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0000168964

Court S. Rich AZ Bar No. 021290  
Rose Law Group pc  
7144 E. Stetson Drive, Suite 300  
Scottsdale, Arizona 85251  
Direct: (480) 505-3937  
Fax: (480) 505-3925  
*Attorney for Energy Freedom Coalition of America*

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BEFORE THE ARIZONA CORPORATION COMMISSION

DOUG LITTLE  
CHAIRMAN

BOB STUMP  
COMMISSIONER

BOB BURNS  
COMMISSIONER

TOM FORESE  
COMMISSIONER

ANDY TOBIN  
COMMISSIONER

**IN THE MATTER OF THE ) DOCKET NO. E-01933A-15-0239**  
**APPLICATION OF TUCSON )**  
**ELECTRIC POWER COMPANY )**  
**FOR APPROVAL OF ITS 2016 ) THE ENERGY FREEDOM COALITION**  
**RENEWABLE ENERGY STANDARD ) OF AMERICA'S NOTICE OF FILING**  
**AND TARIFF IMPLEMENTATION ) DIRECT TESTIMONY OF DAVID W.**  
**PLAN. ) DERAMUS, PHD**

The Energy Freedom Coalition of America ("EFCA") hereby submits the Direct Testimony of David W. Deramus, PHD in the above-referenced matter.

Respectfully submitted this 11 day of March, 2016.

Arizona Corporation Commission  
**DOCKETED**  
MAR 11 2016

/s/ Court S. Rich  
Court S. Rich  
Rose Law Group pc  
Attorney for EFCA

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3 Docket Control  
4 Arizona Corporation Commission  
5 1200 W. Washington Street  
6 Phoenix, Arizona 85007

6 Copies of the foregoing sent by electronic and regular mail to:

7 Janice Alward  
8 Arizona Corporation Commission  
9 1200 W. Washington Street  
10 Phoenix, Arizona 85007  
11 jalward@azcc.gov

Daniel Pozefsky  
RUCO  
1110 W. Washington St.  
Phoenix, Arizona 85007  
dpozefsky@azruco.gov

11 Dwight Nodes  
12 Arizona Corporation Commission  
13 1200 W. Washington Street  
14 Phoenix, Arizona 85007-2927  
15 dnodes@azcc.gov

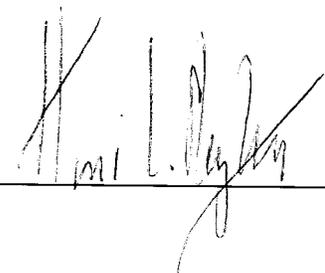
Michael Patten  
Snell & Wilmer L.L.P.  
One Arizona Center  
400 E. Van Buren Street, Suite 1900  
Phoenix, Arizona 85004-2202  
mpatten@swlaw.com

16 Thomas Broderick  
17 Arizona Corporation Commission  
18 1200 W. Washington Street  
19 Phoenix, Arizona 85007  
20 tbroderick@azcc.gov

Kerri Carnes  
Arizona Public Service Company  
P.O. Box 5399, MS 9712  
Phoenix Arizona 85072  
kerri.carnes@aps.com

21 Bradley Carroll  
22 Tucson Electric Power Company  
23 MS HQE910, Post Office Box 711  
24 Tucson, Arizona 85702-0711  
25 bcarroll@tep.com

Thomas Loquvam  
Pinnacle West Capital Corp.  
P.O. Box 53999, MS 8695  
Phoenix Arizona 85072  
thomas.loquvam@pinnaclewest.com

26 By:   
27  
28

**BEFORE THE ARIZONA CORPORATION COMMISSION**

**DOUG LITTLE  
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**IN THE MATTER OF THE  
APPLICATION OF TUCSON ELECTRIC  
POWER COMPANY FOR APPROVAL  
OF ITS 2016 RENEWABLE ENERGY  
STANDARD AND TARIFF  
IMPLEMENTATION PLAN**

**DOCKET NO. E-01933A-15-0239**

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**DIRECT TESTIMONY OF DAVID W. DERAMUS, PHD**

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1 II. Purpose of Testimony

2 Q. WHO IS SPONSORING YOUR TESTIMONY?

3 A. My testimony is sponsored by the Energy Freedom Coalition of America (“EFCA”).

4 Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

5 A. I have been asked to examine the competitive implications of certain proposals made by Tuscon  
6 Electric Power (“TEP”) in its 2016 Renewable Energy Standard (“REST”) Implementation Plan  
7 (“Application”). In particular, I address the significant potential anticompetitive impacts of TEP’s  
8 proposal to expand the TEP-Owned Residential Solar (“TORS”) program and to create a new  
9 Residential Community Solar (“RCS”) program.

10 III. Summary

11 Q. PLEASE SUMMARIZE YOUR CONCLUSIONS.

12 A. My conclusions are as follows:

- 13 1. TEP’s proposal for utility-owned rooftop solar and community solar under the TORS and RCS  
14 programs would have severe anticompetitive consequences that would effectively eliminate  
15 competition from independent DG service providers in the TEP service territory, forcing TEP’s  
16 captive ratepayers to forego the very substantial benefits the competitive marketplace currently  
17 provides. TEP’s foreclosure of competing DG service providers from its service territory will  
18 result in reduced innovation, increased ratepayer risks, and increased ratepayer costs.
- 19 2. The TORS and RCS programs, both of which would target residential customers currently  
20 eligible for net metering, represent a harmful intrusion into a market segment that is currently  
21 served effectively and competitively. The proposed programs, in combination with TEP’s rate  
22 proposals to radically alter the value to customers of net metering, would create significant  
23 anticompetitive advantages for TEP resulting from its monopoly utility position.
- 24 3. TEP has the incentive and the means to exploit its monopoly to foreclose competition from  
25 distributed generation, establish barriers to competitive entry, and shift business risk onto captive  
26 ratepayers, all of which would be accomplished under the anticompetitive cross-subsidization  
27 that is at the heart of its TORS and RCS proposals. TEP’s proposal to put residential solar assets

1 into its rate base is an inappropriate attempt to increase and protect TEP's monopoly profits by  
2 foreclosing competition from independent providers of DG solar. TEP's proposal to offer its  
3 TORS and RCS customers a long-term, fixed monthly rate for all of their electricity services,  
4 covering up to 115% of their historical consumption, will shift substantial cost risks to its other  
5 captive customers. TEP's proposal to use its monopoly retail franchise -- including its access to  
6 customer information, distribution network information, billing services, and other assets -- to  
7 benefit its residential DG activities will result in excluding competing providers from the market.  
8 The anticompetitive consequences of TEP's proposal -- the foreclosure of independent suppliers  
9 from a competitive market segment -- are similar to those that regulators have long sought to  
10 prevent in the electric utility industry.

11 4. TEP incorrectly asserts that, as the franchised utility, it can more efficiently design, site, install,  
12 and administer residential DG services to maximize benefits to the electric distribution network  
13 and its captive customers as a whole. Any alleged asymmetric benefits from TEP-owned  
14 distributed generation would arise solely from TEP's inappropriate exploitation of its monopoly  
15 position, its preferential access to customer and electric system data, and its exclusionary  
16 reliance on proprietary systems and standards. Over the long-term, and even over the short-  
17 term, a robust, competitive marketplace will be better able to provide the type of cost  
18 efficiencies and innovations that will enable customers to fully benefit from residential DG  
19 services.

20 5. If TEP is to provide residential DG solar services, it should be required to establish an affiliate  
21 wholly separate from its regulated monopoly franchise; it should be prohibited from including  
22 residential DG solar assets in its regulated rate base; TEP should be required to offer customers  
23 of competitive DG solar similar rates as it offers other TEP customers, or customers of its  
24 affiliates; and it should be required to provide competitive providers of DG solar access to  
25 information and resources on the same terms and conditions as it provides any affiliate that sells  
26 residential DG solar services. Those requirements would be absolutely necessary to preserve a  
27 competitive and well-functioning DG solar services market segment that has delivered the  
28 benefits of competition to consumers, including lower prices and increased innovation.

1 IV. TEP's Proposals for Utility-Owned DG Solar Would Effectively Eliminate Competition  
2 from a Vigorous and Innovative Industry

3 **Q. WHICH ELEMENTS OF TEP'S PROPOSAL RAISE ANTICOMPETITIVE CONCERNS?**

4 A. There are several linked elements of TEP's 2016 REST filing that would intrude on and ultimately  
5 dismantle the existing competitive residential solar market segment in TEP's service territory. TEP  
6 has proposed to expand and make permanent its pilot program for utility-owned rooftop solar -- the  
7 TORS program. Under the proposal, TEP would offer eligible residential customers onsite rooftop  
8 solar installations and place the associated assets in TEP's rate base. In return, customers would  
9 make a flat monthly payment to TEP, fixed for 25 years, and would be able to consume any amount  
10 of energy annually under the flat fee, within +/- 15% of pre-installation usage over the prior 12  
11 months.

12 TEP's proposed RCS program would function in much the same way as the TORS program. TEP  
13 would construct a larger-scale community solar facility, while putting the associated assets into its  
14 rate base. As with TORS, residential customers in the RCS program would make a flat monthly  
15 payment (fixed over 10 years rather than 25), and would be able to consume energy within +/-15%  
16 of annual usage prior to entering the program.

17 As discussed further below, the fact that TEP would make the RCS program eligible only to those  
18 residential customers eligible for net metering highlights that it is intended to marginalize the  
19 competitive rooftop solar market segment, rather than expand it in a pro-competitive manner.

20 **Q. WHY ARE TEP'S PROPOSALS ANTICOMPETITIVE?**

21 A. Under its proposals, TEP attempts to leverage the advantages it enjoys only because of its monopoly  
22 utility franchise in order to force itself into a market segment that is already served competitively  
23 and eliminate the competition it currently faces from independent suppliers of DG services.  
24 Residential rooftop solar is currently provided in TEP's service territory by third-party businesses  
25 that operate in a well-functioning competitive marketplace. TEP's proposed TORS and RCS  
26 programs, particularly when combined with its rate proposals that would substantially alter the value  
27 to customers of net metering, would allow TEP to use the advantages of its utility franchise to

1 foreclose competitors from providing residential DG services. As a result, TEP would eliminate this  
2 emerging competition in this market segment for residential electric services.

3 **Q. CAN YOU BRIEFLY EXPLAIN THE HARM TO COMPETITION THAT WOULD**  
4 **RESULT IF TEP'S PROPOSALS ARE APPROVED?**

5 A. The recent emergence of independently-owned DG solar, whether purchased by customers or leased  
6 from third parties, has provided important elements of at least partial competition to regulated  
7 utilities, such as TEP, which operate under a monopoly franchise. Over the past several years, the  
8 competitive DG solar industry has expanded rapidly, not just in Arizona but throughout the U.S. As  
9 the number of installations has increased, these independent suppliers have been able to develop and  
10 introduce significant innovations, reduce customer costs, expand customer service choices, and  
11 provide important competitive discipline in retail utility services. I discuss the substantial  
12 accomplishments of the competitive solar industry later in my testimony, but for present purposes  
13 suffice it to say that, if approved, TEP's proposal would almost certainly eliminate the competition  
14 that has delivered those benefits to consumers in TEP's service area.

15 **Q. WHAT SPECIFIC ASPECTS OF TEP'S PROPOSALS WILL RESULT IN THESE**  
16 **ANTICOMPETITIVE CONSEQUENCES?**

17 A. All four core components of TEP's TORS and RCS proposals will have anticompetitive  
18 consequences: (1) TEP's proposal to include residential DG assets in TEP's rate base; (2) TEP's  
19 proposal to create a utility-owned community solar program targeted solely to customers eligible for  
20 net metering; (3) TEP's proposal to provide customers who sign up for these programs with a flat  
21 monthly rate, fixed for 25 or 10 years (for TORS and RCS, respectively); and (4) TEP's proposal to  
22 make use of TEP's access to information, other assets, and other services in ways that are  
23 unavailable to independent participants in this competitive market segment.

