

June 18, 2021

Advice 6232-E

(Pacific Gas and Electric Company ID U 39 E)

Public Utilities Commission of the State of California

Subject: Information Only Volt-Watt Quarterly Report for the Period February 19, 2021 Through May 20, 2021 Pursuant to Resolution E-5016

Purpose

The purpose of this Tier 1 information-only advice letter is to submit a quarterly report to the California Public Utilities Commission (“CPUC”, “Commission”) to estimate the impact of activating the Volt-Watt function of all new smart inverters Advice Letter for one year starting 90 days¹ after February 19, 2021, the approval date of the updated methodologies as required by Resolution E-5016² Ordering Paragraph (“OP”) 4 and Resolution E-4898³ OP 6.

Background**Rulemaking 11-09-011**

The California Public Utilities Commission (CPUC or Commission) initiated Rulemaking (R.) 11-09-011 on September 22, 2011 to review and, if necessary, revise the rules and regulations governing the interconnection of generation and storage facilities to the electric distribution systems of the investor-owned utilities (“IOUs”).⁴ The IOUs’ rules and regulations pertaining to the interconnection of generating facilities are set forth in the Electric Rule 21 Tariff.

¹ Plus time to compile the report.

² [Resolution E-5016](#) *Rejecting Pacific Gas and Electric Company’s, Southern California Edison Company’s, and San Diego Gas & Electric Company’s Proposal for Standardized Reporting Methodologies to Monitor the Frequency and Amount of Voltage Excursions - Date of Issuance - December 23, 2019.*

³ [Resolution E-4898](#) *Approval, with Modifications, of Request for Modifications to Electric Rule 21 Tariff to Incorporate Smart Inverter Phase 3 Advanced Functions in Compliance with Decision 16-06-052 - dated April 26, 2018. See p4.*

⁴ The IOUs or the “investor-owned utilities” consist of Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric (SDG&E).

In early 2013, the Smart Inverter Working Group (“SIWG”) was formed by parties of Rulemaking (“R.”)11- 09-011 to develop proposals to take advantage of the new, rapidly advancing technical capabilities of inverters. In March 2016, the SIWG completed its first set of recommendations for the Phase 3 advanced functions.^{5,6}

Among the key Phase 3 advanced functions of relevance to this advice letter function 6, the Volt Watt Mode. In E-4898 it is described as:

“As a general rule, the production of active power raises voltage. This relationship can be problematic when solar photovoltaic (PV) systems interconnect in large numbers on distribution circuits where utilities have not planned for voltage rise and where existing distribution equipment cannot lower voltage. Volt Watt Mode modifies active power from DERs based on predetermined voltage ranges to prevent the local voltage on the distribution circuit from rising/dropping outside of allowable levels. Voltage regulators are a common mitigation measure used on circuits with and without PV to ensure that voltage stays within acceptable levels all the way to the end of the circuit. As PV injects power to the grid at various points along a circuit, the complex interaction of ever-changing load and generation conditions can cause imbalances in voltage levels. These voltage excursions can be mitigated by the smart inverter’s Volt Watt Mode raising or lowering voltage but that change in voltage reduces the amount of real power that is exported.” (Emphasis added)

Decision (D.) 16-06-052

On June 23, 2016, the Commission adopted Decision (“D.”) 16-06-052⁷, which directed the IOUs to submit ALs proposing revisions to Rule 21 setting forth any agreed-upon technical requirements, testing and certification processes, and effective dates for Phase 3 functions.

On November 17, 2016, the Energy Division hosted a public workshop with the purpose of providing guidance to the IOUs on the Advice Letter submittals.

⁵ SIWG Phase 3 DER Functions: Recommendations to the CPUC for Rule 21, Phase 3 Function Key Requirements, and Additional Discussion Issues, Issued March 31, 2017.

⁶ The SIWG’s Phase 1 and Phase 2 recommendations were incorporated into Rule 21 in April 2015 and April 2017.

⁷ [D.16-06-052](#) *Alternate Decision Instituting Cost Certainty, Granting Joint Motions To Approve Proposed Revisions To Electric Tariff Rule 21, And Providing Smart Inverter Development A Pathway Forward For Pacific Gas And Electric Company, Southern California Edison Company, And San Diego Gas & Electric Company*- Issued July 1, 2016.

