008.*

PPL Electric Utilities Corporation
*United States of America, Before the Federal Regulatory Commission, Docket No. EL08-67-000. Affidavit of A. Joseph Cavicchi (with Joseph P. Kalt) on behalf of PPL Companies, August 12, 2008.*

PPL Electric Utilities Corporation

Entegra Power Group L.L.C.

Harbinger

IEPA

PJM Power Providers Group
*United States of America, Before the Federal Regulatory Commission, Docket No. EL08-34-000. Affidavit of Joseph P. Kalt and A. Joseph Cavicchi on behalf of the P3 Group, responding to the Complaint of the Maryland Public Service Commission against PJM Interconnection, L.L.C., regarding marketing power mitigation, February 19, 2008.*

Tractebel Energy Marketing, Inc.

PPL Corporation
United States of America, Before the Federal Regulatory Commission, Docket Nos. ER00-1712-007, ER02-2408-003, ER00-744-006, ER02-1327-005, ER00-1703-002, ER02-1749-003, ER02-1747-003, ER99-4503-005, ER00-2186-003, ER01-1559-004. Affidavit of A. Joseph Cavicchi on behalf of Triennial Market Power Update of PPL Companies, January 14, 2008.

IEPA
United States of America, Before the Federal Regulatory Commission, Docket Nos. ER06-615-003, 005, 012, ER07-1257-000, ER02-1656-017, ER02-1656-018, EL05-146-000 and EL08-20-000, Affidavit of A. Joseph Cavicchi on behalf of Independent Energy Producers Association, January 9, 2008.

NRG


Independent Energy Producers Association of California

Cross Hudson
PPL Electric Utilities Corporation


PPL Electric Utilities Corporation


PJM Interconnect, LLC

*United States of America, Before the Federal Regulatory Commission, Docket No. EL05-148-000, 001; Docket No. ER05-1410-000, 001, Initial Comments of the PPL Parties and the PSEG Companies in Opposition to Proposed Settlement, Exhibit D-1 (Exhibit AJC-1). Affidavit of A. Joseph Cavicchi, October 19, 2006. Written, Public.*

Excelsior Energy Inc.


PPL Electric Utilities Corporation


Independent Energy Producers Association of California


Independent Energy Producers Association of California

*United States of America, Before the Federal Regulatory Commission, Docket No. EL05-146-000, Affidavit in Support of Justness and Reasonableness of the Offer of*

PPL Maine, LLC

FirstEnergy Solutions Corp.
United States of America, Before the Federal Regulatory Commission, FirstEnergy Solutions Corp., Docket No. ER06-117-000. Prepared Direct Testimony of Scott T. Jones, Ph.D., and A. Joseph Cavicchi on behalf of FirstEnergy Solutions Corporation, March 15, 2006, confirming the auction price result of the Competitive Bidding Process carried out by the Ohio Public Utilities Commission in December 2004, and establishing that Solutions is not charging a rate greater than market prices for wholesale electricity sold to its affiliated Ohio based regulated distribution companies.

PPL Montana, LLC

PPL Corporation

Independent Energy Producers Association of California

PPL Corporation
Independent Energy Producers Association of California

PPL Corporation

PPL EnergyPlus

PPL Montana, LLC

*United States of America, Before the Federal Energy Regulatory Commission,* PPL Colstrip I, LLC; PPL Colstrip II, LLC; Docket No. ER99-3491-003, market power analysis in support of application for renewal of authority to sell electric energy and capacity at market-based rates. Affidavit (filed with Joseph Kalt), November 9, 2004.

PPL EnergyPlus
*United States of America, Before the Federal Energy Regulatory Commission,* PPL EnergyPlus et al., Docket ER00-1712-004, market power analysis in support of application for renewal of authority to sell electric energy and capacity at market-based rates. Supplemental Affidavit, November 9, 2004.

PPL Southwest Generation Holdings, LLC

PPL Wallingford Energy LLC
*United States of America, Before the Federal Energy Regulatory Commission,* PPL Wallingford Energy LLC, Docket No. ER01-1559-002, market power analysis in
support of application for renewal of authority to sell electric energy and capacity at market-based rates. Supplemental Affidavit, October 8, 2004.

PPL Wallingford Energy LLC

PPL Southwest Generation Holdings, LLC

PPL Wallingford Energy LLC

Massachusetts Department of Telecommunications and Energy
Submission of comments on the investigation by the Massachusetts DTE on its own motion into the Provision of Default Service, DTE 02-40-B (with Charles Augustine), May 28, 2003.

BUSINESS STRATEGY ANALYSES

Electricity Generation Facility Developers
Oversees the development and implementation of transmission-constrained dispatch modeling for proposed electricity generation units locating in the Northeastern, Mid-Atlantic, and Midwestern United States. Analyses typically focus on determining likely facility capacity factors and impacts on local and regional air pollutant emissions as well as on wholesale electricity prices. In addition, these analyses provide detailed knowledge of new facilities' impacts on the operation of the electricity transmission system that is critical to assessing the ability of a generating unit to deliver its power in a wide geographical area.