24 **Q. WHY IS TEP'S PROPOSAL TO INCLUDE RESIDENTIAL SOLAR PV ASSETS IN ITS**  
25 **RATE BASE ANTICOMPETITIVE?**

26 A. A regulated monopoly utility maximizes its profit by increasing the size of its rate base.  
27 Competition from independently-owned sources of generation, including residential PV solar

1 systems owned or leased by customers, threatens to reduce a regulated monopolist's rate base. If a  
2 utility can use its monopoly franchise to prevent independent sources of generation from competing  
3 for residential DG customers, and include such generation into its rate base instead, a utility can  
4 preserve or increase its profits -- in effect, extending its monopoly in retail distribution to the  
5 competitive market segment for residential DG systems. As I discuss in more detail later in my  
6 testimony, regulators have long recognized these incentives of a regulated monopoly utility to  
7 foreclose independent sources of generation from electricity markets, and they have long sought to  
8 prevent utilities from acting on, and profiting from, those incentives.<sup>1</sup>

9 **Q. WHY CAN'T THIRD-PARTY PROVIDERS OF DG SOLAR SERVICES COMPETE WITH**  
10 **WHAT TEP PROPOSES TO DO?**

11 **A.** Under the proposed TORS program, TEP would recover its investment in rooftop solar systems, and  
12 earn a healthy return on this investment, by placing the assets into TEP's rate base. While TEP says  
13 the flat monthly charge would cover most of the costs of each customer's system, recovery of the  
14 full, ultimate cost (and a return) will be guaranteed by all captive ratepayers, who will be compelled  
15 to bear the associated business risks in full. With this ratepayer-guaranteed financing, TEP will  
16 place the financial risks associated with its residential solar PV systems, and with serving the  
17 customers taking service under this program, onto all of its other captive ratepayers. This type of  
18 utility cross-subsidization -- using its monopoly control over captive ratepayers to unfairly benefit its  
19 competitive activities -- is not available to independent providers of residential DG systems and  
20 services. Competitive rooftop solar providers must enter into contracts with individual homeowners  
21 and cannot shift their business risk onto other captive customers. By distorting the functioning of  
22 competition, TEP's proposal will limit the ability of independent suppliers to participate in the  
23 market segment for residential DG systems in TEP's service territory. In the absence of a level

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<sup>1</sup> See e.g., Federal Trade Commission Staff Report: "Competition and Consumer Protection Perspectives on Electric Power Regulatory Reform" (July 2000). Available at: <https://www.ftc.gov/reports/competition-consumer-protection-perspectives-electric-power-regulatory-reform>. See also FERC's landmark Order 888 (Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Order No. 888, 61 Fed. Reg. 21,540 (May 10, 1996), FERC Stats. & Regs. ¶ 31,036 (1996), order on reh'g, Order No. 888-A, 62 Fed. Reg. 12,274 (March 14, 1997), FERC Stats. & Regs. ¶ 31,048 (1997), order on reh'g, Order No. 888-B, 81 FERC ¶ 61,248 (1997), order on reh'g, Order No. 888-C, 82 FERC ¶ 61,046 (1998), aff'd in relevant part sub nom. Transmission Access Policy Study Group v. FERC, 225 F.3d 667 (D.C. Cir. 2000), aff'd sub nom. New York v. FERC, 535 U.S. 1 (2002)).

1 playing field, independent suppliers have little or no incentive to enter or remain in a market segment  
2 dominated by a utility with a monopoly franchise, with the result that ratepayers are ultimately  
3 deprived of the benefits of competition: namely, increased choice, innovative products, improved  
4 service quality, and lower prices.

5 **Q. WHY IS TEP'S RESIDENTIAL COMMUNITY SOLAR PROPOSAL**  
6 **ANTICOMPETITIVE?**

7 **A.** There are several ways in which TEP's RCS proposal is anticompetitive. First, as with TEP's TORS  
8 program, TEP proposes to include the assets of the RCS program in its rate base, which is  
9 anticompetitive for the reasons described above. Second, perhaps the most telling indicator of TEP's  
10 anticompetitive intent is that it would offer the RCS program solely to residential customers who are  
11 eligible for the TORS program – in other words, only to customers who could otherwise take  
12 advantage of a competitive rooftop solar offering. Customers who are already excluded from  
13 accessing rooftop solar with net metering would not be eligible for RCS. In other jurisdictions, the  
14 development of community solar has been pursued precisely to *expand* access to solar DG, for  
15 example to people who cannot take advantage of individual systems because they live in apartment  
16 buildings or condominiums.<sup>2</sup> The TEP proposal would expressly limit participation to those  
17 customers who make up the potential customers for competitive systems. The RCS program would  
18 therefore create the same anticompetitive effects as the TORS program discussed above, in the  
19 identical market segment for rooftop solar, with the added (anticompetitive) benefit for TEP that it  
20 can eliminate net metering-eligible customers from the competitive rooftop solar market segment --  
21 without actually installing any rooftop systems.

22 Third, TEP's proposal to provide community solar services includes no provision that would allow  
23 competing DG service suppliers to provide similar community solar services to TEP's captive  
24 residential customers, even though competing suppliers would be able to draw on the experience of  
25 community solar projects around the U.S. Indeed, an unusual feature of TEP's community solar  
26 proposal is that its actual solar generation would not be linked in any meaningful way to any

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<sup>2</sup> See *e.g.*, National Renewable Energy Laboratory, "Shared Solar: Current Landscape, Market Potential, and the Impact of Federal Securities Regulation." Available at: <http://www.nrel.gov/docs/fy15osti/63892.pdf>

1 “community,” except in the very broadest sense in which TEP’s service territory represents a  
2 community. This is very different from the original conception of community solar, or “shared  
3 solar,” and the way it is typically implemented elsewhere, with a facility centered on a local area  
4 where residents and businesses have pursued a project jointly and benefit from it as a group.<sup>3</sup> Under  
5 the proposed RCS, the connection between the facility and the participants is only notional, with  
6 actual generation and actual customer usage having no bearing on each other, and no effect on the  
7 customer’s bill (as long as the customer is within 115% of their historical usage). The full benefits  
8 of community solar can best be realized not by TEP incorporating this activity into its monopoly  
9 franchise and putting the corresponding assets into its rate base, but by TEP working with  
10 independent DG service providers to enable apartment dwellers and condominium owners to enjoy  
11 the benefits of DG solar power.

12 **Q. ARE THERE ADDITIONAL REASONS WHY TEP’S RESIDENTIAL COMMUNITY**  
13 **SOLAR PROPOSAL WILL LIKELY DESTROY COMPETITION FROM THIRD-PARTY**  
14 **SOLAR SERVICE PROVIDERS?**

15 **A.** Yes. The RCS program would also magnify the impact of TEP’s ability to use its monopoly utility  
16 advantages to cherry pick customers under the TORS programs. As I discuss in more detail later in  
17 my testimony, TEP would have substantial advantages over competitive market participants through  
18 its access to customer information, and its access to the physical and operational details of the  
19 distribution system, which would allow TEP, but not independent suppliers, to identify and target  
20 customers most able to benefit from an onsite rooftop system. These are the very customers  
21 competitive providers expend great effort to identify. With TEP’s advantages, it will gain  
22 preferential access to customers who would otherwise be top prospects for a competitively provided  
23 system, and it can steer customers with properties less well-suited to rooftop installations to its RCS  
24 program. TEP can thereby segment the target market to maximize the number of customers it can  
25 remove from the pool of potential customers that could otherwise be served by competitive  
26 suppliers.

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<sup>3</sup> *Id.*

1 **Q. WHY IS TEP'S PROPOSAL TO CHARGE PROGRAM PARTICIPANTS A LONG-TERM,**  
2 **FLAT MONTHLY RATE ANTICOMPETITIVE?**

3 A. TEP's proposal to charge program participants a flat monthly rate, guaranteed for 25 or 10 years (for  
4 TORS or RCS, respectively), is the other side of the coin of its rate base proposal, and it is  
5 anticompetitive for the very same reason. Competitive providers, who cannot cross-subsidize their  
6 rates from captive rate payers, cannot offer the sort of guaranteed flat rate pricing -- covering all of a  
7 customer's residential electricity services -- that TEP proposes under the TORS and RCS programs.  
8 As a result of its monopoly distribution franchise, only TEP can offer such an all-inclusive, long-  
9 term, guaranteed flat rate covering all of a customer's electricity needs; and TEP only offers this  
10 highly favorable rate in return for the customer agreeing to use TEP, rather than a competing  
11 provider, for their residential DG service needs. The flat rate programs eliminate any connection  
12 between customer price and the actual cost of supplying service up to 115% of historical usage.  
13 There is a vast range of uncertainties affecting TEP's service costs, including actual customer peak  
14 usage, current and future generation fuel costs, emissions compliance costs, and events affecting  
15 solar output, all stretching 25 years into the future -- all of which TEP is proposing to shift to its  
16 other captive customers to bear. Only a regulated monopolist could accomplish such a shift. TEP's  
17 proposal would thus prevent competing residential solar providers from being able to actively  
18 participate in the market in TEP's service territory. As with TEP's rate base proposal, the cross-  
19 subsidization of its flat rate proposal will "tilt" the competitive playing field towards the owner of  
20 the monopoly franchise, causing independent suppliers to exit the market, and thereby depriving  
21 TEP's captive customers of the benefits of increased choice, innovation, and lower prices over the  
22 long-term.

23 **Q. IS TEP'S FLAT RATE PROPOSAL DESIGNED TO ENCOURAGE EFFICIENT ENERGY**  
24 **USAGE?**

25 A. No, it is not. TEP's proposed long-term flat rate is precisely the opposite of the type of rate that is  
26 needed to encourage customers to use electricity efficiently, participate in demand response  
27 programs, and reduce consumption. While TEP argues that such a rate structure benefits customers  
28 (at least those who sign up for TEP's program) by providing them with "rate certainty," it increases

1 the uncertainty (and risks) for all other customers, who will ultimately bear any unrecovered costs  
2 from the program. Further, TEP's proposal to provide "rate certainty" for TEP's own residential DG  
3 customers comes at the same time as TEP is proposing other tariff changes that will affect  
4 competitive DG customers, increasing the "rate uncertainty" for any of its residential customers who  
5 choose to purchase residential DG services from TEP's competitors. While I understand that Dr.  
6 Cicchetti is separately addressing the implications of TEP's proposed changes to its tariff applicable  
7 to net metering customers, the full anticompetitive consequences of TEP's proposed rates for its  
8 TORS and RCS customers are best understood within the context of its tariff change proposals --  
9 which in combination will have the effect of entirely foreclosing competing residential DG providers  
10 from the market.

11 **Q. HOW DOES TEP'S PROPOSED FLAT-RATE PRICING COMPARE TO THE CURRENT**  
12 **PRICING OF THIRD-PARTY SOLAR SERVICES?**

13 **A.** TEP has explicitly designed the TORS program so that a customer's flat monthly rate will be  
14 equivalent to what they paid previously for their standard utility service (on average, over the prior  
15 year). Thus, TEP offers customers no savings immediately. What TEP offers instead is cost  
16 certainty over the very long-term (25 years), although it has made no claim that fixing the flat rate  
17 over 25 years would offer any savings relative to prevailing standard utility rates over that period.  
18 Competitive rooftop solar, in contrast, is predicated on offering customers savings on their utility  
19 bills. Competitive providers must evaluate the particular circumstances of prospective customers --  
20 their historical usage, suitability of the customer site for rooftop solar, and expected generation -- to  
21 ensure that a rooftop system offers the customer savings. TEP's proposal would consequently  
22 represent a price increase relative to competitive alternatives under the current tariff.

23 **Q. DOES THAT MEAN THAT CUSTOMERS ARE LIKELY TO CHOOSE A COMPETITIVE**  
24 **OFFERING INSTEAD OF TORS?**

25 **A.** No, for several reasons. First, TEP's proposal forces customers to choose between lower costs with  
26 a competitive offering today vs. long-term rate certainty under TEP's programs (which, as noted  
27 above, only TEP can provide). But second, and most importantly, TEP has proposed changes to

1 residential tariffs that would radically undermine the value customers can obtain via net metering,  
2 and would consequently undermine the competitiveness of third-party solar offerings. Even if TEP  
3 is unsuccessful in achieving all it wants in marginalizing or eliminating the benefits of net metering,  
4 the very fact that TEP can continue to pursue rate modifications in the future that could reduce the  
5 benefits of competitive solar, but *not* the cost of the TORS product, creates significant  
6 anticompetitive advantages for TEP's offering that arise solely from TEP's monopoly position. The  
7 ability of a monopolist to create "fear, uncertainty, and doubt" when consumers are considering a  
8 competitive alternative has been recognized by economists, the antitrust enforcement agencies, and  
9 the courts, as potentially anticompetitive conduct.<sup>4</sup> By cross-subsidizing its flat rate pricing with all  
10 its captive customers and putting at risk the benefits obtained by competing DG suppliers' customers  
11 from net metering, TEP will eliminate competition and effectively raise the price of DG solar  
12 services in its service area. Only a monopolist could achieve this outcome.