Joint Advice Letter 4983-E

On December 20, 2016, the IOUs jointly submitted Tier 1 AL 4983-E⁸ that provided a work plan and an outline of next steps for tariff development including a status update on the activities outlined in the work plan by March 30, 2017.

Phase 3 Recommendations

On March 31, 2017, the SIWG submitted final revisions to the Phase 3 recommendations. In addition, the IOUs filed the required status update on March 30, 2017. In accordance with the work plan, the IOUs each anticipated submitting a Tier 3 Advice Letter in June 2017.

PG&E Advice Letter 5129-E

On June 27, 2017, the IOUs were granted a requested to extend the submittal date of the Tier 3 Advice Letters to August 18, 2017. On August 18, 2017, PG&E submitted AL 5129-E⁹ to comply with D.16-06-052 proposing Rule 21 tariff revisions.

Following the submission of AL 5129-E, the Energy Division held a public workshop to discuss and, if possible, resolve issues raised in protests to the Advice Letters.

Resolution E-4898

On April 27, 2018 the CPUC issued Resolution E-4898. Among other things, OP 1 stated that PG&E AL 5129-E is approved as modified therein.

However, E-4898 OP 5 also required the IOUs “to develop standardized reporting methodologies to monitor the frequency and amount of voltage excursions and, in consultation with the Commission’s Energy Division, shall each file a Tier 1 Advice Letter on the proposed methodologies by October 1, 2018.” In its Discussion¹⁰ it provided additional requirements and clarification.¹¹

Additionally E-4898 OP 6 requires that the IOUs, “shall each file quarterly reports via Tier 1 information-only Advice Letter for one year starting three months after the mandatory activation of Function 6 on voltage data with the methodologies approved by the Tier 1 Advice Letters from Ordering Paragraph 5, and following the completion of the quarterly reports, shall file annual reports on voltage excursions via Tier 1 information-only Advice Letter. No sooner than five years after the activation of Function 6, the IOUs may file

⁸ [AL 4983-E](#) Information-Only Advice Letter Joint Investor-Owned Utilities Status Report and Supporting Action Plan for the Development of Advanced Inverter Functions for Smart Inverters (Phase 3), submitted December 20, 2016, approved January 26, 2017, and made effective January 19, 2017.

⁹ [AL 5129-E](#) - Modifications to PG&E’s Electric Rule 21 Tariff and Interconnection Agreements and Forms to Incorporate Smart Inverter Phase 3 Modifications – submitted August 18, 2018, and approved May 8, 2018 effective April 25, 2018, per E-4898.

¹⁰ Sub-issue: Impact of Activation of Function 6 starting on Page 30 of E-4898.

¹¹ Ibid, Page 32

proposals via Tier 2 Advice Letter on whether to continue or modify the reporting requirement.”

PG&E Advice Letter 5395-E

AL 5395-E¹² was submitted to respond to the E-4898 OP 5 requirement to develop standardized reporting methodologies to monitor the frequency and amount of voltage excursions, pursuant to E-4898 OP5 and included a Proposal For A Standardized Reporting Methodologies To Monitor The Frequency And Amount Of Voltage Excursions.

Resolution E-5016

On December 26, 2019, AL 5395-E was rejected per Resolution E-5016¹³ OP 1. E-5016 OP 2 ordered the IOUs *“to hold at least two meetings with the Smart Inverter Working Group. Meetings”* to discuss modeling tools, alternate methodologies, and AMI capabilities.

And E-5016 OP 3 ordered the IOUs *“to re-submit Tier 1 Advice Letters, within 150 days, after issuance of this Resolution and after meeting with the Smart Inverter Working Group.”*

PG&E Advice Letter 5832-E

Subsequently on May 21, 2020, in compliance with E-5016 OP 3, PG&E submitted AL 5832-E¹⁴ with a proposed methodology for monitoring the amount of voltage excursion events pursuant to Resolutions E-4898 and E-5016.

Based on the consensus in the SIWG, the IOUs proposed an eight-step process that would rely on the established customer voltage complaints process to trigger collecting voltage and other data needed to estimate PV production curtailment in accordance with Resolution E-5016.