Electricity Distribution Companies
Provide extensive strategic advice and analytical support to electricity distribution companies that are required to assess new wholesale marketplaces in order to fulfill their regulatory commitments as providers of last resort or default electricity service. In most instances these companies require assistance with the development and issuance of requests for proposals as well as rapid evaluation of commodity bids. The assignments combine extensive knowledge of wholesale market operations with
general economic theory of contracting and electricity generation plant dispatch in order to provide companies with an approach to commodity procurement that agrees with their risk profile. In most cases there are numerous business and regulatory concerns that are incorporated into the procurement strategies. Additionally, each assignment typically requires extensive analysis of customer demand patterns and wholesale market prices in order to develop market-based customer service cost forecasts.

PUBLICATIONS


PRESENTATIONS


CERTIFICATIONS

Registered Professional Engineer, Commonwealth of Massachusetts, 1992-2010.

PROFESSIONAL AFFILIATIONS

Member, Board of Directors, Northeast Energy and Commerce Association, 2002-2012.
Exhibit JC-1
# PPL Electric Utilities DSP II Product Structure and Procurement Schedule

## Residential Customer Class

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
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**Note:**
1. All products are fixed price full requirements service except where noted.
2. PPL Electric intends to request approval to extend original DSP II product term 6 months to continue supply product laddering.
Exhibit JC-2
### Shopping in PPL Electric's Territory
#### 2012 and 2014

<table>
<thead>
<tr>
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<th>Residential 1/1/2012</th>
<th>Residential 1/1/2014</th>
<th>Commercial 1/1/2012</th>
<th>Commercial 1/1/2014</th>
<th>Industrial 1/1/2012</th>
<th>Industrial 1/1/2014</th>
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<tbody>
<tr>
<td>Number of Customers Served By An EGS</td>
<td>495,539</td>
<td>566,163</td>
<td>91,888</td>
<td>98,406</td>
<td>1,112</td>
<td>1,127</td>
</tr>
<tr>
<td>Percentage of Customers Served By An EGS</td>
<td>40.5%</td>
<td>46.0%</td>
<td>52.1%</td>
<td>55.2%</td>
<td>87.3%</td>
<td>85.8%</td>
</tr>
<tr>
<td>Customers' Load (MW) Served By An EGS</td>
<td>1,597</td>
<td>1,606</td>
<td>1,924</td>
<td>1,975</td>
<td>1,810</td>
<td>1,857</td>
</tr>
<tr>
<td>Percentage of Customers' Load Served By An EGS</td>
<td>46.3%</td>
<td>51.8%</td>
<td>90.4%</td>
<td>90.0%</td>
<td>96.6%</td>
<td>95.4%</td>
</tr>
</tbody>
</table>

Note: Includes active and pending shopping customers.
Source: PA Office of Consumer Advocate.
Exhibit JC-3A
Notes:
1. All products are fixed price full requirements service except where noted.
2. Auctions will be held every six months approximately two months prior to the start of delivery.
3. The first auction will be held at the end of March 2015.
4. DSP-I product term shown with an extension of 6 months to provide supply product laddering.
Exhibit JC-3B
PPL Electric Utilities DSP III Product Structure and Procurement Schedule  
(Small Commercial and Industrial Customer Class)

<table>
<thead>
<tr>
<th>DSP I Product</th>
<th>DSP II Product</th>
<th>DSP III Product</th>
</tr>
</thead>
</table>

Notes:  
(1) All products are fixed price full requirements service.  
(2) Auctions will be held every six months approximately two months prior to the start of delivery.  
(3) The first auction will be held at the end of March 2015.  
(4) DSP-II product term shown with an extension of 6 months to continue supply product ladder.
Exhibit JC-4A
Cost Build-Up v. Full Requirements Price
Residential Customer Class - Recent DSP I and DSP II

Note: An * indicates that comparable block energy was not procured. An average of contemporaneous forwards prices for the duration of the full requirements term were used instead.
### Cost Build-Up vs. Full Requirements Price

#### Small Commercial and Industrial Customer Class - Recent DSP I and DSP II

<table>
<thead>
<tr>
<th>Block</th>
<th>Cost Build-Up</th>
<th>Load Shaping Adjustment</th>
<th>Capacity</th>
<th>Ancillary Services</th>
<th>AECs</th>
<th>Full Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-Month Full Req. DSP I Sol. 12</td>
<td>$54.06</td>
<td>$6.04</td>
<td>$5.88</td>
<td>$1.00</td>
<td></td>
<td>$6.40</td>
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<tr>
<td>12-Month Full Req. DSP I Sol. 13</td>
<td>$57.05</td>
<td>$6.04</td>
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<tr>
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<td>$58.68</td>
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<td>$6.10</td>
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<tr>
<td>12-Month Full Req. DSP II Sol. 2</td>
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<td>$6.52</td>
<td>$1.00</td>
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<td>$6.40</td>
</tr>
</tbody>
</table>

Note: An * indicates that comparable block energy was not procured. An average of contemporaneous forwards prices for the duration of the full requirements term were used instead.