13 **Q. PLEASE EXPLAIN WHY TEP'S PROPOSAL TO USE ITS ACCESS TO OTHER**  
14 **INFORMATION, SERVICES, AND ASSETS AS PART OF THESE PROGRAMS IS**  
15 **ANTICOMPETITIVE.**

16 **A.** As the regulated franchised monopoly in its service territory, TEP has access to certain information  
17 -- both customer-specific information, as well as information about its transmission and distribution  
18 network -- that it proposes to use in implementing this program. Thus, TEP is proposing to use its  
19 informational advantages due to its monopoly franchise in retail electricity distribution to benefit its  
20 own activities in the competitive residential DG services business, to the detriment of competing  
21 suppliers. For example, based on customers' historical load and billing profiles, as well as their  
22 specific location on the grid, TEP can engage in targeted marketing efforts directed at the highest  
23 value customers. TEP also proposes marketing this program to its customers through its standard  
24 billing procedures, e.g., with advertising inserts. In addition, TEP proposes to use some of its  
25 existing assets for the program, such as using currently unused space at some of its facilities to  
26 install community solar assets. TEP is not proposing to provide competing residential DG suppliers

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<sup>4</sup> See *e.g.*, Carl Shapiro, Deputy Assistant Attorney General, Antitrust Division, U.S. Department of Justice; "Antitrust in Network Industries," March 7, 1996. Available at: <https://www.justice.gov/atr/speech/antitrust-network-industries-speech-american-law-institute-and-american-bar-association>.

1 with similar access to its information, assets, and services. As a result, this also significantly “tilts”  
2 the competitive playing field and will further prevent independent suppliers from competing in the  
3 market.

4 **Q. ISN'T IT EFFICIENT FOR TEP TO USE ITS INFORMATION, ASSETS, AND OTHER**  
5 **SERVICES TO PROMOTE AND IMPLEMENT THIS PROGRAM?**

6 **A.** No. First, there is no “free lunch” to be had by allowing TEP to use its regulated activities to enable  
7 it to expand into residential DG services, e.g., by allowing TEP to make use of its unused land for a  
8 community solar project, identify the optimal placement of residential DG solar on its distribution  
9 network, market the program through its current customer billing arrangements, etc. As noted  
10 above, these are not “free,” as they are the result of past (and current) expenditures recovered from  
11 all ratepayers; and to the extent that TEP makes use of these resources to enable it to participate in  
12 the competitive solar market segment, it should only be allowed to do so through a separate affiliate  
13 operating on the same terms and conditions as third parties.

14 **Q. ARE THERE ADDITIONAL REASONS WHY IT IS NOT EFFICIENT FOR TEP TO DO**  
15 **THIS?**

16 **A.** Yes. It is anticompetitive and ultimately inefficient for a regulated monopolist to use such  
17 information, assets, and services to benefit its own competitive activities, while denying competitors  
18 similar access to the same information, assets, and services. If TEP were simply proposing to use  
19 the above information, assets, and services to deliver its existing customer services more efficiently  
20 or more reliably, its proposal would not raise anticompetitive concerns. The anticompetitive  
21 concerns arise precisely because its proposal involves the extension of its activities into a market  
22 segment that is already being served competitively; and because it is using certain advantages TEP  
23 has only because of its monopoly franchise in ways that will distort the competitive process in  
24 residential DG services. This is why regulators generally require vertically integrated utilities,  
25 operating under a monopoly retail service franchise, to establish separate affiliates when entering  
26 into new and potentially competitive service markets; provide competing companies with non-  
27 discriminatory access to the utilities’ monopoly services (e.g., transmission service and related

1 information on their OASIS sites); and ensure that the competitive affiliates engage in arm's-length  
2 dealings with the utility's other regulated affiliates.

3 **Q. DO THE ANTICOMPETITIVE CONSEQUENCES OF TEP'S PROPOSAL ALSO BEAR**  
4 **ON WHETHER ITS PROPOSAL IS EFFICIENT OVER THE LONG-TERM?**

5 **A.** Yes. While TEP's proposed use of its privileged access to information, services, or assets may allow  
6 it to achieve some short-term cost-efficiencies in its TORS and RCS programs, e.g., by making use  
7 of idle land, it is important to distinguish between short-term "static" cost efficiencies vs. long-term  
8 "dynamic" efficiencies. "Static" efficiencies refer to cost savings that can be obtained at a given  
9 point in time, e.g. by enabling under-utilized resources to generate incremental revenues, or by  
10 taking advantage of scale economies to operate at minimum efficient scale. "Dynamic" efficiencies  
11 refer to cost savings that can be obtained over time, e.g., as a result of investment or innovation. In  
12 fact, the competitive DG solar industry has been able to realize both static and dynamic efficiencies,  
13 by taking advantage of scale economies with increased installations, expanding the geographic scope  
14 of their operations, and achieving consistent and significant other operational efficiencies over time  
15 via "learning-by-doing."<sup>5</sup> The competitive DG solar industry has also been successful in developing  
16 -- and most importantly, deploying -- significant innovations, whether with regard to software,  
17 hardware, communications networks, integrated service offerings (e.g., PV solar systems combined  
18 with demand response infrastructure, smart thermostats, appliance controls, etc.), and even financial  
19 services (e.g., customer equipment purchase, lease, or PPA options). In contrast, by limiting the  
20 ability of independent DG solar providers to compete, TEP's proposal threatens to undermine, rather  
21 than support, the continued development of such dynamic efficiencies observed in the overall  
22 residential DG solar market segment -- to the detriment of TEP's captive customers over the long-  
23 term.

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<sup>5</sup> See e.g., Baker, Erin, et. al., "The Economics of Solar Electricity," in *The Annual Review of Resource Economics*, 2013. 5:409-410; accessed at [https://nature.berkeley.edu/~fowlie/PV\\_AR\\_2013.pdf](https://nature.berkeley.edu/~fowlie/PV_AR_2013.pdf).

1 **Q. ARE YOUR CONCLUSIONS CONSISTENT WITH THOSE OF OTHER STATE**  
2 **COMMISSIONS THAT HAVE BEEN FACED WITH THE QUESTION OF WHETHER TO**  
3 **ALLOW UTILITY-OWNED DG RESOURCES?**

4 **A.** Yes. The New York Public Service Commission (“NYPSC”) recently held a “Reforming Energy  
5 Vision” (“REV”) proceeding that addressed, among other issues, the question of whether distribution  
6 utilities should be allowed to own distributed energy resources (“DER,” i.e., distribution generation,  
7 or DG). In its 2015 Order, the NYPSC stated:

8 [W]e do not generally favor utility ownership of DER [Distributed Energy Resource] assets. We  
9 are persuaded that unrestricted utility participation in DER markets presents a **risk of**  
10 **undermining markets** more than a potential for accelerating market growth. The ability of  
11 utilities to increase the State’s DER asset base is not definitive here. The strong level of interest in  
12 REV markets expressed by independent providers demonstrates that **we are not dependent on**  
13 **utility investment to build asset base**. When that factor is given less weight, the balancing  
14 becomes relatively simple. A basic tenet underlying REV [New York’s “Reforming Energy  
15 Vision” proceeding] is to **use competitive markets and risk based capital as opposed to**  
16 **ratepayer funding as the source of asset development**. On an ex ante basis, utility ownership of  
17 DER conflicts with this objective and for that reason alone is problematic. Our concerns are  
18 compounded by the observation made by Staff and others that, **because of their incumbent**  
19 **advantages, even the potential for utility ownership risks discouraging potential investment**  
20 **from competitive providers. Markets will thrive best where there is both the perception and**  
21 **the reality of a level playing field, and that is best accomplished by restricting the ability of**  
22 **utilities to participate.**<sup>6</sup> (Emphasis added.)

23 **Q. IS THERE AN ALTERNATIVE WAY FOR TEP TO PARTICIPATE IN RESIDENTIAL**  
24 **ROOFTOP AND COMMUNITY SOLAR ACTIVITIES IF ITS PROPOSAL IS REJECTED?**

25 **A.** As a monopoly utility, TEP’s TORS and RCS proposals should be rejected, given their purpose and  
26 effect of eliminating competition in the residential rooftop solar market segment in TEP’s service  
27 territory. If TEP, or its holding company, UNS Energy Corporation, wants to participate in this  
28 competitive market segment, it should only be through a separate affiliate with appropriate  
29 restrictions to ensure that the affiliate and other third party competitive suppliers have equivalent  
30 access to customer and distribution system information relevant to the provision of service. If the  
31 Commission determines that community solar would be a valuable service offering, it should require  
32 development of enabling rules such as virtual net metering or distribution wheeling charges; limit

<sup>6</sup> State of New York Public Service Commission, Case 14-M-0101: Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision. *Order Adopting Regulatory Policy Framework and Implementation Plan*, Issued Feb. 26, 2015, p. 67. Available at: <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={0B599D87-445B-4197-9815-24C27623A6A0}>.

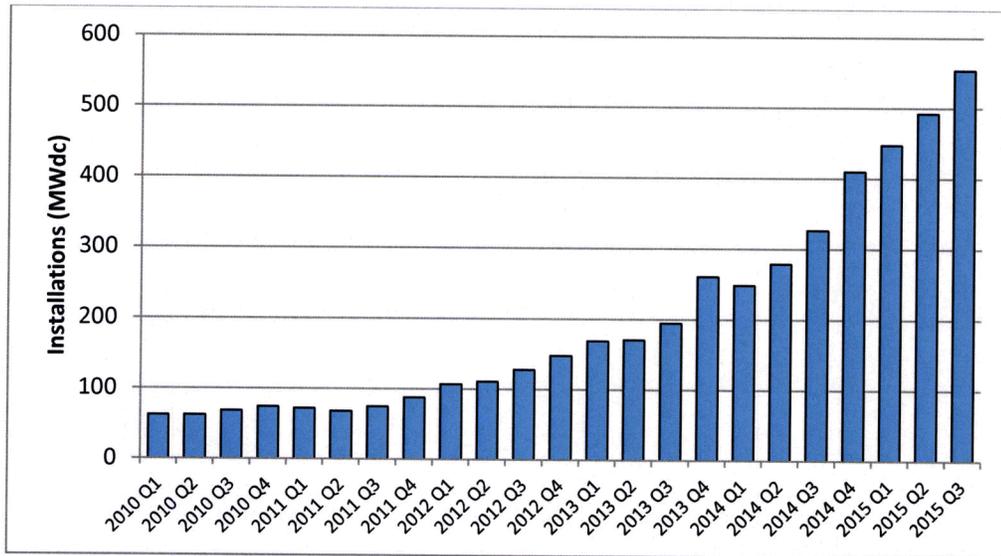
1 participation by a TEP-related entity to a separate competitive affiliate; and allow independent  
2 suppliers to provide similar offerings on an equivalent basis.

3 **V. DG Solar in the U.S. is a Well-Functioning and Highly Competitive Industry**

4 **Q. PLEASE DESCRIBE COMPETITIVE DISTRIBUTED SOLAR GENERATION INDUSTRY**  
5 **IN THE U.S.**

6 **A.** Competitively provided distributed solar generation has grown dramatically in the past five years.  
7 Since the beginning of 2010, quarterly installations of residential solar photovoltaic (“PV”)  
8 generation capacity have grown more than eight-fold, to more than 550 MW<sub>DC</sub> nationwide quarterly  
9 installations in the third quarter of 2015, as shown in Figure 1.

10 **Figure 1: U.S. residential rooftop installations by quarter, MW<sub>DC</sub> (2010-2015)<sup>7</sup>**



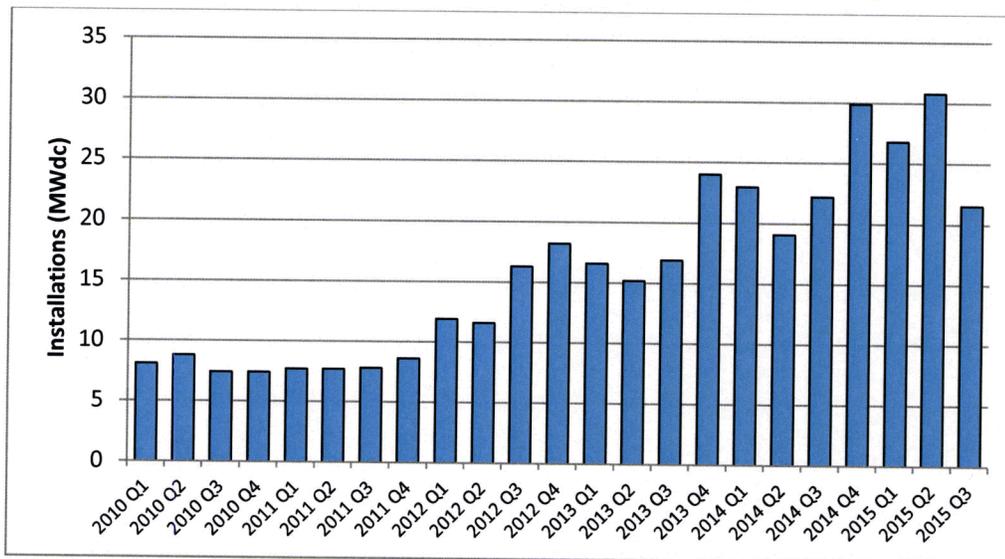
11  
12 **Q. PLEASE DESCRIBE THE EVOLUTION OF THE DG SOLAR INDUSTRY IN ARIZONA.**

13  
14 **A.** Over the same period, rooftop solar installations in Arizona have also grown dramatically, as  
15 indicated in Figure 2, with Arizona installations averaging about 10% of the U.S. total. Despite this

<sup>7</sup> GTM Research/SEIA; data compiled from Solar Market Insight: 2011 Year in Review, 2012 Year in Review, and Q3 2015.