As stated in AL 5832-E, stakeholders did not raise objections to the majority of the eight steps. But additional comments were received and the IOUs, along with the SIWG, held additional discussions.^{15,16}

¹² [AL 5395-E](#) - *Proposal For Standardized Reporting Methodologies To Monitor The Frequency And Amount Of Voltage Excursions, Pursuant to Resolution E-4898* – submitted October 1, 2018.

¹³ [Resolution E-5016](#) *Rejecting Pacific Gas and Electric Company’s, Southern California Edison Company’s, and San Diego Gas & Electric Company’s Proposal for Standardized Reporting Methodologies to Monitor the Frequency and Amount of Voltage Excursions.*- issued December 23, 2019.

¹⁴ [AL 5832-E](#) *Proposed Reporting Methodology to Monitor the Frequency and Amount of Voltage Excursion Events Pursuant to Resolutions E-4898 and E-5016*

¹⁵ See background in AL 5832-E for additional details.

¹⁶ E-4898, p27

Protests

On June 10, 2020, IREC protested SDG&E's AL 3546-E, PG&E's AL 5832-E, and SCE's AL 4217-E.

On June 17, 2020, the IOUs each replied to IREC's protest. The IOUs subsequently collaborated with IREC to resolve the protest issues and refine the proposed eight-step process for monitoring the frequency and amount of voltage excursion events.

PG&E Supplemental Advice Letter 5832-E-A

On February 2, 2021 PG&E submitted supplement AL 5932-E-A¹⁷ to its original AL 5832-E, where in PG&E proposed updates to the eight-step process to reflect the consensus achieved among the IOUs and IREC.

Disposition Letter

On February 19, 2021, the CPUC issued a disposition letter making AL 5832-E and AL 5832-E-A effective as of February 10, 2021.

This Advice Letter

Pursuant to Resolution E-5016, OP 4 requires:

The large IOUs shall each file quarterly reports via a Tier 1 information-only Advice Letter for one year starting 90 days after approval of the updated methodologies required by this Resolution.

This Tier 1 information-only advice letter is being submitted pursuant to E-5016 OP4. The IOUs requested clarification on the submission date, since it requires the IOUs additional time to compile the report after the quarterly data period ends. The IOUs were advised to submit their respective reports by the 30th day after the end of reporting period.

First Quarterly Volt-Watt Report for the Period February 19, 2021 Through May 20, 2021.

Please find the Quarterly Report as **Attachment A**.

Protests

This is an information-only advice letter submittal. Pursuant to General Order 96-B Section 6.2, PG&E is not seeking relief through this advice letter and is not subject to protest.

¹⁷ [AL 5932-E-A](#) - Supplemental: Proposed Reporting Methodology to Monitor the Frequency and Amount of Voltage Excursion Events Pursuant to Resolutions E-4898 and E-5016 – submitted February 10, 2021 and approved by a February 19, 2021 Energy Division disposition letter, making it effective February 10, 2021.

Effective Date

PG&E requests that this information-only advice submittal become effective upon date of submittal, which is June 18, 2021.

Notice

In accordance with General Order 96-B, Section IV, a copy of this advice letter is being sent electronically and via U.S. mail to parties shown on the attached list and the parties on the service lists for R.11-09-011 and R.17-07-007. Address changes to the General Order 96-B service list should be directed to PG&E at email address PGETariffs@pge.com. For changes to any other service list, please contact the Commission's Process Office at (415) 703-2021 or at Process_Office@cpuc.ca.gov. Send all electronic approvals to PGETariffs@pge.com. Advice letter filings can also be accessed electronically at: <http://www.pge.com/tariffs/>.