1 rapid recent growth, residential DG solar still represents a relatively small proportion of total  
 2 residential load. For TEP, residential solar PV amounts to approximately 2.7% of residential sales,  
 3 indicating the potential for significant further growth.<sup>8</sup>

4 **Figure 2: Arizona residential rooftop installations by quarter, MW<sub>DC</sub> (2010-2015)<sup>9</sup>**



5

6

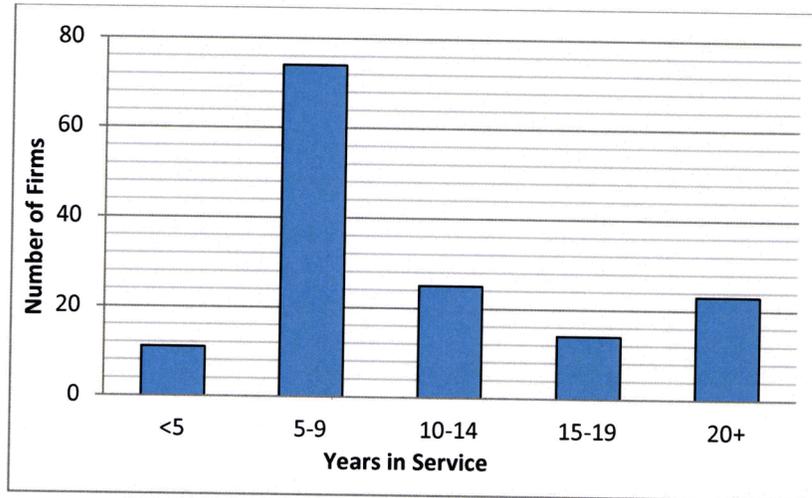
7 In an industry list of the top 500 U.S. solar contractors in 2015, there were 319 rooftop solar  
 8 contractors, 19 of which are based in Arizona.<sup>10</sup> Nationally, the data on installation companies show  
 9 that the industry is young, and that barriers to entry are low. Figure 3 shows the distribution of  
 10 rooftop installation companies by the number of years they have been in operation; a large majority  
 11 of these companies have been in business less than ten years.

<sup>8</sup> The calculation for TEP is based on approximately 102,000 MWh of residential solar PV, derived from data for 2015 in TEP's response to Staff's First Set of Data Requests in this docket, and residential sales of approximately 3,800,000 MWh, representing an average over 2012-2014, derived from data in TEP's 10K for 2014.

<sup>9</sup> *Id.*

<sup>10</sup> <http://www.solarpowerworldonline.com/2015-top-500-north-american-solar-contractors/>

1 **Figure 3: US Residential Rooftop Installers, Number and Years in Service<sup>11</sup>**



2

3 In recent years, the residential solar market segment has shifted from one in which the customer  
4 contracts for and owns the rooftop installation to third-party ownership business models. Under  
5 third-party ownership models, a solar developer manages the design, financing, and installation of  
6 the system on the customer's property at little or no upfront cost to the customer. The customer may  
7 sign a power purchase agreement ("PPA") to buy the solar generated power from the developer, or,  
8 as has become increasingly common, lease the system from the developer and benefit from reduced  
9 energy purchases, as well as from net sales of excess generation to the utility, where allowed. Based  
10 on a 2012 industry report, 80% of residential solar systems in Arizona were financed through third  
11 party lease arrangements.<sup>12</sup>

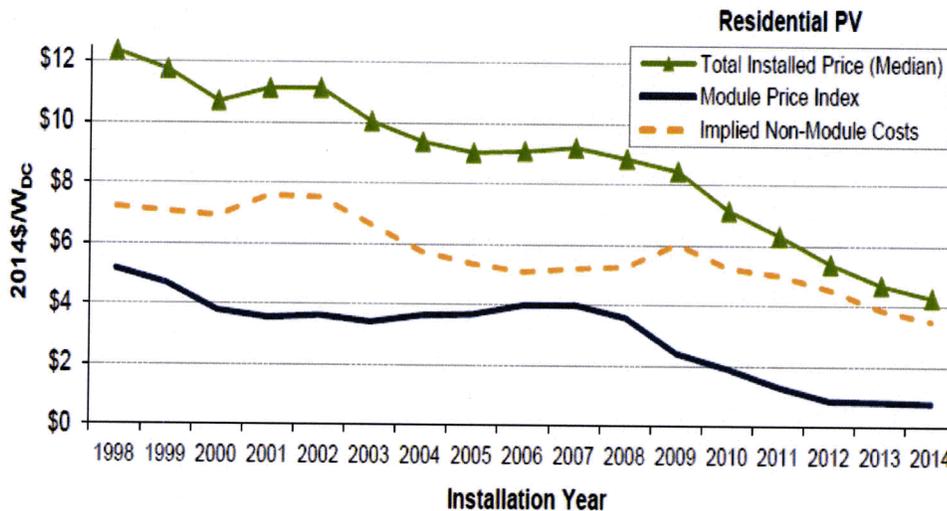
12 The growth of third party ownership models has encouraged scale efficiencies that have lowered  
13 finance costs and so-called "soft" costs for activities such as marketing, customer acquisition,  
14 design, and installation. At the same time, rapid advances in PV technology and manufacturing  
15 efficiency have driven down the "hard" cost of PV modules dramatically. Figure 4 is extracted from  
16 a Lawrence Berkeley National Laboratory ("LBNL") report on PV costs and shows the substantial  
17 drop in overall installed costs for residential PV, particularly since 2009. The report also includes

<sup>11</sup> *Id.*

<sup>12</sup> GTM Research/SEIA, Solar Market Insight 2012 Year in Review.

1 preliminary data indicating installed price declines in 2015 on a pace to match those in recent prior  
2 years.<sup>13</sup>

3 **Figure 4: Residential PV Installed Price, Module Price Index, and Implied Non-Module Costs**<sup>14</sup>



4  
5 It is notable that installed costs have continued to fall even after PV module costs leveled off  
6 beginning in 2012. The LBNL report notes that “many states have continued to ramp down financial  
7 incentives for PV, applying sustained pressure on installers and others in the supply chain to  
8 streamline their business processes....”<sup>15</sup>

9 **Q. HOW DO COMPETITIVE SOLAR BUSINESS MODELS BENEFIT CUSTOMERS**  
10 **COMPARED TO THE UTILITY OWNERSHIP APPROACH THAT TEP PROPOSES?**

11 **A.** First and foremost, residential rooftop solar would not now exist as an option for customers without  
12 the competitive businesses that developed and advanced the market segment. Monopoly utilities had  
13 neither the incentive, nor the expertise, nor the risk capital to develop or innovate in customer-site  
14 solar offerings, and they did not do so. Utilities *have* been active in developing large-scale solar  
15 generation projects that are more consistent with the traditional wholesale generation activities of

<sup>13</sup> LBNL, “Tracking the Sun VIII, The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States,” (Aug 2015), page 16.

<sup>14</sup> *Id.*, figure reproduced from Figure 9, page 17.

<sup>15</sup> *Id.*, page 18.

1 integrated utilities -- although even there, it has been similarly important for regulators to ensure that  
2 utilities appropriately select the least-cost/lowest-risk option for ratepayers, when comparing utility  
3 self-build proposals vs. PPA opportunities with third party developers.

4 **Q. CAN YOU EXPAND UPON THE BENEFITS THAT COMPETITIVE RESIDENTIAL**  
5 **SOLAR PROVIDES CUSTOMERS?**

6 **A.** Competitive residential solar provides customers with valuable alternatives to traditional utility retail  
7 service. For captive customers of vertically integrated utilities, residential solar may be the only  
8 existing form of retail competition in electricity, and such competition is not incidental. For many  
9 residential DG solar customers, the ability to reduce their reliance on their retail provider of  
10 electricity service is a significant factor in their decisions to invest in rooftop solar.<sup>16</sup> The very fact  
11 that TEP has proposed utility ownership of residential rooftop solar and community solar is a  
12 response to these competitive pressures. Indeed, TEP's proposals now threaten to undermine and  
13 possibly eliminate the very competition that prompted them.

14 **Q. ARE THERE FURTHER BENEFITS THAT COMPETITION FROM THIRD-PARTY**  
15 **SOLAR PROVIDES TO CONSUMERS?**

16 **A.** Yes, in addition to the expanded service choice and reduced cost that competitive solar providers  
17 offer customers, third party ownership models provide access to non-utility sources of capital that  
18 can diversify risk away from captive ratepayers, and may be cheaper than the utility's cost of capital.  
19 For example, TEP's current allowed return on equity ("ROE") is 10% (and Fitch projects a 9% ROE  
20 by 2017), while tax equity investors – currently a main source of residential solar financing –  
21 currently aim for an ROE of 7% or 8%.<sup>17</sup>

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<sup>16</sup> See e.g., Paul Balcombe, Dan Rigby, and Adisa Azapagic, "Investigating the importance of motivations and barriers related to microgeneration uptake in the UK," *Applied Energy*, Vol. 130, October 2014, pp. 403-418. Available at: [http://ac.els-cdn.com/S030626191400542X/1-s2.0-S030626191400542X-main.pdf?\\_tid=e4872a70-e64e-11e5-820e-00000aacb360&acdnat=1457566402\\_faf2e050465cd86f1250ebbd48fa9d8b](http://ac.els-cdn.com/S030626191400542X/1-s2.0-S030626191400542X-main.pdf?_tid=e4872a70-e64e-11e5-820e-00000aacb360&acdnat=1457566402_faf2e050465cd86f1250ebbd48fa9d8b). See also Ria Langheim, Georgina Arreola, and Chad Reese, "Energy Efficiency Motivations and Actions of California Solar Homeowners," August 2014 (published in proceedings of ACEEE 2014 Summer Study on Energy Efficiency in Buildings), p. 10. Available at: <https://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/Energy%20Efficiency%20Motivations%20and%20Actions%20of%20California%20Solar%20Homeowners.pdf>  
<sup>17</sup> <http://www.utilitydive.com/news/tong-wellinghoff-should-utilities-be-allowed-to-rate-base-solar/396283/>

1 Competition in the third-party ownership space has also encouraged companies to provide more fully  
2 integrated service, spanning project financing to installation, and even most recently solar  
3 technology and manufacturing.<sup>18</sup> Increasing economies of scale among larger solar developers with  
4 national scope signal that competition-driven cost reductions are likely to continue.<sup>19</sup>

5 Finally, the competitive residential solar industry has demonstrated continued innovation in service  
6 offerings – for example, bundling of residential rooftop solar, battery storage, and energy  
7 management services.<sup>20</sup> This combination of different services and assets, provided by a range of  
8 companies using various innovative technologies, often in cooperative endeavors with utilities, has  
9 the added benefit of reducing consumers’ overall energy use and improving grid resiliency.<sup>21</sup>

10 VI. TEP’s Proposal Would Eliminate These Current Benefits to Consumers and Inflict  
11 Anticompetitive Harm That Regulators Have Long Sought to Prevent

12 Q. PLEASE EXPLAIN WHY REGULATORS ALLOW CERTAIN UTILITIES TO HAVE A  
13 MONOPOLY FRANCHISE AND HOW THEY ENSURE THAT A MONOPOLY UTILITY  
14 NONETHELESS ACTS IN THE PUBLIC INTEREST.

15 A. State regulators grant utilities an exclusive franchise to serve retail customers in a given territory  
16 because it would be impractical and duplicative for multiple firms to invest in the transmission and  
17 local distribution networks required to provide electricity services. A local electricity distribution  
18 network in particular is often considered the quintessential “natural monopoly,” since it would be  
19 unnecessarily costly for multiple competitors to invest in and manage multiple distribution networks  
20 serving the same customers. Utility regulation is aimed at protecting the public interest by ensuring  
21 that the utility’s captive customers are able to benefit from the lower costs of this “natural  
22 monopoly” (particularly in the distribution network), rather than being subject to a variety of

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<sup>18</sup> Based on Solar City’s recent acquisition of Silevo.

<sup>19</sup> The Morningstar Equity Analyst Report of Mar 3, 2016 on SolarCity Corp reported that “the company has reduced per-watt customer costs 40% since 2012, and is targeting another 14% cost reduction by 2017.”

<sup>20</sup> SolarCity has developed such a home energy system offered in Hawaii.  
<http://www.greentechmedia.com/articles/read/SolarCitys-System-For-Self-Supply-in-Hawaii-Includes-PV-Storage-Water-He>

<sup>21</sup> *Id.* See also, Nest Labs, “Energy Savings from the Nest Learning Thermostat: Energy Bill Analysis Results,” Nest White Paper, February 2015, available at: <https://nest.com/downloads/press/documents/energy-savings-white-paper.pdf>.

1 potential abuses by the monopoly utility, such as excessive pricing, discrimination in the provision  
2 of services, the imposition of excessive and unnecessary costs, and/or overinvestment in the rate  
3 base -- which ultimately finds its way into customer rates, along with the utility's profit.

4 **Q. WHY DID YOU FOCUS YOUR ANSWER ABOVE ON LOCAL DISTRIBUTION**  
5 **NETWORKS AS A "NATURAL MONOPOLY" RATHER THAN GENERATION ASSETS,**  
6 **WHICH UTILITIES ALSO OWN?**

7 **A.** For at least the past forty years, economists, regulators, and policymakers -- in the U.S. and around  
8 the world -- have recognized that electric generation is not a "natural monopoly," i.e., that electric  
9 generation is not most efficiently provided by a single monopoly utility, but rather can be provided  
10 by competitive markets, with significant benefits to customers in terms of lower costs and reduced  
11 risks, as well as benefits to society more broadly from the lower emissions associated with more  
12 efficient technologies and operations. The reason to have a regulated monopoly franchise is to allow  
13 it to provide those services with "natural monopoly" characteristics; all other activities, and  
14 particularly generation, should be provided by competitive markets, as with almost every other  
15 sector of the U.S. economy.

16 **Q. DO THE ACTIONS OF VERTICALLY INTEGRATED UTILITIES RAISE POTENTIAL**  
17 **ANTICOMPETITIVE CONCERNS, AS THEY TRY TO RESPOND TO NEW**  
18 **COMPETITORS IN CERTAIN SEGMENTS OF THEIR BUSINESS?**

19 **A.** Yes, and this concern that vertically integrated utilities would work to stymie competition in  
20 generation is by no means new. In 1978, Congress passed the Public Utility Regulatory Policies Act  
21 ("PURPA"), which contained provisions to enable and encourage independent competitive suppliers  
22 to invest in new renewable energy and cogeneration facilities. Congress recognized that incumbent  
23 vertically integrated utilities, with a monopoly franchise to serve retail customers, have strong  
24 financial incentives to prevent new independent sources of generation from competing with the  
25 utilities' own generation assets, either by refusing to purchase the output from these new competitors  
26 or by preventing them from getting access to the utilities' transmission network. A regulated  
27 utility's profits are dependent on the size of its rate base and its allowed rate of return. Market entry  
28 by independent owners of generation threatened to reduce the size of utilities' rate base and/or limit

1 their future ability to increase their rate base. An economically rational (but nonetheless  
2 anticompetitive) response by a utility with a local monopoly franchise is therefore to prevent  
3 independent sources of generation from competing in the market on a level playing field.  
4 Recognizing these harmful incentives, Congress required utilities to interconnect with, and purchase  
5 excess wholesale power from, these newly established "qualifying facilities" ("QFs").

6 In the Energy Policy Act of 1992, Congress undertook further steps to promote competition in  
7 electric generation by allowing FERC to order utilities to provide mandatory transmission access for  
8 independent generators. Since that time period, FERC and various state regulators have continued to  
9 pursue policies to promote competition -- and prevent anticompetitive conduct -- in the electric  
10 utility industry, both at the wholesale level and in many states at the retail level as well.

11 **Q. HOW DOES THIS DOVETAIL WITH THE POLICY OF THE STATE OF ARIZONA?**

12 **A.** While Arizona has suspended full restructuring of its retail electricity markets, due to what I  
13 understand are constitutional concerns regarding aspects of a transition to competition, the  
14 promotion of competitive generation markets remains state policy: "It is the public policy of this  
15 state that a competitive market shall exist in the sale of electric generation service."<sup>22</sup>

16 **Q. HAVE FEDERAL AND STATE REGULATORS GENERALLY PROHIBITED**  
17 **REGULATED MONOPOLY UTILITIES FROM ENGAGING IN ACTIVITIES THAT ARE**  
18 **PROVIDED COMPETITIVELY BY INDEPENDENT PARTIES?**

19 **A.** No, but they have sought to put in place safeguards to ensure that when regulated utilities participate  
20 in competitive markets, they do so on similar terms and conditions as independent market  
21 participants. Preventing vertically integrated utilities from foreclosing other suppliers from  
22 potentially competitive markets, as with open access requirements, is simply the first precondition  
23 for such markets to develop. Another important requirement is that vertically integrated utilities  
24 establish separate affiliates to perform certain functions, and adopt affiliate codes of conduct to  
25 prevent utilities from using their regulated monopoly position to artificially benefit their competitive  
26 market activities and thereby suppressing competition in related market segments. Thus, FERC

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<sup>22</sup> A.R.S. § 40-202(B).

1 requires that utilities establish a code of conduct to ensure that a vertically integrated utility does not  
2 use its information about the operation of the transmission network, or its control over that network,  
3 in ways that unduly advantage its affiliates and disadvantage its competitors. States similarly put in  
4 place comparable restrictions on the ways in which utilities can use their privileged monopoly  
5 position, and information acquired from their monopoly activities, to gain an undue advantage over  
6 competitive suppliers of a particular service. Arizona, for example, recognizes that due to their  
7 monopoly franchise over retail distribution, utilities are able to reach customers more effectively  
8 than potential competitors in other market segments; as a consequence, utilities are prohibited from  
9 placing advertisements in their customer bills for competitive services such as HVAC contracting  
10 services.<sup>23</sup> To the extent TEP is permitted to enter the residential DG solar market segment, similar  
11 restrictions should be placed on TEP's provision of residential DG services: TEP should be required  
12 to establish a separate affiliate to provide such services; and its affiliate should not be allowed to use  
13 information, assets, or services that TEP obtains, owns, or provides as part of its monopoly franchise  
14 over retail electricity distribution, unless TEP provides competing providers of residential DG  
15 services with equivalent access to this information, assets, and services, on the same terms and  
16 conditions as TEP provides its affiliate.

17 **Q. ARE YOU CONCERNED THAT TEP'S PROPOSAL WILL RESULT IN A CROSS-**  
18 **SUBSIDIZATION OF ITS ACTIVITIES?**

19 **A.** Yes. Typical cross-subsidization concerns arise when a utility is able to shift costs or risks that are  
20 properly borne by its competitive activities onto its regulated ratepayers. Regulators have long  
21 recognized that cross-subsidization raises concerns not only about fairness, but also about harm to  
22 competition: if a utility is able to use its position as a regulated monopoly to tilt the competitive  
23 playing field to artificially benefit the utility's entry into otherwise competitive activities, this will  
24 discourage market entry and investment by other competitors.<sup>24</sup> Such cross-subsidization can also

<sup>23</sup> A.R.S. § 40-202(C) ("the commission's authority is confirmed to adopt rules to: ... (2) Prohibit a public service corporation that forms an affiliate for the purposes of providing services that require a licensed contractor or has employees perform these services, including but not limited to electrical, heating, ventilation, air conditioning or plumbing or construction services, from advertising these services in their billing statement or in other mailings done by the electric distribution utility.")

<sup>24</sup> See Timothy Brennan, "Why Regulated Firms Should Be Kept Out of Unregulated Markets: Understanding the Divestiture

1 create barriers to entry for other competitors. Several aspects of TEP's proposal raise cross-  
2 subsidization concerns: its proposal to include customer-specific residential DG solar assets in its  
3 overall rate base; its proposal to charge its residential DG solar customers a flat monthly rate that is  
4 independent of their usage within a +/- 15% band; its proposal to keep this monthly rate constant for  
5 25 years; its proposal to use its privileged access to information about the distribution grid to target  
6 specific residential DG solar customers; its proposal to locate community solar projects on land it  
7 owns only as a result of its regulated monopoly franchise; and its proposal to use its regulated  
8 monopoly franchise to market its DG solar activities to its captive customers. In fact, any proposal  
9 by TEP to include residential DG solar assets in its rate base amounts to an anticompetitive cross-  
10 subsidization of its competitive activities with its status as a franchised retail electric monopoly.  
11 Other aspects of TEP's proposal regarding its rate structure, use of facilities, access to information,  
12 etc., similarly amount to anticompetitive cross-subsidization, unless it offers competing providers of  
13 residential DG services similar access to such rates, facilities, and information on equivalent terms  
14 and conditions.

15 **Q. TEP ATTEMPTS TO JUSTIFY ITS PROPOSAL, IN PART, BY ARGUING THAT IT IS**  
16 **NECESSARY TO PREVENT COST SHIFTS FROM RESIDENTIAL DG SOLAR**  
17 **CUSTOMERS TO OTHER TEP CUSTOMERS. DO YOU AGREE WITH THIS**  
18 **JUSTIFICATION?**

19 **A.** No, I do not. Whether such alleged cost-shifting between residential DG solar customers and other  
20 TEP customers has in fact occurred under the existing ACC-approved tariffs is an issue that I  
21 understand will be addressed in other proceedings. While I believe that competitively-provided  
22 residential DG solar provides a wide range of economic and reliability benefits to all utility  
23 customers, the appropriate design of net metering tariff provisions is a subject that is distinct from  
24 TEP's current proposal to permanently expand its utility-owned residential DG solar program.  
25 Furthermore, as Dr. Cicchetti explains in his testimony, the combined effect of TEP's proposed rate

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in *United States v. AT&T*," 32 *Antitrust Bulletin* 741 (1987), and "Cross Subsidization and Cost Misallocation by Regulated Monopolists," 2 *J. Reg. Econ.* 37 (1990). See, also fn. 1, supra: Federal Trade Commission Staff Report: "Competition and Consumer Protection Perspectives on Electric Power Regulatory Reform" (July 2000). See also 122 FERC ¶ 61,155, 18 CFR Part 35, Docket No. RM-07-15-000, Order No. 707, "Cross-Subsidization Restrictions on Affiliate Transactions" (2008); available at: <https://www.ferc.gov/whats-new/comm-meet/2008/022108/E-2.pdf>.

1 changes and its TORS/RCS proposal will only increase any alleged cost-shifting (if present), not  
2 reduce it. In any event, it is somewhat odd for TEP to propose that, in order to mitigate its future  
3 asset-related cost risks due to increased adoption by residential customers of DG solar (and the  
4 resulting reduction in demand for grid energy from DG customers), TEP should further *increase* its  
5 investments in additional generation assets. This can only increase the risks borne by TEP's cost-of-  
6 service customers. Such a strategy only makes sense for a monopoly utility with the ability to  
7 recover from its captive ratepayers all of the costs of its (presumably prudent) investments -- along  
8 with a healthy rate of return on those investments. Such a strategy makes no sense from the  
9 perspective of the public interest, or competition policy.

10 VII. TEP's Claimed Grid Benefits of Utility-Owned DG Solar Can Be Provided by Third  
11 Parties When They Are Allowed to Compete

12 **Q. WILL TEP'S PROPOSAL ALLOW IT TO MAXIMIZE THE EFFICIENCY BENEFITS OF**  
13 **RESIDENTIAL DG RESOURCES FOR THE DISTRIBUTION NETWORK?**

14 A. No. While it has been asserted by TEP's witness Mr. Tilghman that TEP's unique position allows it  
15 to maximize the value of DG resources to the grid, this is merely an alternative characterization of  
16 the anticompetitive advantages that TEP would reserve to itself under its TORS and RCS proposals.  
17 Yes, if TEP retains preferential access to customer and grid information, and is allowed to  
18 implement proprietary and exclusionary systems and standards, TEP would have substantial  
19 advantages over third party participants. But these are matters that can and should be addressed by  
20 appropriate rules to allow broad and equal access by market participants. Otherwise, TEP will  
21 simply use its privileged regulated monopoly position to undermine competition in this market  
22 segment.

23 **Q. ARE THERE TECHNOLOGICAL LIMITATIONS THAT WOULD OTHERWISE**  
24 **PREVENT COMPETITIVE ROOFTOP SOLAR COMPANIES FROM PROVIDING GRID**  
25 **SUPPORT SERVICES?**

26 A. No. There is no technological barrier to third-party rooftop systems providing grid support. The  
27 only barriers that exist are created by exclusionary utility practices. In particular, the ability to

1 employ so-called “smart” inverters – devices that allow real-time control and management of the  
2 interaction of solar systems and the grid – requires bidirectional communications systems, and  
3 conformity between the technical protocols of the solar system and the grid control system. TEP has  
4 stated that it is “currently planning on the acquisition of an area-wide systems communications  
5 network that will designate communication frequency whereby *Company-owned inverters* will be  
6 able to send and receive signals from TEP’s balancing authority’s energy management system  
7 (“EMS”)” (emphasis added).<sup>25</sup> TEP thus has no intention to create a system based on open standards  
8 that would allow third-party solar systems to provide grid support services. TEP appears to be  
9 pursuing the sort of traditional utility approach to system architecture that not only excludes third-  
10 party access, but also may be insufficiently flexible to accommodate future advanced applications.