/S/

Sidney Bob Dietz II
Director, Regulatory Relations

Attachments

cc: Service Lists R.11-09-011 and R.17-07-007



ADVICE LETTER SUMMARY

ENERGY UTILITY



MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.: Pacific Gas and Electric Company (ID U39E)

Utility type:

- ELC GAS WATER
 PLC HEAT

Contact Person: Kimberly Loo

Phone #: (415)973-4587

E-mail: PGETariffs@pge.com

E-mail Disposition Notice to: KELM@pge.com

EXPLANATION OF UTILITY TYPE

ELC = Electric GAS = Gas WATER = Water
 PLC = Pipeline HEAT = Heat

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #: 6232-E

Tier Designation: Information-Only

Subject of AL: Information Only Volt-Watt Quarterly Report for the Period February 19, 2021 Through May 20, 2021 Pursuant to Resolution E-5016

Keywords (choose from CPUC listing): Compliance

AL Type: Monthly Quarterly Annual One-Time Other:

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #: Res. E-5016

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: No

Summarize differences between the AL and the prior withdrawn or rejected AL:

Confidential treatment requested? Yes No

If yes, specification of confidential information:

Confidential information will be made available to appropriate parties who execute a nondisclosure agreement. Name and contact information to request nondisclosure agreement/ access to confidential information:

Resolution required? Yes No

Requested effective date: 6/18/21

No. of tariff sheets: 0

Estimated system annual revenue effect (%): N/A

Estimated system average rate effect (%): N/A

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: N/A

Service affected and changes proposed¹: N/A

Pending advice letters that revise the same tariff sheets: N/A

¹Discuss in AL if more space is needed.

Protests and all other correspondence regarding this AL are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:

CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102
Email: EDTariffUnit@cpuc.ca.gov

Name: Sidney Bob Dietz II, c/o Megan Lawson
Title: Director, Regulatory Relations
Utility Name: Pacific Gas and Electric Company
Address: 77 Beale Street, Mail Code B13U
City: San Francisco, CA 94177
State: California Zip: 94177
Telephone (xxx) xxx-xxxx: (415)973-2093
Facsimile (xxx) xxx-xxxx: (415)973-3582
Email: PGETariffs@pge.com

Name:
Title:
Utility Name:
Address:
City:
State: District of Columbia Zip:
Telephone (xxx) xxx-xxxx:
Facsimile (xxx) xxx-xxxx:
Email:

Advice 6232-E
June 18, 2021

Attachment A

**First Quarterly Volt-Watt Report for the Period
February 19, 2021 Through May 20, 2021**

Volt-Watt Production Curtailment Report

Utility Name	Pacific Gas & Electric	
	Start Date	End Date
Reporting Period	02/19/2021	05/20/2021
Report Issued Date	06/19/2021	

Report Section 1:

Up to two utility events per customer excluded as described in AL-5832-E-A

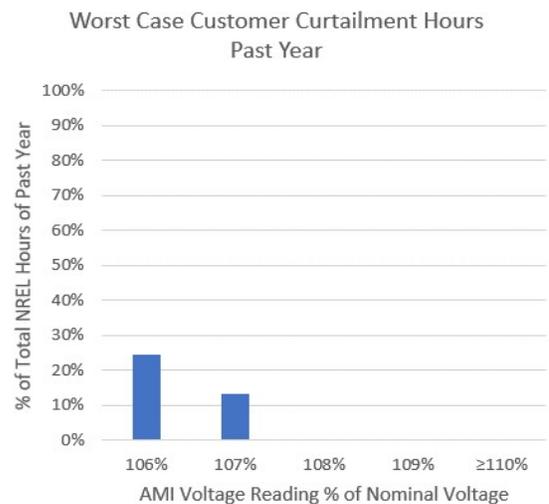
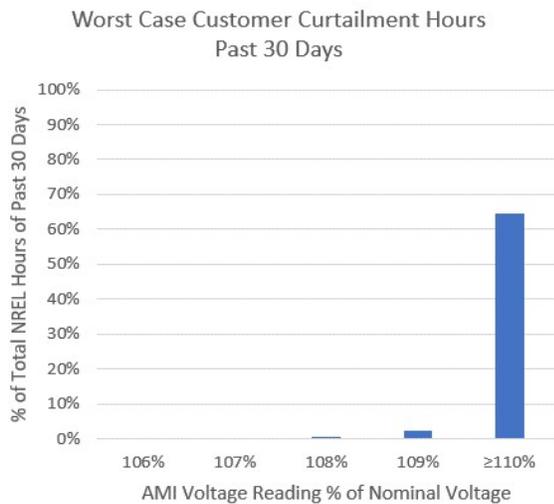
Summary Results for Utility (or Pending) Mitigations