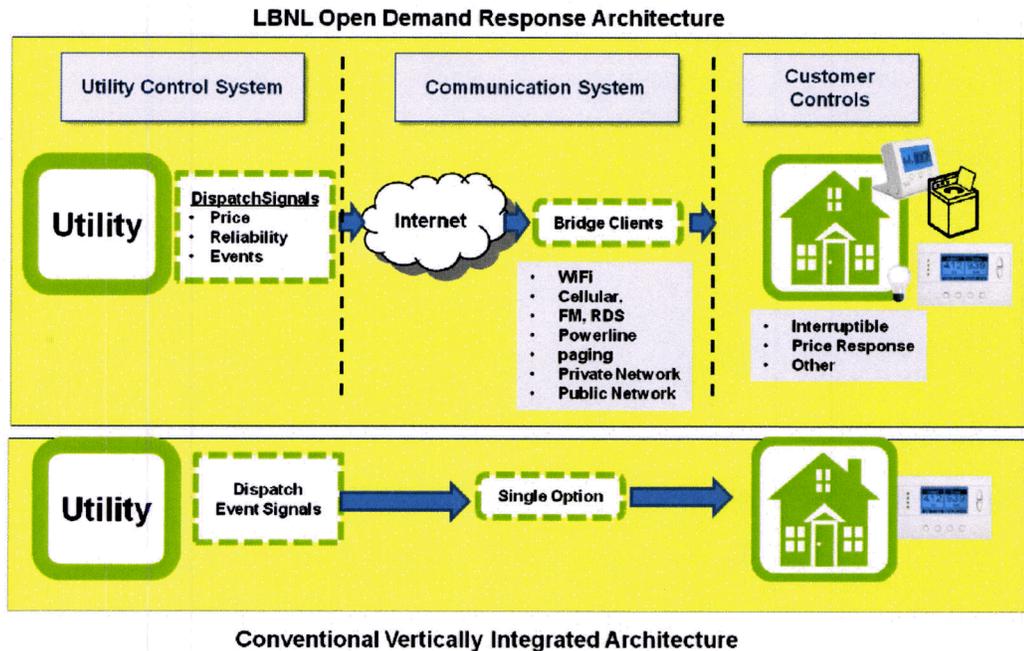
11 **Q. ARE THERE MORE OPEN, FLEXIBLE ALTERNATIVES THAT TEP COULD PURSUE?**

12 **A.** Absolutely. Open architecture approaches have been developed to take advantage of advanced  
13 control capabilities and provide flexibility to adapt to changing technology. One of these is the  
14 LBNL Open Demand Response Architecture, which provides capabilities applicable to both demand  
15 response and onsite solar generation. The open architecture approach is contrasted with the  
16 traditional utility approach in Figure 5.

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<sup>25</sup> TEP response to Staff’s First Set of Data Requests Regarding The Application For Its 2015 Renewable Energy Standard Implementation Plan, Docket No. E-01933A-14-0248, August 22, 2014; response to STF 1.21.

1 **Figure 5: Open versus conventional architectures for system control communications**<sup>26</sup>



2

3 Under the conventional approach, illustrated in the lower part of the figure, the utility designs a  
4 communication system and protocols tied to a specific control application, limiting the ability to  
5 accommodate new applications and electric grid needs, and increasing the potential for the system to  
6 become obsolete and require costly replacement.

7 In contrast, the open architecture approach, illustrated in the upper part of the figure, separates the  
8 control process into three separate but integrated components, relying on a standard data model that  
9 allows the use of multiple communication methods that can be bridged to allow for control of legacy,  
10 advanced, and potential future applications. This sort of open architecture allows for much greater  
11 flexibility over time and also is particularly suited to ensuring access for third-party systems to  
12 provide grid services effectively.

<sup>26</sup> LBNL, "Hawaiian Electric Company Demand Response Roadmap Project," (January 2013).

1 **Q. HAVE SUCH SYSTEMS BEEN DEPLOYED TO DATE?**

2 **A.** Some third-party solar businesses already deploy bidirectional communications capability outside of  
3 utility systems, and collect vastly more data on customer demand and generation than typical utility  
4 systems, with second-by-second detail. Communication latency (the round-trip time for  
5 communications with the rooftop device) through existing systems currently in operation is  
6 approximately two seconds, which is well under the standard four-second requirement for providing  
7 fast response ancillary services to the grid.<sup>27</sup> This provides an additional indication of the innovation  
8 benefits of a competitive marketplace that TEP's proposal will undermine, not to mention the broad  
9 range of benefits that TEP could obtain by working with competitive solar providers to fully utilize  
10 the technologies they have already deployed to address the needs of TEP's electric transmission and  
11 distribution network.

12 **Q. IS THE POTENTIAL FOR A UTILITY TO INVEST IN SYSTEMS THAT BECOME**  
13 **OBSOLETE SIMPLY A HYPOTHETICAL PROBLEM?**

14 **A.** Not at all. One reason the regulation of monopoly utilities is challenging is that it creates inherent  
15 incentives for the utility to both stifle innovation by others and expand its own investments that are  
16 rolled into its rate base, even if such investments ultimately prove to be cost-ineffective or  
17 superseded by other technologies. Utilities, however, are generally cautious in making non-  
18 traditional or unproven investments, because they can only recover the costs of these investments,  
19 including a return, if regulators find that they were prudently incurred. More forward-looking or  
20 adventurous investments are discouraged. At the same time, utilities have an incentive to find needs  
21 to justify new investments that expand their rate base. Incentives are very different in competitive  
22 markets, which reward rapid innovation and risk-taking. Not all companies are rewarded of course,  
23 and some companies will fail. But unlike a franchised monopoly utility, a failed competitive  
24 business is only one among multiple product or service providers, and its losses are not recovered  
25 from captive customers.

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<sup>27</sup> For example, distributed resources are currently being bid into PJM's frequency regulation market, which requires control within four seconds; see, "Grid Balancing with Distributed Energy Resources," available at [http://www.enbala.com/wp-content/uploads/case\\_studies/PJM.pdf](http://www.enbala.com/wp-content/uploads/case_studies/PJM.pdf).

1 **Q. ARE THERE RECENT CASES THAT ILLUSTRATE THE PROBLEM WITH UTILITY**  
2 **INVESTMENT INCENTIVES?**

3 **A.** Yes, the problem with utility investments, undisciplined by competitive market pressures, has been  
4 amply demonstrated in recent years in the wide deployment of advanced metering infrastructure  
5 (“AMI”), more commonly known as smart meters. From the mid-1980s, many utilities began  
6 investing heavily to replace their visually-read electric meters with automated meter reading systems  
7 (“AMR”), in which meters were read by walk-by or drive-by data collection devices, or later by  
8 dedicated radio communications systems. The widespread adoption of AMR extended well into the  
9 mid-2000s. Then as AMI was developed, many utilities rushed to replace their fully-functioning  
10 AMR systems on the premise that AMI would enable consumers to manage their energy use, even  
11 without sufficient programs or evidence to demonstrate a positive benefit to cost ratio for replacing  
12 AMR with AMI at that time. For example, Dominion Virginia Power proposed to replace its 2.4  
13 million AMR meters with smart meters at a cost of \$600 million dollars, even while full adoption of  
14 AMR meters was still under way. Its application was withdrawn after questions were raised about  
15 the insufficient validity of data collected during a test of AMI in some areas, and to date only  
16 250,000 AMI meters have been installed by the utility.<sup>28, 29</sup> This highlights the inherent difficulties  
17 in ascertaining whether utility investments are intended to satisfy the financial objectives of utility  
18 shareholders, or whether they are truly justified on an economic basis. At the end of the day, it is  
19 ratepayers who are forced to bear the risk of utility investments inserted into the rate base, while it is  
20 the utility that stands to profit from the investment. One of the primary benefits of competitive  
21 markets in generation is that they provide outside risk capital and ensure a better alignment of  
22 investment risks and rewards. For residential DG solar, these benefits of competitive markets have  
23 been explicitly recognized by regulators, as I discussed above.

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<sup>28</sup> [http://www.richmond.com/business/article\\_45d16404-f265-53a8-af1b-f983815654a6.html](http://www.richmond.com/business/article_45d16404-f265-53a8-af1b-f983815654a6.html)

<sup>29</sup> <https://www.dom.com/residential/dominion-virginia-power/customer-service/smart-meter-upgrades/smart-meter-locations>

1 **Q. IS UTILITY OWNERSHIP NECESSARY TO MITIGATE POSSIBLE ADVERSE GRID**  
2 **IMPACTS FROM ROOFTOP SOLAR?**

3 **A.** No. As discussed above with respect to the ability of rooftop solar to provide grid support services,  
4 utility ownership is not required in order to manage interaction of rooftop systems with the network.  
5 Technical issues associated with integration of distributed generation are being addressed by the  
6 competitive solar industry in collaboration with utilities and other stakeholders. One notable  
7 example is the Massachusetts Technical Standards Review Group (“MTSRG”) that works to develop  
8 uniform standards for interconnecting distributed generation in the state. The MTSRG has addressed  
9 a range of technical issues, including the potential for DG systems to induce reverse power flow on  
10 the distribution system. TEP has called out this issue particularly to justify its TORS proposal. Mr.  
11 Tilghman states, “[e]ach system must also be designed within a limited capacity range based on the  
12 customer’s usage to mitigate the Company’s concerns with reverse power flow.”<sup>30</sup> It is noteworthy  
13 that all four major utilities in Massachusetts already permit reverse power flow on their circuits,  
14 subject to certain conditions.<sup>31</sup> While the appropriate conditions continue to be debated, it is  
15 apparent that reverse flow is one among several technical issues with integrating distributed  
16 generation that can be managed to enhance overall system benefits. Moreover, the Massachusetts  
17 case demonstrates that utility ownership of distributed generation is not required in order to address  
18 grid impacts, but rather that technical issues can be addressed through the development of uniform  
19 standards that ensure equal access to all market participants.

20 **Q. DOES TEP’S PROPOSAL TO LIMIT ROOFTOP SYSTEM SIZE RAISE OTHER**  
21 **CONCERNS?**

22 **A.** Yes it does. The approach that TEP proposes, in which each rooftop PV system is effectively  
23 designed to minimize excess energy flowing to the grid, undermines the function of rooftop solar as  
24 distributed generation. In TEP’s formulation, rooftop solar is more akin to demand management  
25 than it is to generation – i.e., it is focused on offsetting customer demand for generation from other  
26 utility resources. The management of customer demand, both residential and commercial, is another

<sup>30</sup> Tilghman Direct Testimony, page 14, lines 13-14.

<sup>31</sup> MTSRG Common Guidelines Matrix, available at:  
[https://drive.google.com/file/d/0B836U49Yrh\\_QMXcteWF1WTFIams/view](https://drive.google.com/file/d/0B836U49Yrh_QMXcteWF1WTFIams/view)

1 arena in which competitive service providers operate in a well-functioning market, and in which the  
2 direct participation of regulated utilities raises concerns about anticompetitive effects, for example  
3 when a utility installs customer-sited equipment that is put into the rate base – precisely what TEP  
4 proposed to do under TORS.

5 Rather than advancing the DG solar market segment and expanding customer service options, TEP's  
6 TORS proposal is designed primarily to protect TEP's interests. Indeed, in response to a Staff data  
7 request in this docket, TEP stated:

8 **While the Company recognizes that consumers will always prefer policies that**  
9 **may benefit the individual rather than the system as a whole,** it is incumbent upon  
10 the utility to transition to a cleaner, more sustainable portfolio in a manner which preserves  
11 the Company's ability to provide safe, reliable, and affordable energy to all customers.<sup>32</sup>  
12 (Emphasis added.)

13 VIII. Conclusion: TEP's Proposal Is an Unreasonable Response to Innovation and  
14 Competition from Independent DG Service Providers

15 **Q. DO YOU HAVE ANY FINAL COMMENTS ON TEP'S PROPOSAL?**

16 **A.** Yes. TEP's proposal did not arise out of a vacuum. In the trade press, there have been innumerable  
17 articles about the supposed "crisis" faced by regulated electric utilities in an era of rapid technology  
18 innovation, increased competition, and reduced demand growth, or even declining electricity  
19 consumption. It is my own view that the predictions of the demise of the regulated utility are wildly  
20 exaggerated: developing, managing, and maintaining the operation of an electricity transmission and  
21 distribution network is an important function that provides significant, and in fact increasing,  
22 benefits to a society that is increasingly dependent on a reliable supply of electricity. How a  
23 regulated private utility such as TEP will meet its shareholders' profit requirements in a changing  
24 competitive and regulatory environment is a different question that I have not been asked to address,  
25 nor is it a question that is before this Commission. The question that is before this Commission is  
26 whether TEP's response to these challenges, as embodied in this as well as its separate but intimately

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<sup>32</sup> TEP response to Staff's First Set of Data Requests Regarding Its Renewable Energy Standard and Tariff Application, Docket No. E-01933A-14-0248, August 24, 2014; response to STF 1.37.

1 related rate proposals, is consistent with the public interest, both in the near-term and in the long-  
2 term. I conclude that it is not, as it represents a significant step backward towards preserving an  
3 outdated regulated monopoly business model, rather than embracing and enabling innovation, as it  
4 pretends to do.

5 Innovation brings substantial benefits to consumers, including new and improved products and  
6 services, lower prices, and higher standards of living. Innovation, however, is often disruptive to  
7 existing business, whether regulated or unregulated. Digital publishing and e-books substantially  
8 disrupted the prior business models of book publishers, book stores, and newspapers. Digital music  
9 – downloaded over the Internet – substantially disrupted the prior business models of record  
10 companies and record stores. In regulated industries, cell phone-enabled ride-sharing services  
11 combined with cashless payment systems (Uber/Lyft) substantially disrupted traditional regulated  
12 taxi businesses. Indeed, the emergence of cell phone services, “smart phones,” and even the Internet  
13 are ultimately attributable to the efforts of “disruptive” competitors in a previously highly regulated  
14 market. Not that long ago in the U.S., there was only one type of telephone service (landline), it was  
15 provided by one regulated monopoly (AT&T), and customers could get a single type of telephone in  
16 the color of their choice, as long as that color was AT&T’s “colorful black.” The enormous range of  
17 innovation that we have witnessed in the telecommunications industry in the past several decades  
18 has been due, in large part, to decisions by regulators to enable innovative new entrants to participate  
19 in related – but distinct – competitive market segments, by ensuring that such new entrants were able  
20 to gain access to the incumbent monopolist’s regulated networks on non-discriminatory terms; and  
21 by ensuring that the incumbent monopolist was not able to stifle emerging competition in these  
22 markets by requiring that customers use its products or services.

23 Innovation and technological change has similarly caused widespread changes in – and challenges to  
24 – the electric utility industry over the past several decades. Much of the federal and state efforts to  
25 promote restructuring in electricity markets resulted from improvements in generation technology  
26 that allowed smaller generating units to produce electricity at costs substantially below those of  
27 historical utility-scale plants. These technological improvements in generation allowed new and

1 independent market participants to own and operate their own generating units, initially as QFs, and  
2 later as IPPs selling directly to wholesale customers. These innovations -- and the accompanying  
3 new competitive entrants -- have provided substantial benefits to electricity consumers, but they also  
4 continue to pose a challenge to the business model of incumbent vertically-integrated utilities  
5 operating as regulated monopolies. Monopoly utilities maximize their profits by maximizing the  
6 size of their rate base. They thus have the incentive to prevent or limit the ability of independent  
7 generation from participating in the market, or even (in the case of residential DG solar) from  
8 serving a customer's own load.

9 As residential DG solar expands in its service territory, TEP faces the prospect that an increased  
10 number of residential customers will purchase less electricity, and will generate their own electricity  
11 using "behind-the-meter" assets purchased or leased from third parties, rather than being included in  
12 TEP's rate base where TEP can earn a return. TEP's proposal would "turn back the clock" and  
13 undermine a successful competitive market segment in residential DG solar. The Arizona  
14 Corporation Commission should not allow TEP to use its current proposal to achieve that objective  
15 and prevent its captive customers from enjoying the benefits of competition in residential solar  
16 services, including increased choice, continued innovation, improved services, and lower prices.

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**EXHIBIT  
EFCA-DERAMUS-1**

**CURRICULUM VITAE OF DAVID W. DERAMUS, PHD**



**DAVID W. DERAMUS, PHD**  
Partner

**AREAS OF EXPERTISE**

Antitrust analysis  
Class certification  
Damages estimation

Energy market analysis  
Financial analysis  
Mergers and acquisitions

**SUMMARY OF EXPERIENCE**

David W. DeRamus is a founding member of Bates White Economic Consulting and is active in the firm's Antitrust and Competition, Energy, International Arbitration, and Transfer Pricing Practices. He specializes in economic and financial analysis, quantitative modeling, antitrust analysis, pricing analysis, damages analysis, and valuation. Dr. DeRamus has an extensive background in industrial organization, international economics, antitrust economics, microeconomics, finance, financial modeling, and statistical analysis.

**SELECTED ANTITRUST EXPERIENCE**

- Serving as testifying expert in *XY, LLC v. Trans Ova Genetics LLC v. Inguran LLC*, a patent infringement and antitrust dispute in the livestock reproductive services industry. Testifying on behalf of Counterclaim Plaintiff Trans Ova Genetics on issues related to relevant market definition, monopoly power, anticompetitive conduct, and damages.
- Testified at trial in *ZF Meritor LLC v. Eaton Corp.*, a monopolization case involving heavy-duty truck transmissions. On behalf of plaintiffs, submitted testimony defining the relevant antitrust market, assessing whether a market participant had monopoly power, and evaluating the harm to competition from certain contracts and the performance of those contracts; also submitted testimony estimating damages. Jury verdict on liability in favor of client, upheld on appeal (*ZF Meritor v. Eaton Corp.*, 696 F.3d 254 (3d Cir. 2012), cert denied, 133 S.Ct. 2025 (2013)). Prior to the damages phase of trial, the parties agreed to a \$500 million settlement.
- Submitted expert testimony in *In re Methionine Antitrust Litigation*, a major price-fixing case involving feed additives on behalf of direct action opt-out plaintiffs. Issues included establishment of liability, estimation of damages, analysis of industry structure, analysis of financial performance, and other pricing-related issues.

- Testified on behalf of the Maryland Public Service Commission Staff to assess potential market power issues associated with the proposed merger of Exelon Corporation and Constellation Energy Group, Inc. Analyzed changes in market concentration, the definition of relevant geographic markets, and Applicants' proposed mitigation plan. Assessed the economic viability of the facilities selected for divestiture by the Applicants. Provided testimony on the Applicants' proposal to build additional generation as a means of addressing market power concerns raised by the proposed merger.
- Submitted expert testimony on behalf of indirect purchaser plaintiffs in class certification proceedings in *J&R Ventures, Inc. v. Rhone-Poulenc SA*, a price-fixing case involving feed additives.
- Submitted testimony on behalf of Constellation Energy Commodities Group, Inc., in a complaint proceeding before FERC (Docket No. EL07-47-000) brought by the Illinois Attorney General against various participants in the Illinois Auction for electric power supplies held in September 2006. Analyzed issues related to the competitiveness of the auction structure, market concentration, the ability of the participants to exercise market power, and allegations of collusion.
- Served as consulting expert on behalf of plaintiffs for monopolization cases involving the computer software industry. Assisted with the development of overall case strategy and preparation of economic analysis used in legal filings, analyzed pricing issues, investigated and reviewed allegations of anticompetitive behavior, prepared damage estimates, submitted damage reports to clients, and assisted with settlement negotiations.
- Served as consulting expert on behalf of multiple defendants in several large cases related to the natural gas industry on class certification and damages issues. Alleged conduct involved misreporting of prices to publishers of natural gas price indices.
- Served as consulting expert on antitrust, pricing, and exclusionary conduct issues related to biotechnology and agricultural products. Analyzed potential anticompetitive harm resulting from a proposed acquisition.
- Provided economic analyses related to antitrust issues involving the electric utility industry. Analyzed prices, load patterns, capacity issues, outages, bidding patterns, and allegations of anticompetitive behavior.

#### **SELECTED GENERAL COMMERCIAL LITIGATION EXPERIENCE**

- Testified in proceedings before the International Center for Settlement of Investment Disputes in a contract dispute in the natural gas industry. Testified on issues related to the economics of the contract, industry practices, impact on the parties of recent developments in natural gas markets, and damages.

- Submitted a declaration in *Allure Energy, Inc. v. Nest Labs, Inc.* on behalf of defendant Nest Labs. Performed economic analysis of the four *eBay* factors to assess whether a preliminary injunction against Nest Labs should be granted for alleged patent infringement. Plaintiff's request for a preliminary injunction was denied.
- Testified in proceedings before the American Arbitration Association in a contract dispute between chemical manufacturers. Testified on issues related to the economics of the contract, the value to the parties of the contract, the impact of foreign exchange rate changes on the value of the contract, the competitive alternatives available to the parties, and damages.
- Testified in proceedings before the American Arbitration Association in a contract dispute between defense contractors. Testified on issues related to the materiality of the failure to disclose a government investigation, the economic analysis of a subcontract and alleged joint venture agreement, and damages.
- Served as consulting expert in international arbitration proceedings (International Chamber of Commerce) related to a dispute in the pharmaceutical industry. Estimated damages associated with the alleged breach of contract.
- Submitted expert testimony in *T.E. Security Consultants v. DynCorp Int'l*, a contract dispute between defense contractors. Testified on issues of the financial ability of one of the parties to perform on a contract, a party's ability to obtain financing, the economic analysis of an alleged subcontract, the value of alleged trade secrets, and damages.
- Submitted testimony and testified at hearing in *Jenkins v. Entergy Corp.* estimating damages to plaintiffs resulting from an alleged improper energy purchasing scheme; submitted testimony in class certification proceeding.
- Submitted various expert reports in transfer pricing disputes before the Mexican tax authority (Servicio de Administración Tributaria) related to transfer pricing. These reports evaluated whether various related-party transactions were consistent with the arm's length standard under OECD and Mexican transfer pricing guidelines.
- Served as consulting expert services to the US Department of Justice in a major government contract dispute. Assessed the economics of a development contract with defense aerospace companies. Analyzed the contractors' financial performance and viability, bankruptcy risks, potential financing sources, project cash-flows, and the impact of contract termination.
- Assessed reliability of statistical study related to pricing accuracy for a large retailer. Analyzed issues related to overall study methodology, sampling bias, and quantification of harm to consumers.
- Testified in Delaware Chancery Court in *Frontier Oil Corp. v. Holly Corp.*, a merger-related dispute in the energy industry. Testimony involved the valuation of a potential environmental liability/toxic tort arising from oil and gas operations, including an assessment of the materiality of the liability to the proposed merger.

- Submitted expert testimony in government procurement litigation matter involving office productivity software. Analyzed financial costs and benefits of software standardization initiative, reviewed product comparisons, analyzed data on software installation and use, evaluated claims regarding alleged product integration and standardization advantages, and analyzed market consequences of government procurement decisions.
- Submitted expert testimony assessing the damages resulting from defamation in the travel retail industry.
- Developed a state-of-the-art microsimulation model for estimating the future liability of former asbestos manufacturers from personal injury lawsuits. Developed several financial cash-flow models to determine long-term viability of product liability settlement trusts.
- Conducted several valuation studies related to potential future product liability and potential future litigation recoveries. Valuation reports prepared and submitted as part of the acquisition process for due diligence and tax reporting purposes.
- Provided project oversight for estimation of damages in patent infringement case in the financial services industry. Damages estimated based on a reasonable royalty methodology.
- Conducted a valuation of a plaintiff's legal claims related to several ongoing major litigation matters. Valuation report submitted for tax reporting purposes.
- Analyzed the impact of a private-label credit card on a large retailer's sales and profits in a major tax dispute. Developed a robust statistical model using the company's point-of-sale data, credit card data, and customer demographic information. Tax dispute resolved in favor of the client based on this analysis.
- Conducted market and industry analyses for various due diligence, breach of contract, bankruptcy, and product liability engagements in the areas of insurance, general aviation, commercial property, electronic funds transfer, restaurant franchising, and construction.

#### **SELECTED ENERGY REGULATORY EXPERIENCE**

- Testified on behalf of Florida Power & Light Company in proceedings before the Florida Public Service Commission regarding the potential impact on residential and commercial customers of a proposed base rate increase.
- Testified on behalf of Tenaska and Coral Power in proceedings before the Public Utility Commission of Texas (PUC Docket No. 33687) related to the application by Entergy Gulf States, Inc., of its "Transition to Competition Plan." Analyzed issues related to Entergy's business strategy, cost-benefit analysis, cost allocation, cross-subsidization, and potential harm to competition.