NREL Method 1 Estimation of Curtailment %	# of Customers with 1 year Curtailment %	# of Customers with 1 month Curtailment %
≤ 2%	15	10
> 2% ≤ 4%	0	1
>4%	4	8
Total	19	19

Summary Results for Customer Issues

NREL Method 1 Estimation of Curtailment %	# of Customers with 1 year Curtailment %	# of Customers with 1 month Curtailment %
≤ 2%	16	15
> 2% ≤ 4%	2	0
>4%	0	3
Total	18	18

Worst Case Customer (>5% Curtailment) Voltage Histograms



Per Customer Curtailment Calculations and Mitigations

Customer ID	1 Year Curtailment %	1 Month Curtailment %	Mitigation
1	0.2%	0.0%	CUSTOMER ISSUE
2	3.8%	0.0%	CUSTOMER ISSUE
3	1.2%	7.4%	CUSTOMER ISSUE
4	0.0%	0.3%	CUSTOMER ISSUE
5	0.1%	0.1%	CUSTOMER ISSUE
6	0.8%	5.2%	CUSTOMER ISSUE
7	0.0%	0.1%	CUSTOMER ISSUE
8	0.8%	0.0%	CUSTOMER ISSUE
9	0.0%	0.1%	CUSTOMER ISSUE
10	0.0%	0.3%	CUSTOMER ISSUE
11	0.2%	0.0%	CUSTOMER ISSUE
12	0.4%	0.1%	CUSTOMER ISSUE

13	0.2%	0.0%	CUSTOMER ISSUE
14	0.1%	0.2%	CUSTOMER ISSUE
15	0.2%	0.4%	CUSTOMER ISSUE
16	2.1%	11.6%	CUSTOMER ISSUE
17	0.1%	0.0%	CUSTOMER ISSUE
18	0.0%	0.1%	CUSTOMER ISSUE
19	0.3%	1.0%	DIST - CHANGE SETTINGS
20	0.1%	0.0%	DIST - REPAIR EQUIPMENT
21	1.4%	8.6%	DIST - REPAIR EQUIPMENT
22	0.1%	1.4%	DIST - REPAIR EQUIPMENT
23	0.3%	0.0%	DIST - REPAIR EQUIPMENT
24	0.2%	0.0%	DIST - TREE TRIMMING
25	1.8%	2.2%	PENDING
26	0.1%	1.1%	PENDING
27	7.3%	21.3%	PENDING
28	0.4%	4.3%	SEC/SVC - REPAIR
29	1.6%	8.4%	SEC/SVC - REPAIR
30	0.1%	0.2%	SEC/SVC - REPAIR
31	0.2%	0.0%	SEC/SVC - REPAIR
32	5.8%	16.2%	SEC/SVC - REPLACE
33	0.1%	0.0%	SEC/SVC - REPLACE
34	0.4%	0.0%	SEC/SVC - REPLACE
35	0.4%	4.6%	SUB/TRANS - CHANGE SETTINGS
36	4.5%	22.1%	TX - REPLACE
37	5.8%	67.2%	TX - REPLACE

Volt-Watt Production Curtailment Report

Utility Name	Pacific Gas & Electric	
	Start Date	End Date
Reporting Period	02/19/2021	05/20/2021
Report Issued Date	06/19/2021	

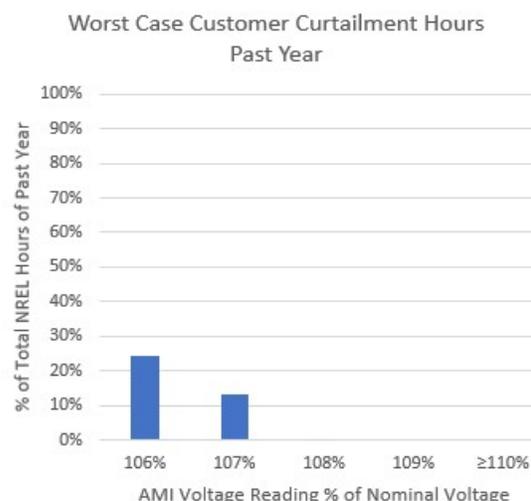
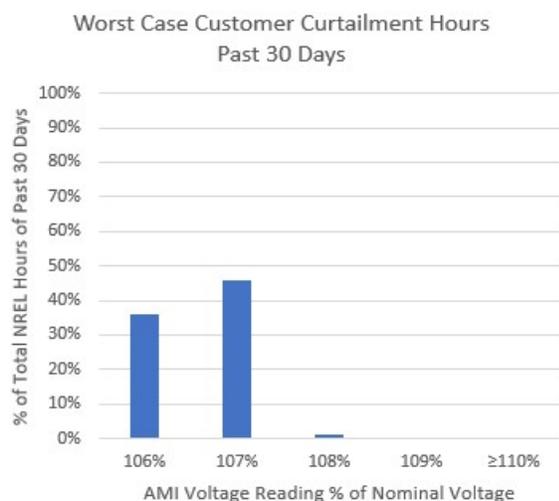
Report Section 2:

All abnormal grid configurations and operations excluded as described in AL-5832-E-A. All customer-caused issues reported in Section 1.

Summary Results for Utility (or Pending) Mitigations

NREL Method 1 Estimation of Curtailment %	# of Customers with 1 year Curtailment %	# of Customers with 1 month Curtailment %
≤ 2%	5	3
> 2% ≤ 4%	0	1
>4%	1	2
Total	6	6

Worst Case Customer (>5% Curtailment) Voltage Histograms



Per Customer Curtailment Calculations and Mitigations

Customer ID	1 Year Curtailment %	1 Month Curtailment %	Mitigation
19	0.3%	1.0%	DIST - CHANGE SETTINGS
24	0.2%	0.0%	DIST - TREE TRIMMING
25	1.8%	2.2%	PENDING
26	0.1%	1.1%	PENDING
27	7.3%	21.3%	PENDING
35	0.4%	4.6%	SUB/TRANS - CHANGE SETTINGS

**PG&E Gas and Electric
Advice Submittal List
General Order 96-B, Section IV**

AT&T
Albion Power Company

Alta Power Group, LLC
Anderson & Poole

Atlas ReFuel
BART

Barkovich & Yap, Inc.
California Cotton Ginners & Growers Assn
California Energy Commission

California Hub for Energy Efficiency
Financing

California Alternative Energy and
Advanced Transportation Financing
Authority
California Public Utilities Commission
Calpine

Cameron-Daniel, P.C.
Casner, Steve
Cenergy Power
Center for Biological Diversity

Chevron Pipeline and Power
City of Palo Alto

City of San Jose
Clean Power Research
Coast Economic Consulting
Commercial Energy
Crossborder Energy
Crown Road Energy, LLC
Davis Wright Tremaine LLP
Day Carter Murphy

Dept of General Services
Don Pickett & Associates, Inc.
Douglass & Liddell

East Bay Community Energy Ellison
Schneider & Harris LLP Energy
Management Service
Engineers and Scientists of California

GenOn Energy, Inc.
Goodin, MacBride, Squeri, Schlotz &
Ritchie

Green Power Institute
Hanna & Morton
ICF

IGS Energy
International Power Technology
Intestate Gas Services, Inc.
Kelly Group
Ken Bohn Consulting
Keyes & Fox LLP
Leviton Manufacturing Co., Inc.

Los Angeles County Integrated
Waste Management Task Force
MRW & Associates
Manatt Phelps Phillips
Marin Energy Authority
McKenzie & Associates

Modesto Irrigation District
NLine Energy, Inc.
NRG Solar

Office of Ratepayer Advocates
OnGrid Solar
Pacific Gas and Electric Company
Peninsula Clean Energy

Pioneer Community Energy

Redwood Coast Energy Authority
Regulatory & Cogeneration Service, Inc.
SCD Energy Solutions
San Diego Gas & Electric Company

SPURR
San Francisco Water Power and Sewer
Sempra Utilities

Sierra Telephone Company, Inc.
Southern California Edison Company
Southern California Gas Company
Spark Energy
Sun Light & Power
Sunshine Design
Tecogen, Inc.
TerraVerde Renewable Partners
Tiger Natural Gas, Inc.

TransCanada
Utility Cost Management
Utility Power Solutions
Water and Energy Consulting Wellhead
Electric Company
Western Manufactured Housing
Communities Association (WMA)
Yep Energy