- Submitted testimony on behalf of Occidental Chemical Company in FERC proceedings (Docket No. ER10-396-000) related to the application by Tres Amigas, LLC for authorization to sell transmission services at negotiated rates. Analyzed potential market power issues raised by the application.
- Submitted testimony on behalf of the NRG Companies in FERC proceedings (Docket No. ER08-1209-\_\_\_) related to the proposal by ISO New England Inc. and the New England Power Pool Participants Committee to compensate rejected Dynamic and Static De-List Bids in the ISO-NE Forward Capacity Auction.
- Submitted testimony on behalf of Milford Power Company, LLC, in FERC proceedings (Docket No. ER99-4102-\_\_\_) related to the Commission's generation market power screens as applicable to Milford's market-based rate authority.
- Testified on behalf of the New York Power Authority in FERC proceedings (Docket No. ER06-456-000, et al.) related to the proposal by PJM Interconnection, LLC, to allocate cost responsibility for certain transmission network upgrades included in the baseline PJM Regional Transmission Expansion Plan to merchant transmission projects that interconnect with the PJM transmission network.
- Submitted testimony on behalf of Southaven Power LLC and Kelson Energy III LLC in FERC proceedings (Docket No. EC08-\_\_\_-000) related to potential market power issues arising from Kelson's proposed acquisition of the Southaven electric generation facility. Submitted testimony on behalf of Kelson Energy III LLC in FERC Docket No. ER08-\_\_\_-000 related to the Commission's generation market power screens as applicable to Kelson's application for market-based rate authority.
- Testified on behalf of Shell Trading Gas and Power Company and Calpine Corp. in proceedings before the Federal Energy Regulatory Commission (FERC) (Docket Nos. ER97-4166-015, EL04-124-000, et al.) related to the application by the Southern Companies (Southern Company Energy Marketing, Inc., and Southern Company Services, Inc.) for market based rate authority. Analyzed issues related to the appropriate implementation of the Commission's Delivered Price Test, generation market power, Southern Companies' transmission network, barriers to entry, and affiliate preferences.
- Submitted comments in proceedings before the Federal Energy Regulatory Commission (FERC) (Docket Nos. RM07-19-000 and AD07-7-000) related to "Wholesale Competition in Regions with Organized Electric Markets" (see "Comments of the Electric Power Supply Association"). Analyzed economic issues related to FERC's demand response proposals.
- Submitted testimony on behalf of Occidental Chemical Company in FERC proceedings (Docket No. EC07-70-000) evaluating the proposed acquisition of jurisdictional assets of Calcasieu Power, LLC, by Entergy Gulf States, Inc. Analyzed issues related to the impact of the acquisition on market concentration and the ability of the applicant to exercise market power.

- Testified on behalf of the Texas Industrial Energy Consumers in proceedings before the Public Utility Commission of Texas (SOAH Docket No. 473-06-2536 and PUC Docket No. 32766) related to the retail electric power rates charged by Southwestern Public Service Company. Analyzed issues associated with the appropriate allocation of average system fuel costs and cross-subsidization.
- Testified on behalf of BP Canada Energy Marketing Corp. and IGI Resources, Corp., in FERC proceedings (Docket No. RP06-407) related to the application by Gas Transmission Northwest Corporation for market-based rate authority and flexible services rates for certain transportation services provided by the GTN natural gas pipeline.
- Testified on behalf of Occidental Permian Ltd. and Occidental Power Marketing, L.P., in FERC proceedings (Docket No. EL05-19-002 and ER05-168-001) related to the wholesale electric power rates charged by Southwestern Public Service Company. Analyzed issues associated with the appropriate allocation of average system fuel costs and cross-subsidization.
- Submitted testimony on behalf of Occidental Permian Ltd. and Occidental Power Marketing, L.P., in FERC proceedings (Docket No. ER01-205-009, et al.) related to the application by Southwestern Public Service Company for market-based rate authority. Analyzed issues related to generation market power and affiliate abuse.
- Submitted testimony on behalf of Calpine Corp. in FERC proceedings (Docket No. ER05-1065-000) and testified in Louisiana Public Service Commission proceedings (Docket No. U-28155) related to the application by Entergy Services, Inc., Entergy Louisiana, Inc., and Entergy Gulf States, Inc., to establish an Independent Coordinator of Transmission in the Entergy control area. Analyzed issues related to the functions to be performed by the ICT, Entergy's transmission pricing proposal, and its Weekly Procurement Process proposal.
- Submitted testimony on behalf of Calpine Corp. in proceedings before the Louisiana Public Service Commission (Docket No. U-27836) related to the application by Entergy Louisiana, Inc., and Entergy Gulf States, Inc. for approval of the purchase of the Perryville, La. electric generating facility. Analyzed issues of market power and calculated the extent to which the proposed transaction increased market concentration.
- Submitted expert testimony on behalf of Duke Energy in response to a FERC Show Cause Order (Docket No. EL03-152-000) relating to alleged "gaming" behavior in the California power markets.
- Submitted testimony on behalf of Calpine Corp. and Occidental Chemical Corp. in FERC proceedings (Docket No. ER91-569-023) related to the application by Entergy Services, Inc., for market based rate authority. Analyzed issues of generation market power, transmission market power, barriers to entry, and affiliate abuse in the Entergy control area. Implemented a model of the Entergy control area transmission constraints in performing the generation market power analysis.

- Submitted testimony on behalf of Calpine Corp. in FERC proceedings (Docket No. ER96-2495-018, et al.) related to the application by AEP Power Marketing, Inc., et al., for market based rate authority. Analyzed issues of generation market power, transmission market power, barriers to entry, and affiliate abuse in the AEP-SPP control area.
- Submitted expert testimony on behalf of InterGen in FERC proceedings (Docket No. EC03-131-000) related to Oklahoma Gas & Electric's proposed acquisition of NRG McClain. Analyzed issues of horizontal and vertical market power within the context of a hearing to identify appropriate mitigation measures.
- Submitted expert testimony on behalf of the Independent Energy Producers Association on vertical market power in FERC proceedings (Docket No. ER04-316-000) related to Southern California Edison's proposed acquisition of a Mountainview, California, electricity generating facility and a subsequent interaffiliate Power Purchase Agreement.
- Submitted expert testimony on behalf of Duke Energy in FERC proceedings (Docket Nos. EL00-95-075 and EL00-98-063) related to the California power markets during 2000–2001 and allegations of improper bidding behavior. Analyzed detailed data on individual bids and plant-level generation, performed statistical analysis of “physical” and “economic” capacity withholding, analyzed financial market data, examined alleged evidence of manipulative trading strategies, and assessed evidence of coordinated behavior.

#### **SELECTED BUSINESS CONSULTING EXPERIENCE**

- Prepared numerous transfer pricing analyses on behalf of a large automotive manufacturer, used for documentation, planning, and audit on a global basis. Evaluated policies and pricing for related-party transactions with respect to the arm's length standard under US, Mexico, OECD, and other country guidelines. Analyzed transfer pricing issues related to finished vehicles, engines, transmissions, other components, royalties, and services. Developed cost-sharing arrangements; assisted in bringing consistency across documentation studies prepared for different tax jurisdictions; addressed issues related to Advance Pricing Agreements and Competent Authority proceedings; and in audit and controversy proceedings, rebutted the transfer pricing analyses of various tax authorities.
- Submitted comments to various government agencies regarding the cost-effectiveness of biodiesel as a means of reducing CO2 emissions from transportation fuels.
- Authored a report on the US ethanol industry, quantifying the impact of the expiration of the Voluntary Ethanol Excise Tax Credit (VEETC) and a tariff on US ethanol imports.
- Estimated value of automotive engine technology for large international automotive manufacturer. Study prepared for tax and financial reporting purposes.

- Conducted numerous transfer pricing studies for tax planning, documentation, and audits. Clients include large multinational companies involved in automotive manufacturing, medical products, computer software/hardware, industrial equipment, retail clothing, food products, tobacco, alcoholic and non-alcoholic beverages, oil drilling services, package delivery services, shipping, and industrial products.
- Designed, managed, and implemented intellectual property-related planning initiatives for large multinational clients in manufacturing, computer, telecommunications, and consumer product industries. Designed R&D cost sharing arrangements and prepared transfer pricing documentation for tax compliance.
- Estimated value of liabilities for a remainder trust established for a former manufacturer of food products. Potential liabilities were related to environmental remediation costs associated with a "Superfund" site containing hazardous waste.
- Managed the development of advanced data analytic software based on artificial neural networks for Internet-based financial services client. Responsible for identifying new product opportunities for client, evaluating feasibility of applications, performing cost-benefit analysis for new product investment, designing implementation plan, and managing the overall software development process.
- Estimated the future asbestos liability of several companies (public and private) for investment research firms and potential acquirers as due diligence. Analyzed the litigation risks faced by the companies, insurance coverage issues, potential consequences of other developments in the asbestos litigation environment, and financial reporting issues.
- Conducted extensive empirical research on the impact of R&D and advertising on profitability; analyzed the impact of foreign exchange rate fluctuations on US prices.
- Analyzed economic issues on behalf of the Electric Power Supply Association with respect to demand response programs and price caps in organized electric markets in FERC Docket Nos. RM07-19-000 and AD07-7-000 ("Wholesale Competition in Regions with Organized Electric Markets").
- Prepared a quantitative analysis of the benefits of competitive electric wholesale markets on behalf of an energy company.
- Prepared a whitepaper on the use of competitive procurements as a means of reducing market power in wholesale electric markets on behalf of an energy company.
- Submitted a report on behalf of the Independent Energy Producers Association regarding the proposed market price referent methodology for use in the California Renewables Portfolio Standards power solicitations in proceedings before the California Public Utilities Commission (Docket No. OIR 01-10-024).

- Developed a financial simulation model for a major transportation consortium in contract negotiations with the US Department of Defense in order to determine the appropriate compensation for risk in a long-term supply contract.
- Managed and directed various business consulting projects requiring statistical analysis to guide pricing and marketing decisions.
- Provided strategy consulting to seed-stage start-up companies, including development of business strategy, competitive analysis, intellectual property assessment, development of revenue and cost projections, and formulation of business and financing plan.
- Conducted an antidumping study to estimate exposure to tariffs in the petrochemical industry.

## **PUBLICATIONS**

- Axelrod, Howard, David DeRamus, and Collin Cain. "The Fallacy of High Prices." *Public Utilities Fortnightly* 144 (2006): 55–60.

## **INDUSTRY PRESENTATIONS**

- Renewable Fuels Association, Conference, National Ethanol Conference, February 21, 2011: "Future of Biofuels Tax Policy Panel Discussion."
- COMPETE and the Electric Power Supply Association, Conference, Empowering Customers Through Competitive Markets, November 5, 2007: "Ensuring Consistent Environmental and Competition Policies in Electricity Markets."
- Federal Trade Commission, Conference, Energy Markets in the 21st Century: Competition Policy in Perspective, April 10, 2007: "Empirical Analyses of Wholesale Electric Competition and Industry Restructuring."
- Federal Energy Regulatory Commission, Technical Conference, Generation Market Power and Affiliate Abuse, January 28, 2005: "Comments by David W. DeRamus, PhD."
- Federal Energy Regulatory Commission, Technical Conference, Acquisition and Disposition of Merchant Generation Assets by Public Utilities, Docket No. PL04-9-000, June 10, 2004: "Comments by David W. DeRamus, PhD."
- Federal Energy Regulatory Commission Technical Conference, Market-Based Rates for Public Utilities, Docket No. RM04-7-000, June 9, 2004: "Comments by David W. DeRamus, PhD."
- Electric Power Supply Association, Spring Membership Meeting, April 2004: "Utility Power Supply: Costs and Risks of Vertical Reintegration."
- American Antitrust Institute, Fourth Annual Energy Roundtable Workshop, January 2004: "Electric Utility Reintegration: Vertical Market Power and Potential Market Foreclosure."

- Institute of Public Utilities, Annual Conference, December 2003: "Distinguishing Between Market, Regulatory, and Business Failures."

## **PROFESSIONAL EXPERIENCE**

Dr. DeRamus was previously a Manager with A.T. Kearney and a Senior Manager with KPMG. In both positions, he had broad client responsibility including the management of complex litigation, transfer pricing, and business consulting engagements.

## **EDUCATION**

- PhD, Economics, University of Massachusetts at Amherst
- MA, Economics, University of Massachusetts at Amherst
- BA, Political Science (magna cum laude), Duke University

## **PROFESSIONAL ASSOCIATIONS**

- American Bar Association
- American Economic Association
- Energy Bar Association

## **RELATED ACTIVITIES AND HONORS**

- German Academic Exchange Service Grant (awarded)
- Council for European Studies Pre-Dissertation Fellowship (Columbia University)
- Dean's University Fellowship (University of Massachusetts)
- Herbert Lehman Fellowship (New York State)

## **LANGUAGES**

- French (fluent)
- German (fluent)
- Spanish (intermediate)